

MEDISCOPE

Journal of Medicine & Surgery

SPECIAL NUMBER

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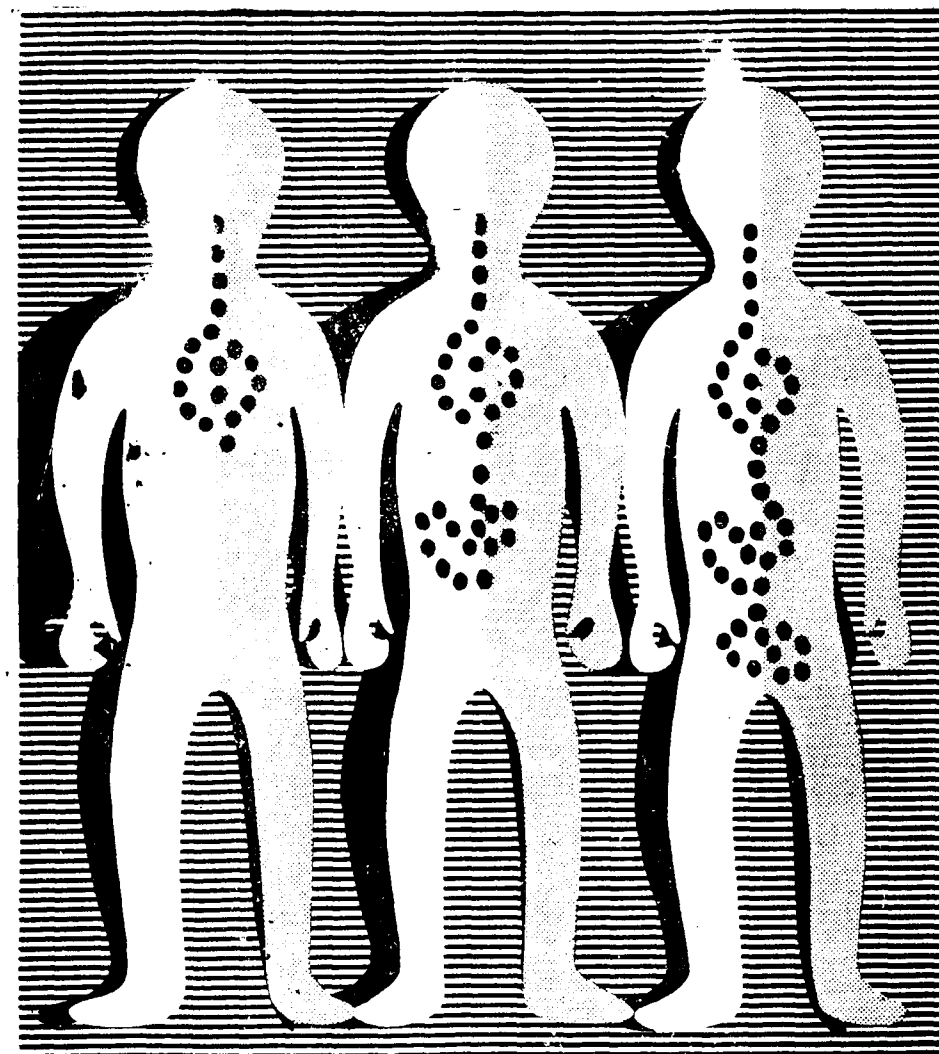
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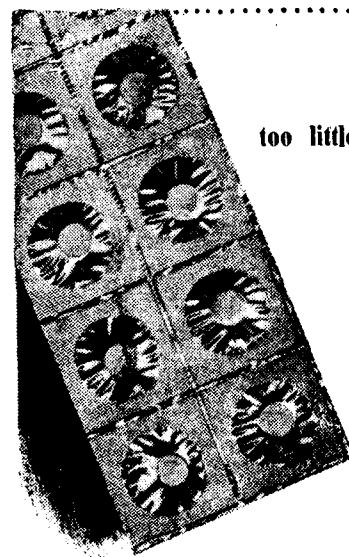
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MEDISCOPE
JOURNAL OF MEDICINE & SURGERY

★
VOLUME 2 JUNE '59 NUMBER 3

★
CONTENTS

MEDICINE IN ANCIENT INDIA Dr. K. BHASKER RAO, M.D.,	91
BONE-SETTERS—ORTHOPAEDICIANS OF SOUTH INDIA Dr. C. VYAGHRESWARUDU, M.B.,M.S., (Gen. Surg.) M.S. (Ortho.)	95
THE CANCER CELL Dr. S. KRISHNAMURTHI, M.S.,	99
MODERN TRENDS IN RADIO DIAGNOSIS Dr. A. N. K. MENON, M.B. & B.S. D.M.R., D.M.R.D. (Lond) M.S. (Min) F.C.C.P. (U.S.A.)	103
BRONCHIAL ASTHMA Dr. R. SANKARAN. L.M.P.,	110
TUBERCULOSIS OF THE KIDNEY Major P.GOVINDA RAU, M.B.B.S. F.R.C.S. F.I.C.S.	119
MODERN TRENDS IN OPHTHOLMOLOGY Dr. J. M. PAHWA, M.B.B. S. (Ph.), D.O.,Z.O. (Vienna), M. S. (Luck.)	125
NYSTATIN IN THE TREATMENT OF CANDIDA ALBICANS INFECTIONS Dr. S. RAJAGOPALAN. L.M. & S., F.D.S.,	132
ESSENTIALS FOR CLINICAL RESEARCH IN MEDICINE Dr. D. P. GUPTA, M.D. (Med.) M.D. (Pharm.) M.R.C.P.(Ed), P.M.S.I.	136
CARCINOMA OF THE FALLOPIAN TUBE Dr. N. NEMIRAJA, M.B. B.S., D.G.O. (Madras.),	142
THE CLINIGAL DIAGNOSIS OF FOETAL DEATH IN UTERO WITH SPECIAL REFERENCE TO THE VALUE OF RADIOLOGY Dr. VISHNU SARMA M.A. M.D. B. Chir. M.R.C.S. L.R.C.P. D.G.O.	144

★
BOOK SECTION

1. PLASTIC SURGERY FOR MEDICAL STUDENTS & DOCTORS Dr. R. J. MANEKSHA, F.R.C.S. (Eng.)	151
2. RETINAL DETACHMENT AND ITS MODERN TREATMENT Dr. J. M. PAHWA, M.B.B.S. D.O.,Z.O., (Vien.) M.S. (Luck.)	167

MESSAGES

Dr. S. RADHAKRISHNAN

Vice-President

India

NEW DELHI.

April 1, 1959.

I hope the special Annual Number of your MEDISCOPE will be a useful publication to the Medical profession.

(Sd.) S. RADHAKRISHNAN

—:O:—

BISNURAM MEDHI

Governor of Madras.

RAJ BHAVAN,

Guindy, Madras-22

March 26, 1959.

I send my best wishes to the "Mediscope" for its success on the occasion of the first year of service.

(Sd.) BISNURAM MEDHI

—:O:—

D. S. REDDI

Vice-Chancellor

Osmania University

HYDERABAD-7.

15th March 1959.

Please accept my congratulations on bringing out a special annual number of "Mediscope" with the new feature regarding text books for the medical students. I trust that this will serve the cause of medical education in the country.

(Sd.) D. S. REDDI

B. D. JATTI

Chief Minister

Government of Mysore

VS 8998

Balabrooie, Bangalore-1.

27th March 1959.

With pride I have noted the novel idea of publishing serially under the "Book Section" in "Mediscope" Text Books for Medical Students and Doctors for the benefit of its regular readers and with great pleasure I am sending this message in response to the Editor's request. I need hardly say that this new venture, i.e., "Book Section" is indeed very commendable. It deserves encouraging response from the students of Medicine and also from the members of the Medical profession. A noble profession as the Medical profession is rightly called, any effort made to disseminate widely knowledge about Medicine is always welcome and praiseworthy. The Science of Medicine is a Science of Life teaching man to live a healthy life—a life with a sound mind in a sound body.

I offer my hearty congratulations to the Editor on the celebration of the Anniversary of his esteemed Journal in April this year and wish success to it in its mission and to the Special Number proposed to be brought out to commemorate the occasion.

(Sd.) B. D. JATTI.

Dr. S. C. BOSE, Bsc., MB., FRCS., FRCOG.,
Professor-Director of Midwifery and Principal
Medical College
Calcutta.

CALCUTTA
25/26th March 1959.

Kindly refer to your letter dated the 9th March 1959, requesting me to send a message of good wishes in connection with the publication of a Special Annual Number of your Journal "Mediscope".

I have great pleasure in sending my best wishes for your noble idea of bringing out a Special Annual Number in which the integration of medical education and patients' care should be the avowed objective. I hope you will never lag behind in focussing attention to the important issues that will confront the profession and will always give helpful suggestions. May the Journal continue to give devoted services for the advancement of medical education and may it be illumined by the glorious morning Sun's unfaded light of progress. I am confident that you will hold up the banner in such a manner as to merit approbation from the medical world, and I convey my hearty congratulations for your pious desire.

(Sd.) S. C. BOSE

Dr. U. KRISHNA RAU, MBBS., MLA.,
Speaker of the Madras Assembly
Consulting Editor,
"Antiseptic"
Madras.

MADRAS
9th March 1959.

I have your letter dated 3rd March '59.

I am glad to hear that the 'Mediscope' will be completing its first year of service in April '59. The difficult days for an infant is the first year and now that you have successfully passed through that period, I am sure you will prosper and progress. Permit me to congratulate you on what you have done and allow me to offer you my good wishes for the future.

(Sd.) U. KRISHNA RAU

—:O:—

Dr. R. MAHADEVAN
M.S. FRCS (Eng) FRCS (Edin)
Professor of Surgery, Madras Medical College,
& Surgeon, General Hospital, Madras (Retd)
Surgical Consultant, General Hospital, Munnar

MUNNAR
(Kerala State)
22nd March 1959.

I have perused the articles published in "Mediscope". They are very good and have been written by men of experience.

The idea of completing "Text Books" in medicine by special articles written by eminent authorities is certainly a very good one. I wish the "Mediscope" all success.

(Sd.) R. MAHADEVAN

Dr. A. C. JOSHI
Vice Chancellor
Panjab (India) University

1114 Rc/Ds
Chandigarh
March 23/26 1959.

The decision of the Editor of Mediscope to start the feature "Book Section" in which text-books on medical and surgical subjects will be published serially is commendable. It should give the much-needed encouragement to the production of standard medical text books in the country and help eminent Indian physicians and surgeons to place their valuable knowledge and experience at the disposal of our medical students. I wish the new venture every success. May the MEDISCOPE grow more useful and interesting with every issue!

Sd. A. C. JOSHI

—:O:—

Dr. K. K. HEGDE, MBBS, M.L.A.,
Minister for Health
Government of Mysore

"VIDHANA SOUDHA"
Bangalore-1
28th March 1959.

I am glad that you are bringing out a Special Annual Number of your Journal. Your efforts to make available text books to students of medicine is a worthy cause and will certainly help many to own text books and also encourage eminent medical men to write books on Medicine and Surgery. I am confident that you have before you many more years of useful service in the cause of the noble profession of ours, and help to bring the profession to the standards attained by other developed countries.

(Sd.) K. K. HEGDE



VOL. II

JUNE 1959

No. III

Medicine in Ancient India

By

Dr. K. BHASKER RAO, M.D.,

Reader in Obstetrics and Gynaecology, Madras Medical College, and Obstetrician and Gynaecologist, Institute of Obstetrician and Gynaecology, Govt. Hospital for Women and Children, Madras-8.

The origin of medicine in ancient India dates back to the prehistoric era. But according to Sigerist it is comparatively more recent than Egyptian medicine. A fundamental difference between the two, however, is that ancient system of Indian medicine is still being taught and practised in some parts of our country.

Medicine in the Vedic Age :

There are some reference to physicians and their profession in both the Rig and the Atharva Vedas. From the evidence now available it is estimated that the Vedic period was between 1000 B.C. to 1500 B.C. The medicine in Rig Veda has been discussed in detail in another paper (Rao, 1958). It consisted mainly of prayers, charms and a few herbs, and was practiced almost entirely by priests or sages. Medicine as a profession was followed by some in the Rig Vedic times (R. V. IX. 112, 1-3). The Atharva Veda deals to a greater extent with the medical practice of the era. There were hundreds of medical practitioners and thousands of herbs but charms and amulets were considered superior to other forms of medicine (A.V. II 9,3), The word "bhesaja" in the Atharva Veda meant a charm or an amulet which could remove diseases or their symptoms. It is only in the later literature this term is used to denote herbs and minerals. In Rig Veda, Aswins and in the Atharva, Prajapathi and Indra form the

JUNE '59

91

gods and demigods of medicine. There were charms against fever, diarrhoea, diabetes, dropsy, against evil spirits and for easy delivery. In both the Vedas there is mention of jaundice, leprosy and tuberculosis. Water is repeatedly (R. V. I. 23, 19; x 9, 57, x. 137, 6 and A. V. I. 4, 4; I. 5; I. 6: 1.33 and VI. 24 VI. 92) praised for its medicinal qualities and was considered as panacea for all the diseases. Rig Veda (VIII 61, 17 & 68, 12) also describes Soma as "sick person's medicine". Herbs were dug by physicians and about 106 herbal preparations were known (R. V. X. 97, 1 & 4).

Origin of Ayurveda and the commentaries:

Ayurveda is considered by some as an Upaveda or a branch of the Atharvan. But there is no evidence to support this view in the Upanishads where different branches of the vedic studies are enumerated. Ayurveda is claimed to be of divine origin, from Brahma. It was handed over to men through Divodasa (or Dhanwanthari)—King of Banaras; and through Bharadwaja—a great sage of the Ramayana era. Bharadwaja taught this to Atreya (about seventh century B. C) who in turn explained it to Agnivesa, Bhela, Jatukarna, Parasara, Harita and Ksarapani. Each of these disciples wrote down the teachings in the form of easily memorable verse. The Agnivesa tantra was commented on by Caraka and it is this commentary, Caraka Samhita, that is available to us to-day. Susruta and others, however, learnt Ayurveda from Divodasa. Susruta's commentary too is now well known. Caraka was believed to have been the physician to King Kanishka (78 A. D.) and looked after a difficult delivery of the queen. His commentary has been redacted by numerous medical writers in the course of centuries chiefly, by Harichendra (4th century A. D), Jejjata (6th century), Dradhbala (8th century), who made some important additions to it, Chakrapani (11th century), Sivadasa

(15th century) and Bhavamisra (16th century). Similarly Susruta's work also has been subjected to certain revisions by Nagarjuna (? second century A.D.) Jejjata, Chakrapani, Dalhana (12th century) and Hemadri (13th century). Except for Bhela Samhita, the works of other co-students of Agnivesa are not currently available.

At first the training was of the gurukula type—apprenticeship with the teacher in his hermitage. But during the Buddhist era (500 B.C.—500 A.D.) there were residential universities which taught medicine besides other subjects. Jeevaka, physician to the Buddha, studied medicine at Taxila. Nagarjuna was another Buddhist physician. Medicine was also taught at Banaras and later at the University of Nalanda. In Mahavagga of the Vinayapitaka, (Vi-1 to 14) numerous instances are given to show that both medicine and surgery were fairly well evolved and were free from the charms and hymns of the Vedic Age. Vagbhata I, in the sixth century wrote his Astanga Sangriha which was still popular when Itsing visited India from 675-685 A.D. Two hundred years later, Vagbhata II, wrote Astangahridaya Sangriha and Madhava wrote his famous "Nidhana",

Basis of medical practice:

Originally it was thought that illness was brought about by evil spirits or due to the displeasure of the gods. But in the Vedic era, we find the dawn of the three-humoral or "Tridhatu" theory. The term "Tridhatu" is first mentioned in Rig Veda (I. 34, 6) in relation to medicine and Ayyar (1957) has explained its significance. According to the Atharva Veda (I. 12, 3) diseases were classified into 3 groups—those produced by phlegm, wind and bile. In Mahabharata too (II. 1.25; XII. 342 86-87; XII, 210. 21) the trihumoral theory of medicine has been emphasised. In Ayurvedic medicine, both of Caraka and Susruta School this theory was fully elabo-

rated. These three elements in the body when properly balanced are responsible for well being; and ill health is caused by their imbalance (Dhatuvaisamya). The aim of Ayurveda is to restore this balance by removing the excess or correcting the deficit. Just as physical health was maintained by the Tridhatu, it was suggested that mental health was due to proper balance between the three gunas—Sattva, Rajas and Tamas. In Mahabharata (XII. 16) it is said that out of the body arise mental diseases and out of the mind, the physical diseases. This shows that psycho-somatic relationship in the causation of disease was appreciated at that time. Caraka states that a physician should take care not only of bodily but mental diseases also.

Ayurveda deals with 8 sections:—

- (i) Salya or surgery
- (ii) Salakya, diseases of head
- (iii) Kayachikitsa—treatment of ordinary diseases
- (iv) Bhutavidya—demoniacal diseases,
- (v) Kumarabrtya—pediatrics
- (vi) Agadatantra—toxicology
- (vii) Rasayana: rejuvenation and
- (viii) Vajikarana, science of acquiring sexpower, virility.

Caraka Samhita deals mostly with medicine or therapeutics, Susruta's work is mostly a surgical text. In the Chikitsasthana or section dealing with treatment, he describes operations for penetrating injuries, intestinal obstruction, piles, fistula in ano, vesical calculi, stricture urethra or rectum, operative obstetrics and paracentesis abdominis. Rhinoplasty was also described by him (S.S. I. 16,27). He used knives, cauteries and about 101 types of instruments but of all yantras he stressed that the hand was the most important. Needles with vegetable fibre or hair from the tails of animals were used for suturing. (Jolly, 1951). Catheters and

dilators were used and enemata were given. As medicine, Caraka prescribed herbs, minerals, honey, clarified butter, prayers and fasts. Blood letting and cupping were also practised. Ante-natal care and management of labor is described by both Caraka and Susruta and has been described in an earlier paper (Rao, 1951).

Medical education and practice:

The practice of medicine was not the monopoly of any group of individuals Brahmins, Kshatriyas Vaisyas or Sudra, could study it for acquiring merit, wealth or for the sake of pleasure (C.S.I. 30,24). But it was essential that the boy or student should be intelligent and from a good family and about 16 years of age (S.S.I.2) Teacher too should be well versed and of a good repute. The teaching was mainly in the form of discourses—questions and answers and memorising of the sutras. Practical training was given including dissection of the deadbody, operations on dead animals and section on gourds, watermelons etc. They were also trained in logic as it was considered essential in discussing with other physicians or in arriving at a diagnosis (Das Gupta, 1932). Medical ethics were of a high order (Kutumbiah, 1958). After the training, the student was given a license or permit by the ruler before he started his practice. There is enough proof to show that quackery was as much as misancee at the time of Caraka and Susruta as it is today and attempts were being made to put it down (C.S.I. 29.11; S.S.I.3). The patient was treated with due respect and dignity. Physician, patient, medicine and nurse or attendant were considered as four pillars on which medicine is supported (S.S.I. 34). The physician too was looked upon with respect and gratitude. In early periods he got in return, a cloth, a horse or a cow (R. V.X.97,4) but in the time of the Buddha, they were paid either in kind or in cash. Jeevaka got 16,000 Kahapanas,

a man servant a maid servant and a coach of horses as his fees from his first patient. For another operation, he was rewarded with 100,000 Kahapanas (Rhys) auids and Oldenberg 1881).

Thus it may be seen that medicine in ancient India was evolved as elsewhere from initial stages of priestcraft using prayers and charms. The development in the postvedic period and even upto about 8th century A.D. was something remarkable when we compare it with what was prevailing in other countries. Subsequently: however numerous factors were responsible for its decay. The views of Susruta and Caraka whent unchallenged as Ayurveda

was claimed to be of divine origin. With advent of Buddhism, dissections were discouraged and surgery was not looked upon with favour. Probably, after the Muslim invasion, there was not the proper soil for its growth as there was no royal patronage for the indigenous system of medicine. They had their own physicians still, as pointed out earlier, some important medical writers revived with interest the medical teachings of their predecessors and a part from preserving some of these old texts added some contributions of their own, even as late as the 16th century. The history of Indian medicine is quite fascinating and deserves a more detailed atudy.

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"I have always had a presentiment that I should die young."
"Well, darling, you didn't, did you?"

★ ★ ★

"I have twelve children and I just found out that my husband doesn't love me, doctor," wailed the patient.

"Imagine if he did love you?" counselled the doctor.

★ ★ ★



SPECIAL ARTICLE

Prepared for Mediscope

By

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Bone-Setters—Orthopaedicians of South India

"Old order changes and gives place to new." That is the law of nature. That is what happens in every walk of life, and that is what is happening in the realm of orthopaedics too.

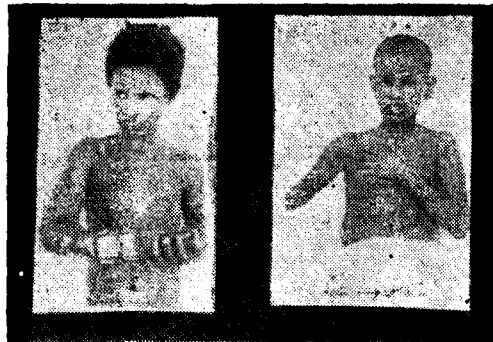
From the days of witchcraft surgery to the present day many changes have occurred. Now a Citizen of the world can get rid of an offending appendix or can get a fractured limb set under well developed anaesthesia not knowing a thing about it without being under the spell of Hypnotism as was the case in olden times.

Ever since the mankind is known to be living there must have been fractures, dislocations, and deformities and as such every practitioner of the time must have dabbled in the treatment of fractures. This art of bone setting or you may call it a craft was handed over to generations and became a family trade. These are our present day bone-setters. Just like the Barbers who were the surgeons of olden times, Bonesetters were the orthopaedicians of olden times. Even in England Bone-setters were the earliest orthopaedic surgeons. These bone setters were thriving well in the industrial area of England but were subjected to lot of harassment by the government and the modern medicine practitioners. Out of

disgust and to have protection under the law the bone-setters have sent a young man, H. O. Thomas, to the medical school for qualification who promptly qualified and became the father of modern orthopaedic surgery. His nephew Sir Robert Jones has improved, popularised and developed the speciality into its present status.

Wars are horrible in a way but are also useful in another way. Under its stress great medical discoveries have been made. Bulk of war casualties in the first world war has placed the orthopaedic surgery as one of the essential speciality and the stress of 2nd has brought to the forefront the art of orthopaedic surgery, and the importance of Rehabilitation in the treatment of the injured.

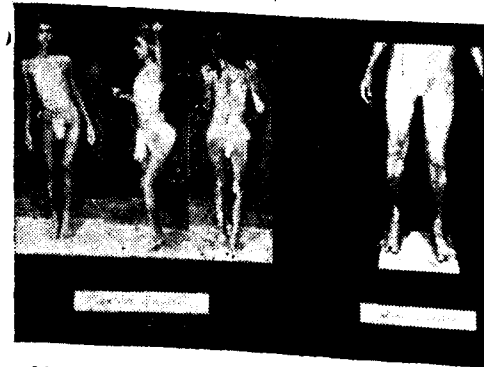
Yes, in western countries the Sun is setting for the bone-setters, but not in India. In South India some bone-setters are not new to us. They are practising this as a family trade. Their cases eternally clog our outpatient department. They had their allotted place in the medical relief of those times, but none of them have improved themselves with the



No. 1. A Boy whose forearm fracture has been treated by applying bamboo sticks bound by thread. The forearm became gangrenous and so amputation has to be done.

advancement of modern medicine. No wonder people went to them for relief as they were easily available. They have

established Clinics in various parts of the country, and also canvassed for patients in



No. 2. The Artist Depicting The Picture of The True Version of the Patient.

and around the hospitals and caught hold of few victims. I have learnt something of their methods from their victims...Alas, so called educated people were also among them. The anaesthesia if one can speak of any is by assault and the patient is fixed to the ground or table by 3 or 4 people sitting on him. Manipulation which may mean anything but most often consists of passively moving a dislocated joint or a fracture followed by severe massage locally and immobilisation by bamboo sticks and thread or a paste made up of egg albumin with few herbs. This sort of manipulative misery continues for several days which produces enough irreparable damage to the joint and the fracture and to the mind of the patient who is terrified by the thought of manipulation and runs away from it. He will later land in a hospital for further treatment where he will be told that his limb is beyond repair. Their work is not confined to bone and joint injuries. They dabble in anything from a cartilage tear to congenital talipes and have the lasting imprint of diabolical action:

It needs no effort to condemn these methods. Many such crippled people who are around with deformities such as myositis ossificans, ankylosed elbows, volkmann's ischaemic contracture, gangrene of limbs

etc., produced by their treatment should organise to fight this evil. But blind to these facts and figures, the bone-setters have obtained merit certificates from political figures, Justices of Peace, and highly placed govt. officials. Those signatories must have seen cases of supposed fractures treated by them where in no fractures ever existed or cases of sprains or contusions which would recover well with massage and gave certificate of merit without knowing the bad results. All cases of dislocations fractures were spoiled without exception and many elbows, hips were damaged beyond repair by them. The testimonials have been used for duping the lay public to continue their family trade. At one time due to the pressure of the so called patriots a bone setter was given undeserved place in a hospital, thanks to the authorities concerned he was removed later.

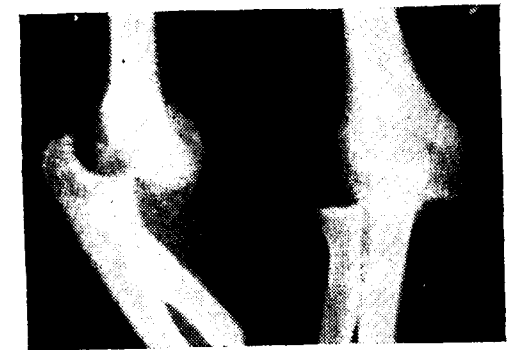
It is a long way for the development of orthopaedics in India. The earlier orthopaedic centres were started at Bombay, Calcutta, and Lucknow. In South India at Madras late Dr. M. G. Kini who was trained as orthopaedic surgeon under late Sir Robert Jones was the first man to organise the orthopaedic work. While he was at Madras and Visakhapatnam he practiced this speciality in addition to his general surgical work, and created interest in the young surgeons towards this speciality. Dr. N. S. Narasimhan was running the orthopaedic clinic in addition to his general surgical work. In spite of the need and necessity to teach orthopaedics in the Medical Colleges was felt long ago. It was only in 1949 the first Chair of professor of orthopaedics was created and the first person to occupy the post is Dr. V. R. T. Swamy the present Director of Medical Services of Madras. An attempt is being made to start orthopaedic units in every college and organise teaching of orthopaedics both to undergraduates and post graduates.

The delay in the development of this speciality as was at present in other countries



No. 3. The Photo of the patient who described the story of his treatment by the bone setter. His picture when he came and at the time of discharge.

where every town and every hospital and every university had orthopaedic surgeons is mainly due to lack of proper encouragement both by the govt. and general surgeons. The general surgeon has neither time nor interest to improve his knowledge of orthopaedics. But still he is unwilling to surrender this to specialist out of fear of losing



No. 4. The X-Ray of a patient's elbow who was treated by a bone setter showing unreduced dislocation with Myositis Ossificans. This elbow is spoiled for life.

his own importance. The General practitioner is not interested in this work as it does not pay him as much as other specialties.

The evil of bone setters must be stopped. Only way is to impress the public by show-

ing the results of modern orthopaedics. It means a number of orthopaedicians must be available. To achieve this, the young doctors after graduation must be given a compulsory training in orthopaedics for at least 3 to 6 months. Those interested in pursuing the specialty must be made to qualify for a diploma or a degree, who will be available to man the posts in the hospitals.

At the present day, modern orthopaedics has advanced to a great extent, the skilful manipulation, the replacement of part of bones by prosthesis, the fixation of fractures by screws and plates and nails, bone grafting, formation of bone banks are a few of the advances. The most important is the development of rehabilitation of the injured. Formerly a paraplegic could never walk, but now he is made to walk with the help of crutches and calipers. A fractured individual gets back to work much earlier than in olden days after physiotherapy and exercises probably much stronger than what he was. A cerebral palsied child has a

better outlook than before and is made to walk with calipers etc.

To conclude it is the duty of practitioner to warn the patients from going to bone setters and impress the public by showing the good results of modern orthopaedics, and thereby preventing permanent crippling disabilities to patients.

In these columns a few Pictures are shown depicting the following:—

A picture of a boy whose fractured forearm has been immobilised in bamboo sticks ended in gangrene which had to be amputated. A story of a boy who sustained a posterior dislocation of hip who underwent treatment under a bone setter translated into pictures after his own version. He was treated exactly in the way depicted in the picture. The dislocation was not reduced and myositis ossificans developed around the joint. The joint function was lost for ever and orthrodesis has to be done to make the hip painless. He is now able to do his work without pain though he lost the mobility of the hip.

An army colonel of 70 startled the community by marrying a beautiful girl of 18. When she presented him with a son a year later, the overjoyed colonel assembled his entire regiment, mounted the bandstand, cleared his throat, and announced: "I have called you together to tell you that my wife gave birth to a fine baby boy. Gentlemen, I thank you!"

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Duncan spotted Jock, dressed to the kilt, in the Glasgow railway station and asked him where he was going.

"Edinburgh," replied Jock. "It's my honeymoon."

"And where's the Lucky bride?"

"I'm not taking her", said Jock; "she's been there before."

★ ★ ★

"I'd just like to know how many girls you made love to before you met me," shouted a young wife during a quarrel.

"Twelve," groaned her husband; "but I forgot to count until it was too late."

★ ★ ★

SPECIAL ARTICLE

Prepared for Mediscope

By

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The Cancer Cell

Human life, as you all must know, starts in a single cell, the fertilised ovum. The dominant property of the fertilised ovum of which we know is its great potentiality for multiplying itself. The ovum divides and divides again till from the single cell billions and billions of cells are born. These daughter cells arrange themselves after a time into individual groups and organise to form the different organs of the body, subserving special functions. After a particular period growth stops except when called forth again under special circumstances. The power of growth in these cells seems to be in inverse proportion to the degree of their specialisation, the more differentiated cells being feebler in their ability to grow and regenerate. Thus after a fixed interval from the time of fertilisation the normal human adult is evolved from a single cell. All overt growth then ceases. But the power of growth is latent in most cells, to a greater or lesser degree. This growth potential asserts itself normally in the process of tissue repair.

The parental ovum to the present extent of our knowledge, possesses only growth potential. It has no functional potential. It divides and multiplies to a set pattern, at a present speed, keeping to a fixed schedule, the rate of growth slowing down progressively as the daughter cells begin to differentiate more and more and finally coming to a stop when the purpose of growth is consummated in the normal human adult.

In one individual is seen, however, a quiescent cell or group of cells resumes the growth activity of the embryonic cells. The cells grow and multiply at variable speeds. In the vast majority of cases, these cells are functionless and possess no activity other than interminable growth. These cells seem to be endowed with greater vitality than the normal cells, for they overwhelm and destroy the latter. These proliferating cells seem to possess the peculiar power of infiltrating between normal cells along tissue spaces, reaching out long relentless malignant fingers into an ever-widening circle of invasion. Sooner or later the extending columns of invasion reach the lymph spaces and so the lymph nodes, or penetrate the vascular channels to disseminate all over the body. Ultimately almost every organ in the body may be riddled with these uncontrolled, proliferating islands of malignant tissue. This is cancer.

The first biological question in a Cancer cell is, "Is Cancer just an abnormal change supervening on a previously normal cell or was the cell abnormal at its very nativity?" This question has been argued back and forth for over a century but has failed, as all arguments, to be either conclusive or to conclude.

Our studies at the Cancer Institute, of malignant tissue, suggests that both origins are possible. We have found frequently in oral cancers, at distances of a fraction of a millimeter from a growth, a gradual and progressive transition from normal epithelium, through thickened but non-malignant epithelium, through cellular but non-invasive malignancy to invasive established Cancer. Quite often too, in stratified squamous epithelia we have found malignant tendencies which could be reversed and returned to quiescence by removing the carcinogenic factor. All these seem to indicate that in squamous cell carcinomata at least. Malignancy is an induced change.

In certain embryonic tumours, however, no such inducing factor is apparent and one has to seek refuge in the proposition that malignancy in the parent cells was inborn.

Cancer, can therefore, be classified for the purposes of this paper as (i) Spontaneous cancers and (ii) Induced Cancers.

What is the basis of one and the other:--

In spontaneous cancer, I will say it is either Heredity or Accident. I cannot say more nor can I be more precise, because beyond these broad statements we are all very much in the dark. Fortunately for us these spontaneous, uncontrollable and fatal Cancers are few and far between.

Induced cancers constitute 85%—90% of the total human incidence. The inducing factors are many and varied—protracted tobacco chewing; dental sepsis; chronic cervicitis; exposures to chemical carcinogens like shell shale oil, petroleum products; soot; exposure to the actinic rays of the sun; prolonged exposure to excessive heat as in the lamp industry and the kang; indiscriminate exposure to radiations and radioactive dust; Hormonal perversions or excess consumption of carcinogenic chemicals like arsenic and the colouring matter of butter.

It will be interesting to know at what point in the cellular constitution the carcinogenic factor acts. Cytologically I am convinced that the essential transition to Malignancy is effected in the nucleus. As you trace the progress to malignancy through the various cell changes the cytoplasmic alteration is negligible while the nuclear metamorphosis is striking. What exactly happens within the nucleus is far from clear, though ideas and theories keep running through our minds. Is it a disturbance of the enzyme systems or other chemical chains? Is it a modification of cell respiration? Is it a chromosomal mutation? or is it a combination of all

these, or none of these at all and something else? One does not know as yet.

But whatever the theories, the nuclear change is there for all to see. There is a gradual increase in the overall size of the cell, but the increase in size of the nucleus is disproportionately great. The nucleus appears to swell out, becomes more translucent giving the appearance of vesiculation and in the transmitted light of microscopy shimmers, as I always say, like onevil moonstone. The chromatin condenses into two, or more often three masses, which take the Haematoxylin stain deeply. These chromatin masses tend to take a peripheral position within the nucleus. The cytoplasm also shows a vacuolation sometimes.

The cell as a whole gradually begins to lose its original shape and its anchorage. It assumes a variety of forms, which is possibly decided by the congestion or the tensions of its environment, and gradually the ordered arrangement of cells in the tissue disappears yielding place to such a disarray and perversion that has earned it the well merited epithet of the "Cellular badlam."

The reaction of the tumour bed is non-specific. It responds as it does to a foreign invader. It pours in an exudate of serum and cells, it erects a fibroblastic granulation barricade which however proven and effective against the bacteriological invader, are helpless and of little avail against the disrupting traitor from within.

Thus transformation of an ordinary cell into a malignant one is never a dramatic coup. It takes place over an extended period of years. Till quite late it is reversible. The recognition of the process in its reversible phases clinically or cytologically—will be our greatest achievement. We have indeed done quite well along this line during the last decade and I have no doubt that we will do better still.

But once the irreversible stage is reached the Cancer will progress relentlessly and the cells will continue to multiply and destroy even if the carcinogenic factor is withdrawn. The only means of staying the carcinous Process at this stage is either by surgical removal or by radiational sterilisation.

Surgical removal does not need any explanation for it is the crude extirpation of the malignant tissue bearing organ.

The action of radiation is far more subtle and interesting. The biological change in the Cancer cell, whatever the form of the applied radiation, is the same, the difference arising only inside reactions.

The effectiveness of radiation lies in the differential susceptibility of the cancer cell and the normal cell. The greater the difference the more effective is the radiation likely to be in curing the cancer.

The mechanism of the action of radiation is still not very clear. What I am clear about from my studies is that the main site of action of the radiation is the nucleus. Whether the action is an interference with cell respiration, or cell nutrition or nucleic acid synthesis or the ionisation of water or genesis of cytolytic chemicals, I cannot say. But I can definitely say that the first and foremost effect of radiation is on the malignant nucleus. The angry and menacing nucleus subsides into a quiescent one, the chromatin masses condense and conglomerate and the nucleus fragments or just quietly fades away. There is also an increase in cytoplasmic granularity and there is a definite cytoplasmic edema suggesting an increase in intracellular osmotic pressure. Finally all one sees is an empty space devoid of nucleus or cytoplasm or a structureless coagulated mass containing a few ghost nuclei, or just inflammatory tissue without a trace of a malignant cell.

There is one other change that sometime happens. The Malignant cells do not

degenerate but undergo a reverse mutation into the normal adult cell of the species. This process is called differentiation.

Apart from its action on the cancer cell itself radiation has also an action on the tumour bed. It has an obliterative action on the blood channels resulting in a gradual shutting off of the nutrient pathways. It also sets up a violent local inflammation and the exudate that pours in contributes its own destructive share of cytolysis and phagocytosis. There is also a fibroblastic reaction which probably raises a barrier to further malignant invasion.

There is no doubt that radiation brings out a local tissue defence against the malignant process to reinforce its own intrinsic lethal power, for it requires a radiation dose six to ten times as great to kill a cancer cell in a culture as in the human organism.

Again in a previously irradiated field a cancer implant never takes.

But please do not go away with the impression that radiation is an universal weapon against cancer. Radiation may be effective against some species of cancer and ineffective against others, there may be a marked difference in the response to radiation between individual tumours of the same species. A discussion of these vagaries may take us too far out into a field which may not interest you.

I have tried to explain the cancer cell to you as I understand it. But our understanding of its mysteries is so poor that the cancer cell remains still to all of us an enigma. And I cannot escape the feeling as I turn away after a most successful irradiation, or a most radical surgical extirpation or a most minute cytological study, that the Cancer Cell is laughing quietly at my back.

In the heat of a courtroom battle, one lawyer yelled at the opposing counsel to go to Hell. Opposing counsel was naturally incensed and turned to the judge with his grievance.

The judge rapped his gravel and announced he would retire to his chambers to deliberate on the course to be taken. About 15 minutes later the judge reappeared on the bench, his face wreathed in smiles. Beckoning to the offended lawyer, he said: "Mr. Johnson, I've just looked up the law and you don't have to go there."

★ ★ ★

"It's a boy!" the nurse reported to the expectant father in the waiting room.

"Thanks for telling me," said the man, unmoved, as he returned to his reading.

The nurse had witnessed all kinds of paternal reactions, but none like this. "You don't seem to be very happy about it," she retorted sharply, "Aren't you going to ask how your wife is?"

"Na," said the father. "Matter of fact, we haven't spoken to each other in almost three years,"

"Three years! But...I mean...what about the baby?"

"Oh," he reassured her, "we never got *that* mad."

★ ★ ★



SPECIAL ARTICLE

Prepared for Mediscope

By

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Modern Trends in Radio Diagnosis

The progress of Radio Diagnosis in the past decade has been so rapid and far reaching that it is difficult in the course of a single article even to briefly mention the recent advances in this speciality. After briefly outlining the notable advances in the apparatus construction, newer contrast media and radiological protection devices, I shall dwell for a short while on the recent progress in the radiological technique and interpretation of each of the human anatomic and physiological systems.

There has been greater collaboration, national as well international in scientific development with greatly improved teamwork between Radiologist, x-ray Engineers and Physicists. "The general principles of design in apparatus during recent years are partly a fulfilment of the just demands of Radiologists to simplify their work, and give improved protection against radiation and to obtain better function of their apparatus and also the incorporation of new development in electronics and adjacent technical fields (George Schonander et, al—"Design in Radiological Apparatus"). Special interest has been bestowed to the use of kilovoltages higher than 100 K. V. in diagnostic radiology so as to obtain shorter exposure times as well as increased diagnostic possibilities when used in conjunction with newer radio opaque solutions. Latest devices in serial radiography and cine radiography have commendably increased the interest in studying the dynamics of human organs in health as well as in disease.

Apparatus construction.

Motor driven tilting table has during the recent years undergone various improvements. Counter weight have been substituted by counter balancing spring systems which facilitates the examining work.

In some of the newest types even motors are being used for moving of the fluorescent screens as well as for cassette carriage. Besides, this carriage can be slid down to off side of the table when not required. Some tables may be tilted to any position between vertical and 45 degrees Trendelenberg by means of special double pivoting system.

Spot films devices.

The serial changers used in connection with motor driven tilting table have also been improved recently. Most important feature of the devices which facilitate gastrointestinal examination is that all movements are mechanically operated by compressed air or servo motors and released by means of push buttons. The operator not being disturbed by manual handling of the apparatus can devote his full attention to examining work.

Serial radiography.

In order to study the rapid processes within the entire human organism, manufacturers have introduced a series of different apparatuses for serial radiography. Two basic principles are used for apparatuses of this type.

1. In direct method of operating with miniature film using different types of optical cameras and by recording fluoroscopic image only in one plane. These originate from the experiments of Jancker. This produces a quick sequence of pictures and can be extended to a speed suitable for Cine-radiography. Loss of definition and detail due to small size of the film and the relatively large radiation dose makes it unsuitable for such important examinations as angiocardiology.

2. The direct method has the advantage of full size pictures of usual radiographic quality. In machines using cassettes or roll films picture sequence is limited to 2 pairs of cassettes per second, often at right angles to each other. In types using films placed in frames as in the film changer designed by Axen, can run at a speed up to 6 pairs per second. This is generally used in angiocardiology where there is also a device for simultaneously recording the electrocardiogram.

Wegelius and Lind have designed an apparatus specially designed for the scientific examination of children with special card board cassettes of 18"/24" has a maximum exposure velocity of 12 pairs of radiographs per second.

Body section radiography. When an ordinary radiograph fails to reveal the presence or extent of lesions due to obscuring by supervening structures especially in chest, skull and larynx, body section radiography has to be resorted to. The one most used up to now is a longitudinal body section radiography.

The Universal Planigraph (Siemens Reinger Work).

First shown in London exhibition in 1950 during the VI international congress of Radiology, enables to take body section radiographs of patients in any angle or position. Recent advances have resulted in the development of an apparatus known as stratiograph in which body section radiography can be taken in oblique and transverse layers of the patients. Basic principle of this apparatus is developed by Vallabona. Patient and film are in this case synchronously rotated while the tube is placed in a fixed position in such a way that the central x-ray beam strikes the patient at the point where the layer radiograph is wanted. The adjustment is made exact by an optical device. I have seen such an apparatus working in the diagnostic depart-

ment of the University of Minnesota Hospital at Minneapolis, U.S.A. But interpretation of transverse section laminography requires expert anatomical knowledge.

A number of body section radiographs can be produced simultaneously (usually 5) with one exposure by using a special apparatus called, "simultaneous multisection tomograph" which is a modification of longitudinal planigraph by using high speed x-ray emulsion and higher kilovoltages in conjunction with higher ratio secondary grid. This reduces the total x-ray dose in this investigation to less than half of the usual dose.

Mass radiography units.

Photofluorographic mass examination has greatly developed as the most reliable means of detecting tuberculosis. The invention of Schmidt Camera as a substitute for ordinary lens system involves the use of minor generators since the camera has the luminosity of 8 times that of best lens system. In the latest apparatus the patient is completely enclosed in a protecting lead cabinet during exposures so that the radiation safeguard problem is attended to.

Tubes and generators. Rotating anode tubes have become a standard part in all powerful x-ray units. By increasing the size of insert tube and the rotating discs of solid tungsten, a new type of providing a heat dissipation rate 85% in excess of previous tubes is attained and with better vacuum and internal insulation it was possible to increase 100 to 125—130 KVP without noticeable augmentation of inherent filtration. Philips Eindhoven has brought out a double focus rotating anode tube with one focus as small as 0.3×0.3 mms, the other focus being of ordinary size. In 1951 at a German Exhibition Siemens showed the x-ray diagnostic apparatus for 150 KVP fitted with a tube of the triode type.

X-ray generators. Small and automatic x-ray generators are invented due to impro-

vement in insulation technique with high tension cables, insulated with plastic and of half the diameter of previous rubber cables. In supervoltage machines where a large volume of insulation is required, oil has been exchanged for suitable gases at high pressures. Gas sulphur hexafluoride (SF₆) has been introduced by General Electric. A 125 KVP, 1000 m. a. 4 valve generator is manufactured by name Schonader D I K. 1000.

Photo timers: This measures the intensity of x-ray beam after passage of the object and determine the suitable radiographic exposure time. In the latest type by Siemens in Iontomat x-ray intensity is directly measured by a large flat ionisation chamber instead of indirectly via visible light by the phototimer.

Electro kymography, is a new method of recording the movements of the heart and great vessels, made possible by the invention of electron multiplier phototube. It places the radiological analysis of cardiovascular pulsations on a sound physical basis due to accurate timing and recording. During fluoroscopy, a narrow beam of x-rays is directed on to a section of the heart border. A pick up unit, sensitive to x-rays containing a photo tube is placed between the patient and the fluorescent screen. Photo tube is shielded with lead with the exception of the slit and the tube is placed in the x-ray beam so that the slit scans the heart border.

Variations in the photo tube current is obtained due to the movement of the heart shadow in the slit and this current is recorded graphically after amplification and filtering. The record is called electrokymograph.

Image amplification. Full attention has to be paid to the x-ray after passage through the patient and the chief inventions made in the x-ray field in recent years concern the amplification of the image. Amplifi-

cation by a factor 100 to 1000 direct in the flurosecent screens is theoretically impossible and the only way left is an injection of energy from an external source. This is accomplished by electronic means in the x-ray image amplifier tube invented by Westinghouse research laboratory and is called fluricon. The amplifier represents a brightness gain of 150. Various television systems specially adopted for reproduction of flurosecent image is used in U.S.A. in order to increase the fluroscopic brightness. Image amplification and pulsed x-radiation will play a great role in future evolution.

Contrast Media. Great advance have been made in manufacturing newer and better contrast media. In gastrointestina investigations new fine colloidal barium suspensions as microbarium, citu barium. Alu Bar have considerably fecilitated the study of mucosal patterns since they promote an even coating of barium in the gastro intestinal mucosa. Recently Marks have reported very good results with methyl cellulose as the colloidal agent in $2\frac{1}{2}$ per cent strength by weight to barium sulphate in colonic studies with barium enema. Carboxyl methyl cellulose $1\frac{1}{2}$ to $2\frac{1}{2}$ percent strength by weight with barium sulphate keeps ($\frac{1}{2}$ gm to 100 cc of enema fluid) Ba sulphate well maintained in suspension and does not produce any spasm or bowel irritation in the bowels. An addition of 0.5 gm of tannic acid per 100 cc of barium suspension is of greater advantage since the mixture is sufficiently irritative to stimulate contraction of the whole colon and give a good after evacuation radiograph. It is astringent and inhibits secretion of mucous as well as adds viscosity to the fluid, promoting adhearance of barium to the bowel wall. In the field of cardiovascular system, iodoxyl and diodone groups of intravenous contrast media have been successfully used for considerable time. Newer contrast media as pyelosil, urografen, diaginol etc. are available in 35%, 50%, 60% and 76% concentra-

tion. 36 percent solutions are used in peripheral angiography, 50 and 60% for urography and 76 percent for angiocardiology and aortography. These contrast media give excellent contrast and detail and is non toxic and non irritating and have been successfully used in the radiology department of Stanley Hospital without any untoward incidents.

For Bronchography aqueous and oily dianosil is the newest addition which gives gratifying results.

For carotid and vertebral angiography 35 percent diodone or diodrast is quite efficient.

For Mylography, Myodil is the newest contrast medium used. We have also used myodil for ventriculography in the diagnosis of suspected posterio fossa and midline tumours with very good results. For uterosalpinography aqueous contrasts media as undografin are available by using which peritonal spill takes place immediately and need not wait for 24 hours, as when oily contrast media are used. In the field of chole cystography and for the diagnosis of the diseases of the hepatobiliary system intravenous contrast medium, biligrafin represents a distinct step forward to obtain a complete radiological visualisation of the extra hepatic and large intrahepatic biliary ducts without resorting to operative techniques.

It visualises not only the gall bladder but also cystic and biliary ducts and the intravenous method makes this investigation independent of absorption conditions of gastrointestinal tract.

Protection in Radio Diagnosis. Protection against ionising radiations has received a great deal of attention in the last few years especially after the recent publication of the reports on this problem by the American, British and International Commission on radiological protection. Recent developments in nuclear physics and radio active

fall out have focussed this important problem. The tolerance dose has been reduced to 300 milli Roentgens (0.3 Roentgen) per week. The international recommendations specially stress that every effort should be made to reduce the exposures to all types of ionising radiations to the lowest possible level since certain radiation effects are irreversible and accumulative. The problem of protection in diagnostic radiology fall into 2 classes (1) protection of Radiologist himself and his technical staff (2) protection of the patient. One of the main changes in outlook with respect to radiation is the genetic effects of radiation to the whole community. In India where the percentage of population which undergo x-ray examination is very small, this effect on communities is no problem at present. Radiographic pelvimetry and x-ray cinematography must be resorted to only when absolutely necessary and radiological examination of the pelvis in pregnant women in the first trimester of pregnancy discouraged. An integration dosimeter should be attached to screening units to record the doses received during screening. Surgical and orthopaedic manipulations should not be done under screening. An extra filter of 1 m.m. aluminium to the tube reduces the surface dose by more than 50%. A weekly monitoring service by making use of small photograph films as instituted by the atomic energy commission in radiological institutions and a haemalological exams at 3 monthly intervals will warn the x-ray works whenever they get overdoses, besides recording the radiations that they have received. If proper precautions are taken and standard well protected x-ray units are installed, one need not get worried or panicky about radiation hazards and protection problems.

Advances in the Radiological technique and interpretation.

Cardiovascular system. A simple method of diagnosis of congenital cardiac abnor-

malities based upon the study of pulmonary vasculature in plain radiographs have been evolved by the Minnesota School of Radiologists in U.S.A. According to them congenital cardiac abnormalities are classified by a study of plain radiographs as increased, normal or decreased pulmonary vasculature and by a planned examination about 70 to 75% of these diseases can be diagnosed.

Synchronous radiography in 2 planes as invented by Wegelius and Lind enables a diagnostic evaluation of the heart dynamics by angiocardiology as well as a three dimensional interpretation.

In selective angiocardiology, the patient is examined in a supine position and the contrast media is injected through a catheter with the aid of a pressure apparatus. A 70% solution is used, 1 to 1.2 cc per kgm body weight. Pictures are taken in at least 2 planes at right angles to each other the position preferred being purely frontal and lateral. The catheter is placed in different positions, depending upon the problem to be solved and the area to be visualised. Electrocardiograms should be taken during examination. Entire intra thorasic circulation, right auricle, uncomplicated atrial septal defect as well as one with other cardiac deformities, right ventricle, isolated pulmonary stenosis, tetralogy of fallot, truncus arteriosus, Eisemenger's complex, Arterio venous aneurysm can be carefully diagnosed by selective angiocardiology.

Thorasic aortography is a method of special investigation evolved recently. The ones most commonly used are retrograde injections through the carotid artery and the injection through a catheter introduced into the aorta through a peripheral artery, generally the right radial artery.

Done correctly, it is attended by less risk than an angiocardiology. When the injection is made, the tip of the catheter must be in the middle of the ascending

aorta. Coarctation of the aorta, patent ductus arteriosus and aortic aneurysm are the condition in which precision diagnosis can be made by this special investigation. By a modification of this technique, *coronary arteriography* has been done in U. S. A. by Drs. Dotter and Frische.

Lungs. As stated previously, recent innovations in the *mass miniature radiography units* marks this examination as the most reliable means of uncovering tuberculosis.

Multisection radiography has been increasingly used in the diagnosis of Bronchogenic tumours and cavities, without the risk of overdosage which was a drawback in previous tomographic apparatus.

Electronic intensification of fluoroscopic image gives the following advantages in the study of cardiovascular and lungs investigation.

Size of field is 12 cm in diameter.

1. Examination can be done with ordinary room illumination with resultant greater visual acuity. 2. Due to low radiation intensity fluoroscopic time can be prolonged without danger to patient or radiologist making long examination necessary in procedures like cardiac catheterisation. (3) No dark accommodation is necessary. (4) photography can be made of screen image (5) fine details of tissue alteration can be seen.

Microradiography makes it possible for the production of images about 4 times the normal size. In pulmonary microarteriography, radiopaque contrast media is injected through a cardiac catheter wedged in a small pulmonary artery, outlines the pulmonary vascular pattern. This pattern is compared with the histology and haemodynamics with congenital heart disease. In emphysema also micro radiography is useful.

Gastro intestinal system. Movements of the small intestine has been more fully

investigated and the variations in the pattern picture of small intestines due to the physical properties of the opaque medium employed in the examination. Dr. Ross Golden has done monumental work in this direction. Over penetration or heavy penetration technique using 30 per cent by volume Barium sulphate suspension have been recommended by Gracia, Rigler and Gianturco in the study of colon. Forty ma, 110 KV, 40 inches target film distance, and 16:1 ratio grid have been recommended.

Frimann—Dahl in Sweden has done considerable work in the radiology of acute abdominal diseases by a closer examination of plain films of abdomen with special reference to gas shadows. Patients should have no water enema prior to the examination. Films are usually taken in at least 3 positions namely supine, upright and left lateral recumbent with movable grid if possible in all positions. In acute abdominal condition especially in obstruction, this method of examination gives rich dividends.

Urogenital system. Aortography is playing an important part in radiological renal diagnosis. Sedinger has developed this method. After percutaneous puncture of one femoral artery a catheter is introduced of the same dimension as the needle via, the artery into abdominal aorta. Thus the level of the contrast injection can be chosen carefully. This gives information not obtainable by other nonsurgical means. It demonstrates the degree and speed of filling of renal arteries. Renal tumours or cysts if they have grown to sufficient size, deform the renal pelvis and often displace blood vessels characteristically, and displaying in vascular tumours large abnormal vessels. Avascular areas due to cysts or tuberculosis can be demonstrated. Peri-renal insufflation with air or oxygen combined with excretion urography has its application in the diagnosis of adrenal tumours.

Soft tissue radiography.

Soft tissue radiography of the muscles, skin and subcutaneous tissue has been developed in the study of both normal and pathological conditions depending upon the distribution of the radiolucent interstitial fat normally or abnormally. Edema, Pseudohypertrophy, fatty degeneration of muscles, benign tumours as myofibromas, and sequelae following poliomyelitis have been diagnosed. No specialised equipment is required. An ordinary rotating anode tube with focal spot of about 2 x 2 mm, double intensifying screens and standard film alone are required. In the Albert Einstein Medical Centre Philadelphia, Groshom Cohenetal made 4500 radiographic breast studies and evolved a method of soft tissue roentgenography of the breast in the detection of occult lesions as an aid between benign and malignant lesions prior to surgical intervention.

Neuro Radiology. Methods of contrast radiography are two fold in neuroradiology. One method aims at visualising cavities inside the brain and subarachnoid space (ventriculography and pneumocephalography) while the other aims at showing up the blood vessels in the brain (cerebral angiography). Myodil has been used in the place of air to localise and diagnose mid line and posterior fossa tumours. Myodil ventriculography is the recent advance in neuro-radiology in the diagnosis of mid line and posterior fossa lesions.

Arthrography. The visualisation of the size and form of joint cavities has been achieved by arthrography using either positive or negative contrast. Negative contrast is obtained either by a process known as vacuatisation or by direct injection into the joint of 100-120 cc of sterilized air or oxygen. Positive contrast calls for the use of a medium which is freely miscible, which is relatively non

irritant and is capable of absorption. Lindblom recommends of aqueous iodine compounds as ureselactan or perabrodil 35% which is nearly absorbed in one hour. Arthrography has been used with success in most joints of the body but its greatest application has been in the knee joint.

In the field of obstetrics and gynecology recent advances has been made in the direct or indirect placentography to detect the site of the placenta in the uterine cavity. This is particularly useful in cases of suspected placenta previa. Goal of perfection is almost reached in pelvimetry and cephalometry.

At the Roentgen Diagnostic department of University Clinics in Lund in Sweden, hystero-graphy with water soluble contrast media has been done by Dr Olaf Norman in the investigation of cancer of the uterus with a fair amount of success in the detection of tumours malignant and non malignant.

Lastly coming to the diagnostic uses of radioactive isotopes, Radiography with Thulium-170, and Xenon 133 has been investigated W. V. Maynard and H. J. D. Ireland at the Royal Cancer Hospital London. Main difficulty in general clinical application is still the comparatively long exposure times required.

Low energy Isotope radiography will be most useful in cases in which portability and freedom from supply mains are major factors. But this is still in the experimental stage but with a great future promise.

Thus I have attempted to give a bird's eye view of some of the modern trends in Radio Diagnosis in the course of this short article, a task which is almost impossible, since recent advances have been so vast and rapid. I am thankful to the authorities of MEDISCOPE for asking me to write this article.

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SPECIAL ARTICLE

Prepared for Mediscope

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Bronchial Asthma

Introduction: Ordinarily Asthma is reckoned with Bronchial Asthma especially by the lay people, which is not scientifically correct.

Literally, interpreted, in Greek "Asthma" mean "Panting" or "Audible" and Hard Breathing"

Asthma may be Bronchial or Cardiac, for which pathology and symptoms are quite different so also the treatment. Some of the drugs that are indicated in Bronchial Asthma are contra-indicated in Cardiac Asthma and vice-versa. If the proper diagnosis is not made and the treatment of the one is given for the other, it may end in fatality. As I am going to deal with Bronchial Asthma only in this article, I have purposely given the heading as such.

Bronchial Asthma is one of the most distressing and pertinacious respiratory diseases for which treatment is sought for in all seasons of the year and at all parts of the day. Though it is not serious as the Cardiac Asthma, it can nevertheless be incapacitating. It equally affects both males and females of all ages. An acute attack with difficult and laboured breathing with ineffective harassing cough frightens the patient and the others in the house when the doctor is called for.

Aetiology: Its aetiology is as indefinite as its treatment. Hence a good lot of patience, sympathetic understanding and perseverance is demanded of the medical men to determine the exact cause for the disease with reference to each individual case. The co-operation of the patient is also as much important. Different theories are propounded for the cause of the disease. The generally accepted causes are as follows:

It is caused by:

- (1) Allergens which may be intrinsic, or extrinsic or both.
- (2) Allergic familial tendency.
- (3) Psychic and nervous causes.
- (4) Certain Physical deformities.
- (5) Certain Endocrine disturbances.

The Russian Pavlov Physiological School Clinicians and Physiologists view the cause of this disease on the basis of the reflex theory of the Cortico Visceral Conception. Hence in the Internal Diseases Clinics of Russia they adopt the following method of treatment. First, they treat for any infection that may be present when the patient comes under observation by Antibiotics, Antipyretics, sedatives and anti-allergents, according to the condition and then do tissue grafting—the tissues of either the Adrenal glands, Placenta or the other organs, taken from young healthy animals.

Whatever the cause may be, Bronchial Asthma is specifically applied to the condition of paroxysmal dyspnoea caused by the spasmodic constriction of the bronchial muscle, obstructing the bronchial tubes and the bronchioles, by a tenacious and gelatinous secretion due to the hyperaemic swelling of the mucous membrane of those parts. This condition may be seen in all ages. Generally when the condition develops in the adults, there is always a previous history of Bronchitis, Throat infections, Tonsillitis, Adenoids, Influenza, Whooping Cough and or Diphtheria in the childhood; menopause, psychic and nervous factors, change of climatic conditions, constitutional deformities may also be one of the factors responsible.

In the case of children, Influenza, Bronchitis, Whooping-cough Diphtheria, recurrent cough and cold, Tonsillitis and Adenoids are mainly responsible.

Now let us consider one by one the various causes that are responsible for the diseases.

1. Allergy and Allergens: According to von Pirquet, a state of altered reaction occurs in certain individuals when protein and protein like substances called Allergens are absorbed and circulate in the system. This reaction is known as Allergy. Hypersensitiveness also means the same thing. Idiosyncrasy though has a slightly different meaning, practically it means more or less the same.

The allergens are of two categories namely (a) Specific and (b) Non-specific. Specific Allergens are of two varieties (i) Extrinsic and (ii) Intrinsic.

Extrinsic Allergens are generally absorbed in the system by one of the following ways:

- (1) Inhalation (2) Ingestion (3) Infection (4) Injection and (5) Contact.

(1) **Inhalation:** Among the most frequent causes, especially in the adults the extrinsic allergens are from the pollens of plants, grass, trees, corns, spores and mould in the house dust, dandruff of the domestic and pet animals such as dogs, cats, horses, cattle and birds like parrot pigeon, etc.

(2) **Ingestion:** Certain articles of food and vegetables, chemicals and drugs which may vary from individual to individual when taken by mouth.

(3) **Infection:** Infection of the teeth, mouth, tonsils, throat, the upper respiratory tract, various sinuses, lungs, Influenza Diphtheria, Staphylo and Streptococci and Intestinal Helmentiasis.

(4) **Injection:** Drug by infections, insect bites, stings, scratches.

(5) **Contact:** Certain articles, chemicals, drugs, dyes etc.

In the above extrinsic factors the occupational allergy and seasonal allergy should also be included, which may be caused by any one of the above causes or combination thereof.

Intrinsic Allergens may be circulated in the system due to the following conditions:

- (i) partly digested substances of the food absorbed circulating in the body due to indigestion or diseased condition of the digestive system;
- (ii) due to putrefaction of the food in the alimentary canal when they overstay in a particular portion due to various causes;
- (iii) certain toxions liberated from one or more organs of the system due to the diseased condition.
- (iv) constipation and toxins liberated due to putrefaction of the faeces in the rectum.

Non-specific Allergens: There are certain conditions in which no specific allergen can be made out, as the allergens may be so minimal that it is not possible to particularise it in the one of the above categories.

II. Familial tendency: There are certain families who have the allergic diathesis without any preceptible cause. Generally such persons, irrespective of the place of living, conditions of living, climate, food habits and social conditions, get the disease. In this group, the inheritance is more from the mother than from the father.

III. Psychic and Nervous causes. Sudden emotions, prolonged worries, fear, nervous irritation, unhappy marriages, failure in the examinations and business transactions and other matters, cause the imbalance of the sympathetic and parasympathetic system and the disease sets in.

IV. Certain deformities: Certain physical or constitutional deformities may also be responsible. The deformity may be acquired or congenital, such as Ricketic Chest, deflected septum of the nose, flat nose etc.

V. Endocrine Disturbances: Certain people who keep good health get the disease

at the menopausal stage or due to certain endocrine disturbances.

Clinical Picture: Though there are very many differences in the types of the asthmatic attacks occurring in the adults and the children, nevertheless the clinical picture of the spasm is fairly the same. In the words of Hyde Salter, who himself was a sufferer, it runs as follows, which is very vivid and worth reproducing:

"With the face expressive of the intensest anxiety, unable to move speak, or even make signs, the chest distended and fixed, the head thrown back between the elevated shoulders, the muscles of the respiration rigid and tightened like cords, and tugging and straining for every breath that is drawn, the surface pallid or livid, cold and sweating, such are the signs by which the dreadful suffering manifests itself.....To be fairly imagined, it should be witnessed -to be fairly appreciated it should be experienced".

Types: In the children, generally the following types that are commonly seen:

- (1) Acute Bronchitic type of infancy;
- (2) The Hereditary type
- (3) The Eczematus type
- (4) The lung-damage type
- (5) The Coryzal type

In the adults the types are as follows:

- (1) Alternating paroxysmal and free interval type
- (2) Constant attack without free interval type
- (3) The Hereditary type
- (4) Menopausal type.

(1) **Acute Bronchial type:** In infancy first it starts with repeated attacks of cough and cold with slight rise of temperature. The respiratory rate is increased

Cough later becomes persistent. The child becomes cyanosed and prostrated. Sometimes, it is mistaken for Bronchopneumonia. The Expiration is prolonged. Sibilant and sonorous rales are present. Repeated attacks end in this type.

(2) **The Hereditary type:** This commences mostly in the 2nd or 3rd year of life all of a sudden. The patient gasps for breath. The pulse is rapid. The respiratory rate is increased. There is little or no cough. The wheeze is audible. The alae nasae are expanded. The chest is in the position of full inspiration. There is difficulty in expiration. Inspiratory sounds are minimal if present or absent. Musical expiratory ronchi are found all over the lung area. There is no sputum; if present it is merely mucoid. The periodical attack with the intermittent free periods is characteristic of this type.

(3) **Eczematus type:** The disease sets in after an attack of Eczema lasting for more than 2 years either continuously or intermittently. Even though the Eczema subsides the asthmatic attacks sets in regularly. There is no sputum. Dyspnoea and wheeze are the main symptoms.

(4) **The Lung-Damage type:** Generally respiratory infection is the starting point. It occurs invariably in the winter months. Recurrent and persistent cough is the troublesome feature in this type. There is plenty of sputum with Staphylococci, Streptococci, Eosinophils and Pus cells. Percussion reveals exaggerated resonance. Expiration is prolonged. The ronchi are constant. Fibrotic and Bronchitic changes are common. The general health is very poor and the digestion is impaired.

(5) **The Coryzal type:** Profuse watery discharges from the eyes and nose, violent sneezing with blockage of the nostrils precede the attack. It is generally seasonal. Sometimes due to the house dust or dandruff of the pet animals, feathers of

pet birds and pollen of certain plants, flowers or grains, the attack sets. After some time, it disappears of its own accord.

In Adults: Generally the attack depends on the aetiological factors. The aetiology is always due to more than one cause.

(1) **Alternating Paroxysmal and Free interval type:** Invariably it starts with sneezing. Cough and sputum are generally absent. Dyspnoea and musical wheeze are present. The spasm is mild. After the attack and even when there is attack, the patient does not feel very weak excepting for the worry caused by the above complaints.

(2) **Constant attack without free intervals:** Most of these patients, whose general health is below par, suffer from the attack for number of years without much damage to the lungs. They are invariably "lean and angry-looking". The wheeze is audible from a distance. Dyspnoea is the chief complaint with or without sputum, and if there is sputum, it is scanty, thin and watery. Musical ronchi and prolonged and high pitched expiration is very prominent.

(3) **The Hereditary type:** The majority of this type of patients suffer from asthma right through their lives from the day of commencement. They have constant dyspnoea. Invariably the disease starts early in life and the element of infection is very rare. The patients are generally thin with barrel-shaped chests and raised shoulders. Their chief symptom is shortness of breath with dry cough.

(4) **Menopausal type:** Ordinarily the complaint is shortness of breath; and cough starts one or two years before the menopausal period which is more common in women.

When the menopause completely sets in the dyspnoea intensifies with slight hacking cough with no sputum. It is very intense in the winter months. In about 50% of the cases the complaint disappears after a few years as if some magic has taken place. In about 25 percent of the cases,

the complaint gradually disappears or becomes very very mild in which case the patient is not worried about it and generally such cases do not come to the notice of the medical-men unless the patient is plethoric or fussy type. The other 25% of the cases suffer right through the life and they are a problem to the medical men and the relatives.

Prognosis : As already said earlier it is a non-killing but worrying disease. Generally they live longer.

In the case of children, in about 70% of the cases, unless it be of the hereditary type, it improves towards puberty. When the onset is after puberty generally they pant right throughout their lives. In the case of women when the asthma appears immediately after puberty, they get free from this after menopause. When there is a family diathesis, if the case is brought to the care of medical men as soon as the symptoms appear, if a careful study of the case is made there is a possibility of giving relief to a greater extent if not complete relief. The shorter the duration of the attack, the greater are the chances for the eradication of the disease and vice versa. Complicated cases are not amenable to the treatment. Cases due to certain malfunctions and constitutional deformities generally improve, if the deformities are set right and the general health is maintained. The general rule is "an asthmatic is an asthmatic right throughout the life".

Diagnosis : When there is the attack, it is very characteristic. Once a case is seen it can never be forgotten. *Inspection :* The characteristic points are. (1) The characteristic spasm (2) the musical wheeze and Ronchi (3) The hacking cough (4) The forward stooping and sitting posture of the patient with the head thrown back between the elevated shoulders (5) The characteristic dyspnoea and the struggle for breathing (6) The anxious look

(b) *Percussion :* Hyper resonance of the Chest is found.

(c) *Palpation* The skin will be cold and sweating. The sibilant and the sonorous ronchi are felt.

(d) *Auscultation:* Expiration is prolonged. Inspiration is very feeble and sometimes absent. Sibilant and Sonorous ronchi, and the characteristic wheezing, invariably musical in character are heard. Sometimes bubbling rales are heard.

When the patient is symptom free, only on the patient's version about the various symptoms, we have to depend upon to come to a diagnosis. In the uninterrupted variety the symptoms that are all enumerated under the headings are seen.

A thorough and careful study of each individual case must be made before it is classified, (as for the points please refer the points under the paragraph types), under any type.

For allergic type skin test and food tests are very important. Here it is worth while to remember the following points when a case is suspected of food allergy :—

"Certainly nearly every physician has encountered a few patients who have clear cut symptoms within a few minutes or hours after the ingestion of specific foods. One patient may develop acute nausea, vomiting or diarrhoea following the eating of eggs in any form, another may break out in hives a few hours after a seafood dinner, a third may have an attack of asthma within an hour after drinking a glass of milk. In each of these cases the attacks occur with such regularity after the sensitizing food substance is swallowed that the patients are quite aware of the sensitivity and usually avoid the offending food.

There are undoubtedly some cases of food allergy in which the patient is not so aware of his sensitivity. Some of these cases may be picked up by screening skin

tests, but in each instance, the final proof of the sensitivity lies not in the discovery of a positive skin test alone but also in the regular and repeated reproduction of his symptoms within a few hour of taking the offending substance. In order to be of diagnostic significance (and to avoid coincidences) the reaction should occur regularly after symptom free intervals. Vague stories that symptoms sometimes occur when foods are taken in certain sequences, due not in others, or that symptoms develop the next day or after three days of repetitious eating must be discarded, and not considered in any way diagnostic of food allergy.

In general, food allergies manifest themselves first in childhood. They tend to subside spontaneously after several years. Food allergy developing for the first time in adult years is very unusual".

The sputum of the asthmatics especially of the infectious type when present, and examined under microscope, Staplylococci Micrococci Catarhalis, a few Eosinophils, Pneumococci and occasionally of influenza, Streptococci and pus cells can be seen. In the other types, in fairly long standing cases, Crushmans spirals and Charcoat-laden crystals are the characteristic findings in almost in all the cases.

Differential diagnosis : The disease has to be carefully studied and it has to be differentiated from the following diseases : Cardiac Asthma, Tropical Eosinophilia and Dyspnoea of the Renal Disease.

The strict differential diagnosis of this condition from the Cardiac Asthma is absolutely necessary as otherwise, if the treatment of the one is adopted for the other, invariably death of the patient will be the result. In this connection, it is worthwhile to reproduce the following observations of Dr. Robert Heilig :

"There are few pathological conditions which require so strict differentiation as the two main forms of Asthma; the Cardiac

and the Bronchial. That is so because prognosis and treatment are fundamentally different in the two conditions and, as far as treatment is concerned, not only different but diametrically opposed; what is indicated and possibly life saving in the one is definitely contraindicated and sometimes even fatal in the other. To substantiate this statement, it is enough to remember that every year lives are being lost because the medical attendant does not appreciate that *even a small dose of morphia might kill a case of bronchial asthma, while adrenaline so beneficial in that condition, (Bronchial asthma) might be the last straw for a failing heart that causes "an attack of Cardiac Asthma.*

In recurring Bronchitis and Renal disease expiratory dyspnoea, the characteristic wheeze of the asthma will be absent.

From Cardiac Asthma: In Cardiac Asthma there will be inspiratory gasping, worse in the recumbent position. The blood pressure will be high, and symptoms of heart disease will be present, whereas in Bronchial Asthma there will be expiratory dyspnoea with noisy and musical wheeze. Cardiac Asthma is invariably common in the elderly patients after 40 years of age. The Bronchial Asthma has no bearing with the age. In Cardiac Asthma the pulse rate will be high and feeble and tachycardia will be present. In Bronchial Asthma the pulse rate and pulse pressure are not affected; tachycardia will be absent. The apex beat will be normal in Bronchial Asthma. In Cardiac asthma the patient who has been carrying on normal life complains of disturbed nights with unproductive cough all of a sudden, generally in the latter part of the night after a days hard work and mental strain. Subsequent attacks appear more or less at the same hour. It does not last long. The season has nothing to do with the Cardiac Asthma. Dyspnoea though severe is not so noisy as in Bronchial Asthma. Family history has nothing to do in Cardiac Asthma.

On palpation ronchi and wheeze are felt in Bronchial asthma whereas it is not felt in Cardiac Asthma.

Percussion reveals consolidation of the lungs at the base in cardiac Asthma whereas in Bronchial Asthma there is hypresonance all over the lung area excepting small patches of consolidation here and there, if present.

On auscultation vesicular breath sounds, prolonged expiration, rales and ronchi scattered all over the lung area are heard in Bronchial Asthma while in Cardiac Asthma diminished breath sounds and ronchi are heard invariably at the bases, and the heart will show signs of left ventricular failure. The apical impulse will be characteristic.

From Tropical Eosinophilia: Season, family history has nothing to do in this case. Blood examination will show high Eosinophilic count. If the Eosinophilic count is more than 15% and the total count 15,000 per c.m.m. definitely it is a case of Tropical Eosinophilia. The Right Auricle will be hypertrophied. The cough is invariably severe after 2 a.m. and by sunrise the patient is completely free from cough as if nothing has happened. In the sputum there will be preponderance and Eosinophils in fairly long standing cases.

Crushman's Spirals and Charcoat-laden crystals are completely absent in Tropical Eosinophilia. The E. S. R. rate is high. Adrenaline when injected may not have much effect in Tropical Eosinophilia. It will not be amenable to any other treatment excepting Arsenic treatment (it is my view and experience.)

From Renal Dyspnoea: Especially in the acute condition in addition to the symptoms of renal diseases—glomerulo nephritis and nephrosis, when, there are symptoms of cardiac failure, the dyspnoea will be intense. The rhythm of the pulse will be galloping and the rate will be high. Signs of heart dilatation and pulmonary oedema with moist

rales at the bases and frothy blood stained expectoration are the points to be taken into consideration for the differentiation.

Treatment: Every case of asthma must be thoroughly studied with a certain amount of patience. The confidence of the patient and of those near to them must be gained with a certain amount of sympathetic understanding. They must be made to understand and to appreciate the chronic nature of the disease and the need for a co-operative attitude, a patient, consistent and prolonged well planned treatment so as to avoid the disappointment and the serious complications, such as status asthmaticus and emphysema of the lungs.

Treatment also depends upon the variety under which the individual case comes in. The general line of treatment will be as follows:

(1) When there is the attack, the patient should be given immediate relief and then a well planned longterm treatment must be chalked out depending upon the individual case.

(2) Septic conditions if any, should be treated

(3) Desensitisation of the patient for the allergy with suitable methods.

(4) General habits and the routine of life must be such as to keep the disease under control if it is not possible to cure.

The attack should be treated either with Adrenaline, Ephedrine, preferably neutral Aminophylline with or without phenobarbitones and antihistamines according to the condition. As there are a number of preparations in the market with different trade names, purposely I have omitted the combinations and trade names.

Infections if any, have to be treated with appropriate medical and surgical methods. Antibiotics may be used. Here it should not be forgotten that some patients are highly sensitive to Penicillin and Streptomycin and Sulpha drugs. There are cases

on record where the patients have collapsed on the administration of Penicillin.

Allergic type: 'The specific allergens' if can be definitely ascertained the patient should be sensitised by giving the sterile solutions of these substances in graduated and very small intradermal doses. If the specific allergens cannot be ascertained, then the non-specific antiallergens have to be tried. It can be done with sterilised milk and solutions of peptone or auto-haemotherapy. All these injections should be preferably given intra-muscularly. There are a number of antihistamines in the market with different structural and chemical formulae which may be tried. The one preparation which may be useful for one patient may not be useful for the other. Only by trial it can be found as to which be useful for whom. Still they are worth trying. Ephedrine, though it is fairly good for Bronchial asthma to cut short the attack, it is not always advisable to place a vial of Ephedrine in the hand of the patient as it is very often indiscriminately used.

To cut short the attack and as a preventive measure orally Ephedrine, Aminophylline, Caffeine, Aspirin, Phenacetin and a combination of Aminophylline and Phenobarbitone are useful. When there is coryza, the time honoured remedy of either Ammonium carbonate or Ammonium chloride with Pot. iodide, Pot. Bromide. Tr. Lobelia Aetheris and Tr. Stramonium or Tr. Belladonnae are worth administering.

In endocrine and menopausal varieties A.C.T.H. cortisone preparations and sex hormones are worth trying. All the precautions that are necessary have to be taken while ACTH and cortisone preparations are administered. Arsenic has no place. It is useless in Bronchial Asthma. Diethylcarbamazine is also not useful though it may give temporary relief. Under no circumstances Morphine should be administered in Bronchial Asthma. Administration of Morphine is nothing but criminal quackery verging on manslaughter, if not anything else. The respiratory centre which is already in a very depressed state will

JUNE '59

not withstand even the slightest depression. Further when the constricted Bronchi and Bronchioles are full of mucus secretion and the patient is struggling to get it out, if Morphine is administered the patient will die of choking with the secretion. Atropine also should not be indiscriminately used.

In the case of adults in all the varieties, after giving 10 to 12 injections and Auto-haemotherapy, the interval in between the injections being 3 days or more, depending on the reaction, it is worth administering Colloidal Calcium with Vitamin D mixed with 100 to 500 mcgm of Cynacobalamine once in 5 days in all about 12 to 15 injections. In the case of children above 1 year colloidal calcium with Vitamin D $\frac{1}{2}$ to 1 cc and 50 to 100 mcgm of Eynacobalamine is worth administering. The treatment should be started well before the commencement of the winter and continued right up to the summer. Afterwards one injection once in 15 days for about a year. Invariably patients are free from attacks and even if there is an occasional attack it is very very mild.

General Dress, Diet and Habits:

The clothes should be of such variety which is soft, porous and will absorb the sweat immediately and get dried easily. Silk and mercerized clothes should be avoided. The patient should not expose to any form of cold. The food should be taken early in the evening and when going to bed the stomach must be empty. The evening meal must be light and easily digestible. Easily digestible foods only should be taken. Sugar and jaggery preparations, ashgourd, sweet pumpkin, potatoes, yams, and gas forming articles of diet should be avoided in addition to those articles of diet for which the patient is sensitive. Oil bath and preparations made in oil should not be taken. There should be moderation in everything. Sour butter milk also should be avoided. Mango, Jack fruit, highly acid fruits should be avoided. A desert spoonful of honey in

117

6 ounces of warm water in the early morning on an empty stomach is invariably good. Coffee and tea are allowed, Cocoa and cocoa preparations are not advisable.

Alcoholic drinks if taken should be in moderation. A cup of warm milk, Horlicks with two teaspoonful of honey at bed time is advisable provided the patient has no allergy for the milk and horlicks. The bowels must not be constipated. Mag Sulph or any one of the saline laxatives available in the market in different names is advisable once in a fortnight or month according to the condition. Drastic purgatives like Castor oil and other oily preparations containing croton should be completely avoided.

Vitamin B complex and Vitamin C 500 mgm a day is good. If the appetite is poor some carminative or liver stimulating tonics are preferable.

I have tried to give a general line of treatment. No hard and fast routine of treatment can be adopted, as each case is a separate entity by itself.

There is a feeling that Adrenaline injection or Ephedrine by mouth is indicated at all times whenever there is an attack. I do not entirely agree with that view. They are useful but not always. To advise the patient to have the self administration either of the two drugs is not the scientific method of treatment. Sometimes instead of doing good to the patient they may cause potential harm.

Either the family physician or the doctor who has studied the case minutely is better fitted to handle the case than on occasional consultant, however eminent he or she may be.

Conclusion: Bronchial asthma is a non-killing, chronic, annoying disease affecting both males and females of all ages.

The aetiology is varied and hence each case is a separate entity by itself.

It requires a thorough careful study and sympathetic understanding of the patients' worries and fears.

The patient should be made to understand the chronic nature of the disease and the necessity for a co-operative understanding attitude for the successful management of the case.

It is very important to make sure that is Bronchial asthma and not cardiac; otherwise Some of the drugs that are very useful in cardiac asthma are given for a case of bronchial asthma it will end in fatality and vice-versa. Opium and opium preparations should never be administered in bronchial asthma.

The successful management of the case depends upon the co-operation and the well regulated life of the patient with a certain amount of restraint in the diet habits, with moderation in everything.

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"A talk given at a symposium on "Surgical Diseases of the kidney" held at Madurai Medical College on 21st November, 58.

By

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Tuberculosis of the Kidney

Renal Tuberculosis is quite a common condition. Although considerably less common than tuberculosis of the lungs, it occurs much more often than is generally supposed. There are said to be nearly four lakhs of active pulmonary tuberculosis cases in the Madras State only, and so renal tuberculosis which is found in nearly 10% of cases of pulmonary tuberculosis and in 50% to 70% of cases with extra pulmonary tuberculosis, as glandular, intestinal, bone and joint tuberculosis, must be present in nearly a lakh of people. One of the reasons why renal tuberculosis is apparently not very common is, because, many of the cases may exhibit only tuberculosis bacilluria, without any other evidence of involvement of the urinary tract.

Renal tuberculosis is a blood borne infection, secondary to a tuberculous focus elsewhere, as tuberculosis of the lungs, glands, bowels, bones and joints.

Pathology: The earliest lesions in renal tubercles are cortical tubercles (Fig. 1) and these are commonly found within the capillary tuft of a glomerulus, within the capillaries of the tubules and sometimes even within the lumen of the tubules. This state of tubercles in the cortex is a bilateral condition, in view of the fact that the infection has been haematogenous. This bilateral infection has been amply proved, both clinically and pathologically. This is the stage where tuberculous bacilluria may be present. Of course, when the lesions heal, as they do very often, the bacilluria stops. As mentioned before, at this stage there will be no urinary symptoms.

When resistance is low, the tuberculous process extends, tubercles become larger, coalesce with one another, caseation occurs



Fig. 1. Cortical Tubercles.

and the infection spreads to the medulla, either by the intrarenal lymphatics or extension along the lumen of the tubules. Following the lumen of the tubules, it finally arrives at the renal papilla, where ulceration of the papilla takes place, and bacilli and leucocytes appear in urine, and urinary symptoms become manifest. In a slightly advanced type of the disease a tuberculous abscess of the cortex, which has extended in to the pyramids, finally ulcerates into the calyces directly (Fig. 2), thus producing



Fig. 2. Tuberculous abscess opening into pelvis.

cavities communicating with the pelvis of the kidney. This stage of the disease is considered "the point of no return" as from this point conservative treatment is considered to be of no avail, against further spread, and surgical treatment becomes necessary. Once the pelvis is invaded at a particular point the rest of the

pelvis becomes affected by the disease, the infection travels retrograde along the collecting tubules of the other papillae and similar tuberculous cavities communicating with the pelvis occur throughout the kidney. Although tuberculosis might and does extend in both kidneys, producing extensive bilateral disease, in a major proportion of cases the lesion is mainly unilateral, producing the clinical type of unilateral tuberculosis.

The tubercular granulation tissue at the pelviureteral junction may produce a stricture of the ureter and this leads to a tuberculous Hydronephrosis (Fig. 3), the difference from the simple Hydronephrosis being,



Fig. 3. Tuberculous Hydronephrosis

that in the tuberculous Hydronephrosis there are, in addition to the obstruction and the consequent distension of the pelvis and calyces caseating areas in the substance of the kidney. Secondary infection of such a Tubercular Hydronephrosis produces Tuberculous Pyonephrosis.

When the ureter is blocked early in the disease, the whole organ becomes converted into a sac filled with caseous material which may show calcification. As no urine escapes from this type of kidney and the kidney has become functionless, the term "Autonephrectomy" has been applied to this end result.

Occasionally, cortical lesions tend to fibrosis and caseated areas frequently

lead to a scarred, contracted and calcified type of tuberculous infection which is another type of "autonephrectomy" as this type of lesion also leads to a functionless kidney.

Occasionally perirenal infiltration takes place leading to a tuberculous perirenal abscess (Fig. 4).

A tuberculous granuloma has been described — a space occupying lesion about 5 to 6 c.m. in diameter, which may be mistaken for a tumor of the kidney.

Clinical features: Renal tuberculosis occurs chiefly in the years of young adult life. 70% of the patients with renal tuberculosis are between 20 and 50. Renal tuberculosis is more common in males and the ratio of incidence in males to females is 2 : 1.



Fig. 4. Tuberculous Perirenal abscess.

The three chief symptoms are increased frequency of micturition, dysuria and haematuria. Urinary frequency both by day and night is an important symptom. It has been said if there is no frequency there is no tuberculosis in the urinary tract. Nocturnal frequency is very troublesome, and its occurrence in a young adult should be considered evidence of tuberculosis of the kidney unless proved otherwise. This frequency is due to polyuria (which is usually present in the early stages of the disease) to tuberculous cystitis, and to the contracted bladder associate with the later

stages of cystitis. At times, the frequency may be so much that the patient complains of incontinence and this coupled with the dysuria (discomfort and pain during micturition) makes the patient's life very miserable. Haematuria may be the only symptom, in a few cases and it may be from an ulcerated papilla in the pelvis of the kidney or from an ulceration in the bladder.

Other symptoms are pain, chills, fever and in later stages of the disease, nausea and vomiting. Pain may be a predominant symptom occasionally. I had one patient who complained of severe pain for which he had been getting injections of morphine almost daily for some time, and investigation revealed unilateral tuberculosis of the kidney. Acute epididymitis has been the initial symptom in some cases. Incidentally, it may be mentioned that in the majority of cases of tuberculous epididymitis, examination will show renal tuberculosis.

Diagnosis: The presence of pus cells without organisms (as made out by ordinary staining) in an acid urine is suggestive of renal tuberculosis.

- (i) Identification of tubercle bacilli in the urine or from a suspected kidney is important in diagnosis. This is done by
 - (a) examination of smears of the centrifuged deposit of the urine (this is considered the most satisfactory method.)
 - (b) Culture of the urine.
 - (c) and by guinea pig inoculation of the centrifuged deposit. This last is the confirmatory test and is the most accurate.

Formerly 24 hour specimens of urine were used for the above purposes, but now it is felt that three or four morning specimens of urine collected in a sterile bottle and kept under sterile conditions is better for this purpose.

Tuberculous bacilluria (i.e., the finding of tubercle bacilli in the urine), it should be remembered, can be present without any serious damage to the kidney but its presence is a warning that the kidney is damaged, and requires treatment and one of the objects of treatment is "conversion of the urine" to a negative specimen.

Plain radiography of the urinary tract may show evidence of calcification. Intravenous pyelography is the next procedure. Diminution or absence of junction on one or other side can be made out. The altered shape of the calyx, from its normal cupped appearance to a rounded or clubbed shape, fluffiness of the calyceal outline or a moth eaten appearance of a calyx are all evidences of tuberculous disease of the kidney. Cystoscopy of the bladder may show tubercles around the ureteric orifices.



Fig. 5. Tuberculous Granuloma.

The typical "Golf hole" (round clear cut margins) appearance of the ureteric orifice is characteristic of the disease. Patchy cystitis and sometimes polypoidal masses are seen in the bladder. In tuberculosis of the kidney which has affected the bladder, the bladder shows punctate haemorrhages on even slight over distension of the bladder obscuring the view thereafter, and so great care must be taken not to put in too much fluid.

Retrograde Pyelography is very useful in the diagnosis of early lesions and gives an exact picture of the extent of the lesion.

A normal pyelogram definitely excludes the possibility of tuberculous disease of any surgical significance. In advanced cases retrograde pyelography may not be possible, as it is difficult to identify the ureteric orifices in the bladder.

Examination of the chest and the sputum is necessary for the evidence of active pulmonary tuberculosis.

Treatment of renal tuberculosis comprises three main measures—general treatment, specific therapy and surgical measures. General treatment is rest and a sanatorium regime for at least six months.

Specific Therapy is antibiotic and chemotherapy for tuberculosis. This therapy is beneficial in cases of tuberculous bacilluria. It is necessary as a preliminary measure for at least two months before surgical intervention. It is the only procedure left, for relief of major bilateral lesions of the kidneys.

The therapy consists of the administration of 1 gm streptomycin intramuscularly, daily, until fever subsides and three times a week after that, 200 mgm Isoniazid and 10 gm P.A.S. orally daily. This regime should be continued for 6 months at least, and sometimes may have to be continued for longer periods extending upto 2 years. Streptomycin has a tendency to produce fibrosis with the development of structures of the ureter and its sequela. Because of this, cortisone and similar drugs have been recommended, in addition, to prevent this excessive inflammatory reaction and the consequent fibrosis.

One more drug has been found useful in cases where the usual treatment has been of no avail. This is a new product called Hinconstarch (an oxidised starch powder combined with isoniazid and thio semi carbhzone) and up to date very good results have been claimed for this drug in cases resistant to the usual therapy.

Surgical treatment: It has been accepted hitherto that unilateral clinically evident renal tuberculosis is only amenable to nephrectomy. There has been a controversy about the treatment of a kidney which is in a condition of "autonephrectomy". It has been suggested that it could be left alone, but now the considered opinion is that the quiescent lesion is liable to flare up any time and the correct treatment is nephrectomy. Other indications for nephrectomy are tubercular pyonephrosis and also extensive ulcerocavernous lesions of the kidney. In bilateral infections, the only indication for nephrectomy of one side are severe pain and gross infection of the kidney which is likely to lead to infection of the bladder or severe haematuria from one



Fig. 6. Localised lesion of upper pole. kidney.

kidney. The operation of nephrectomy will entail nepyro ureterectomy, the ureter being removed as far as the bladder if it is thickened diseased and and only as far as the pelvic brim if it is looking normal. Removal of the lower end of the ureter will necessitate a second incision lower down. Partial nephrectomy has been recommended for an ulcerative lesion at one pole of the kidney as total nephrectomy has shown in a large number of these cases, that the rest of the kidney could easily have been salvaged. Partial nephrectomy is, of course, the only procedure available to remove an area of localized disease in a single kidney.

Thus far the orthodox treatment. Recently some new views have been put forward about the management of renal tuberculosis.

It is recommended that as urinary tuberculosis is secondary to pulmonary, bone and joint tuberculosis mostly, urine should be examined carefully in these cases and Tuberculosis bacilluria if present, treated with appropriate therapy until the urine has become "converted". By this method renal tuberculosis can be diagnosed in the non destructive stage and treated successfully.

It has also been shown that restricted unilateral tuberculosis of the kidney can be healed clinically as well as anatomically by the specific antibiotic and chemotherapy and does not require surgical intervention.

For the decreased renal function, produced by a tuberculous stricture of the ureter, the treatment should not be nephrectomy, but dilatation of the ureter or resection of the structured segment and repair.

The main indication for nephrectomy should be tuberculous pyonephrosis and wide spread unilateral disease, as also the autonephrectomised kidneys.

As for partial nephrectomy, a procedure for which there was great enthusiasm at the time it was suggested, the high operative mortality, the complications as urinary fistulae, haemorrhage and cessation of function of the remainder of the kidney, have all made this operation much less popular and the specific therapy has been found to give much better results.

A new operation to replace partial nephrectomy has been launched. In this operation which is called *cavernotomy*, the kidney is exposed, the localised lesion is evacuated by aspiration, the outer shell is incised, the caseous matter curetted out, 1 gm of streptomycin placed in the empty cavity and a

small polyethylene drain fixed in the cavity for daily instillations. The lumbar incision is closed with this drain passing through and through this tubing instillations of streptomycin are made daily for 14 days. This

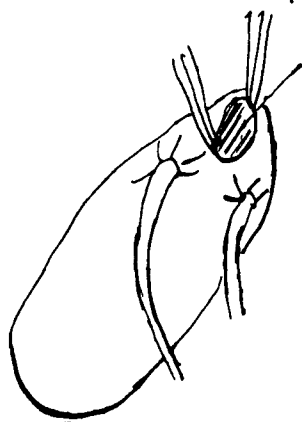


Fig. 7. Cavernotomy opening of cavity & insertion of Tubing for drainage.

operation is specially recommended for localised lesions in a single remaining kidney. (Fig 6 to 7)

An important complication of renal tuberculosis is contracture of the bladder

wall—This condition may also occur after nephrectomy and is of importance as back pressure on the remaining kidney may result in renal failure. This condition may necessitate ureterosigmoidostomy or cutaneous ureterostomy to allow free passage of urine from the remaining kidney. Ileocystoplasty—enlarging of the bladder by anastomosing a loop of intestines to it has also been recommended.

Prognosis: In 1945, it was considered that 50% of patients operated for nephrectomy were dead in 5 years. In 1952, 70 to 80% of patients operated remained cured and at present with the addition of isoniazid, cortisone and Hinconstarch the results ought to be very much better.

The most important points to remember in treatment is the long period of specific therapy necessary and the appropriate surgical measures.

My thanks are due to the Principal, Dr. C. K. P. Menon, M.S., F.R.C.S., 'Eng' for permission to publish this paper".

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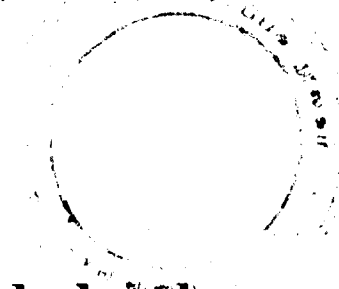


SPECIAL ARTICLE

Prepared for Mediscope

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Modern Trends in Ophthalmology

In this age of satellites and space travels, medical science has also made many strides and developments and Ophthalmology is no exception to it. It will be beyond this paper to describe all the various developments and researches made in the aetiology, diagnosis, pathology, *therapeutics* and surgical techniques etc., rather only some of the prominent and important ones will be taken up over here.

One of the subjects which has received much attention is the subject of cataract surgery. Due to advent of various types of corneoscleral sutures, preparation of the patient with proper anaesthesia and akinesia, direct separation of the zonule and use of modern antibiotics etc. cataract surgery has become very safe and has even allowed removal of immature cataracts. So a case of binocular cataract has not to wait for indefinite time to grope in the dark to reach the stage of maturity which used to be considered the right stage of operation. Recently after lot of experiments and researches Dr. J. Barraquer of Barcelona has evolved a safe technique of delivering the lens through "Enzymatic Zonulolysis" by means of Alpha chymotrypsin enzyme which when injected in the posterior chamber has a selective action on the suspensory ligament. It thus advantageously substitutes the mechanical zonulotomy technique of direct separation of zonule, thus making intracapsular extraction possible at any age most suited for young people and myopic persons.

This Alpha chymotrypsin is a protein which is extracted for Veal's pancreas under

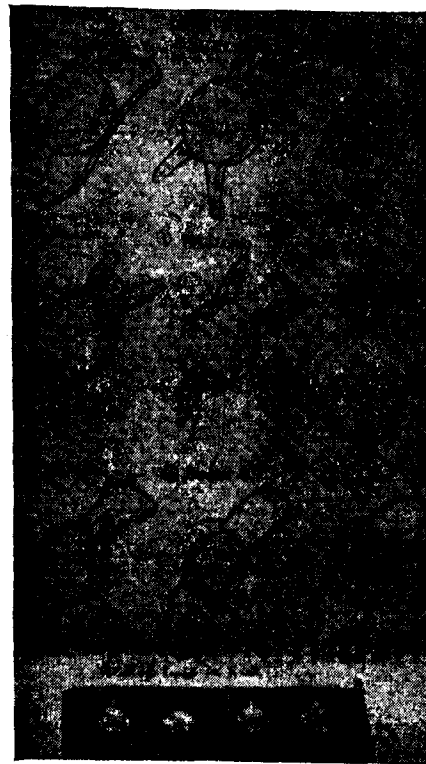


Fig. 1. Various types of Anterior Chamber Lenses

the form of chymotrypsinogen. It is then activated and purified until crystallised chymotrypsin is obtained. 2-4cc of 1 in 5000 solution is just enough, but care must be taken that it is freshly prepared because solutions older than 4 to 6 hours become somewhat inactive. This has also no action on posterior synechiae, so if these are present they must be dealt with in the usual way.

Looking to the many disadvantages of aphakic patients i.e. unsightly heavy glasses with its serious optical defects etc. particularly in unilateral cases where binocular vision is not possible (except by contact lens) attempts have been made to replace the missing lens by an artificial one made of chemically inert material. Ridley's lens

placed in the retro-iridial space by two stage extra-capsular operation used for unilateral traumatic or Juvenile cases did not remain popular because of various complications like dislocation of lens, Iridocyclitis and opacification or wrinkling of posterior capsule etc. and has been abandoned by many of us today.

So in order to extend its use and achieve better results Prof. Strampelli of Rome and Prof. Schreck of Germany (Fig. 1) conceived a new idea of inserting the lens in the anterior chamber and evolved new designs for such applications. Dr. Dannheim

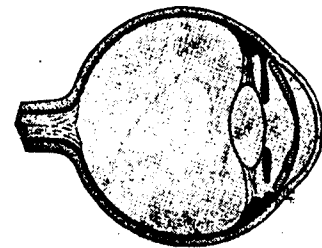


Fig. 2. Concave Strampelli Lens in Unilateral myopia (Diagramatic)

has (Fig. 4) still further improved the lens by making it very light (8-9 mgm) and having a loop of supramit plastic thread on each side of the central optical portion of the lens. Dr. Ridley has now made it with 3 legs, which rest on the root of the iris. (Fig. 1)

These lenses, unlike Ridley lenses are specially made for each individual case after doing proper refraction of the patient by skiascopy and are of proper size as measured under slit-lamp. While ordering the lens, its distance in the trial frame from the anterior corneal surface must be mentioned. The indications are also much more, as it has made us possible to insert it even in non-aphakic cases (Anisometropia or Unilateral high myopia.) (Fig. 3 and 4) These lenses are well tolerated and even if need be, can be easily removed. In young children, as the eye enlarges with age, the

lens can be changed also without any adverse effect on the eye. If there is any thickening of capsule or it becomes opacified, Capsulotomy can be done through behind the lens without touching or injuring the lens.



Fig. 3. Strampelli Lens placed horizontally

Retinal detachment is another subject which has received much attention within last few years. In 1929, in the Lancet it was mentioned that there are few Ophthalmic surgeons who cannot count on the fingers of one hand the cases of cures of retinal detachment in their own experience. But to-day due to various advancements of



Fig. 4. Danheim Lens in Position

shortening Eye-ball through lamellar scleral resection (Shapland and Paufigue) perforating method (Mueller and Lindner) reefing (Weve) scleral buckling (Custodis and Schepens) or scleral outfolding (Everett and

Casterviejo) the gloomy picture of such cases has markedly changed. In still hopeless cases Schaffer has evolved a technique of vitreous implantation by which method 1.5cc of sterile stored vitreous is injected into the vitreous cavity thus acting not only mechanically by pressing the retina against the choroid but by having some loosening effect on the retinal star shaped fold.

In spite of all these developments I must stress that Gonin's old principle of closing the retinal tears by Diathermy still stands foremost, so every attempt should be made to examine the fundus and search for the holes by direct and indirect Ophthalmoscopic examinations. Schepen's Binocular indirect Ophthalmoscope with scleral depressor is indispensable for the examination of the periphery (Fig 5 and 6). Looking to the type of the cases that we get in India (old

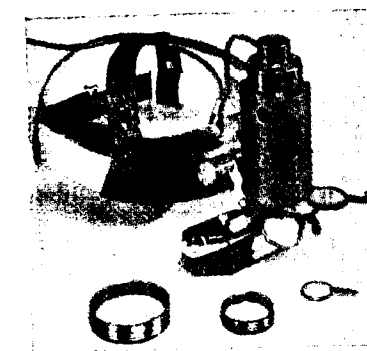


Fig. 5. Schepen's Indirect Binocular Ophthalmoscope

cases with vitreous changes and multiple retinal folds) I have evolved a method of combined diathermy, scleral buckling and reefing which gives good results.

Recently Professor Mayer Schwickerath of Bonn has ingeniously evolved an apparatus of Photo-coagulation (Fig. 7) which is not only useful in retinal detachment and macular holes but also it is used in various other conditions like Eale's disease, Von Hippel Lindau's disease, small tumours of the retina and Proliferative Vascular retinopathies to occlude new vessels.

The idea of light coagulation was born to him when he observed patients of macular burns after watching the solar eclipse. This involuntary experiment showed that chorio-retinal burns by light irradiation were possible without damage to other parts of the eye. After year's of experimental work on this problem he proved that light sources whose intensity and spectral distribution were comparable to that of the sun were suitable for clinical use. The first clinical results were obtained by an apparatus which made use of sunlight. But its dependence on weather and season was so annoying that he developed a special arc-lamp, but recently M/S Zeiss have further improved and brought out a Xenon Lamp for this Coagulator (Fig. 7).

The method of its use and details of its working for the various ocular lesions are beyond the scope of this paper. It will be enough to mention that it is a great therapeutic advancement. In retinal detachment it can be used either alone or in combination with a diathermy or scleral resection and has the advantage of its being used repeatedly under direct visual control without having any adverse effect on the eye.

Not too many years ago when text books of Ophthalmic surgery used to describe corneal grafting as of academic interest only, but today due to various researches and advancements in the technique of operation, development of sharp and fine instruments and application of fine direct edge to edge sutures under operating microscope, it forms an important chapter. Till recently partial perforating graft was very popular but it is due to Sourdille and Paufigue that lamellar graft has taken its due place and its indications have been extended. Total graft Lamellar or Perforating is now being successfully undertaken in various clinics. In hopeless cases of Fuch's corneal dystrophy or corneal burns with vascularised corneas etc., Prof. Fran-

cesschetti has evolved a mushroom graft. In still hopeless staphylomatous cases or when two or more grafts have failed artificial plastic corneas have been successfully implanted.



Fig 6. Patient being examined in lying down position with this ophthalmoscope

Though exact figures are not available but it has been estimated that nearly 10% of the blind population (2 million totally blind and 2 million partially blind) can be improved upon by this operation, but it is a pity that we have no donor material at our disposal for want of any legislation to remove the eyes of dead persons within 2-3 hours after death. The eyeballs can be stored either in sterile Liquid Paraffin at minus 4°C or by moist chamber method and within 4-7 days' time.

To solve the problem of viability of cornea etc. attempts are being made to achieve long term storage through various methods of:—

- High concentration glycerol soakage and drying without freezing at normal temperature (Keing)
- Lyophilisation.
- Moderate glycerol soakage and freezing at minus 79°C without drying (Polage, Parker and Smith)

which when successful will enable us to store the cornea for 6-8 month's time.

Treatment of squin and Heterophorias by orthoptic exercises which aim at restoration of binocular single vision is too well known, but recently 'Pleoptics' is becoming very popular. The word Pleoptics was introduced by Bangerter as a comprehensive term to include all forms of treatment of the amblyopic eye. Something over a hundred sessions may be required in the treatment of one case and involve the co-ordination of hand, ear and memory. Several ingenious instruments have been designed to discourage the use of a false macula by dazzling the area prior to binocular exercises. A form of ophthalmoscope called "Euthyscope with intervalometer has been made by Cuppers through which exercises are undertaken almost daily by the principal of Hering's after images. By his special ophthalmoscope which projects a black star upon the retina he can also measure the distance from the point of fixation and the macula with great accuracy, thus he can classify his cases into various groups. Great perseverance and persistence may be required as the treatment may have to be carried out two or three times a day for several months.

In this atomic age particularly under the heading "Atoms for peace" "Radio-active isotopes" have been extremely useful not only in general medicine but also in ophthalmology particularly in research, diagnosis and treatment of various ocular lesions. In research it has clarified many outstanding biological problems. Radio-

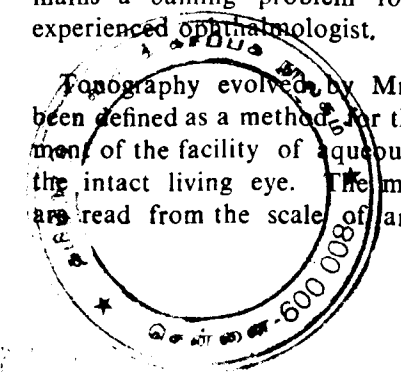
JUNE '59

active Phosphorous P 32 has been used in the diagnosis of intra-ocular tumours. In such cases it provides supplementary evidence because malignant melanomas concentrate P 32 to a greater extent than other tissues. This concentration does not occur in serious detachments, vitreous haemorrhages, or degenerative lesions of the retina and choroid. To be regarded as positive there must be a 30% difference in concentration between the affected eye and the normal fellow eye. In patients with one eye differential readings may be made between the quadrants. Readings are usually taken between 24-48 hours after the injection of the material.

In therapeutics—the progress that has been made in the harnessing of this new power to the service of humanity and the alleviation of suffering is remarkable. Strontium 90 application for corneal vascularization and other superficial lesions of the eye and Stallard's radio-active Cobalt 60 discs of various sizes for small Retino-blastomas etc. are recent developments. In this connection it has been shown that radio-active diameter of the disc should overlap the neoplasm by atleast 1mm and provide a dose of 4000r at its summit. Glaucoma—One of the major causes of blindness has also received wide interest in the recent years. In spite of the original work done by Duke Elder and Davson on blood aqueous barrier, flourescine excretion test done by Amsler, discovery of aqueous veins by Ascher and Goldmann, study of the angle of anterior chamber by latest 4 mirrored gonio-contact lens, and tonography etc., its exact aetiology and treatment still remains a baffling problem for even the experienced ophthalmologist.

Tonography evolved by Mr. Grant has been defined as a method for the measurement of the facility of aqueous outflow in the intact living eye. The measurements are read from the scale of an electronic

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tonometer of the Schiotz type which is held in position upon the cornea for four minutes and can be recorded accurately through its sensitive recorder. The weight of the instruments squeezes aqueous out of the eye and this depends upon the efficiency of the drainage area at the angle of the anterior chamber. In closed angle glaucoma the aqueous outflow shows impairment particularly in the congestive phase or where there are posterior synechiae. In such cases the flow returns to normal when

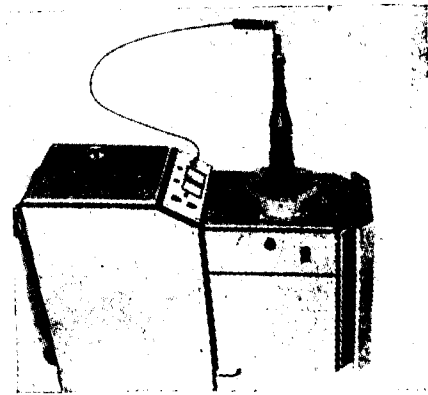


Fig. 7. Meyer Schwickerath's Photo-coagulation apparatus. (Zeiss).

the angle is opened up. These facts are no doubt already known but in chronic simple glaucoma where the angle appears to be open, the test also shows a permanent resistance to outflow. This is the most important finding that has been made in tonography showing thereby that the abnormal resistance to outflow is the basic observation of importance and that the findings are not due to hyperformation of aqueous. The instrument, however, is still of more value for research than for routine clinical use. (Fig. 8)

For exact measurement of Intra-ocular tension specially of value in border-line cases of glaucoma Professor Goldmann has evolved a special Applanation tonometer in which the effect of the scleral rigidity is completely eliminated. This has also the

advantage of being fitted to the Haag and Streit slit lamp so that during other routine examinations exact tension can also be recorded in sitting posture on the slit Lamp.

Ophthalmology has been benefitted equally if not more by the recent introduction of the latest drugs like Penicillin, Streptomycin or other broad spectrum antibiotics like Achromycin and Terramycin etc. So the long protracted course of many acute diseases has been cut short. Prognosis of cases of ophthalmia neonatorum and hypopyon Ulcers has markedly changed. Due to routine subconjunctival injection of Penicillin and pre-operative use of Polymyxin ointment containing Polymyxin etc., sepsis in intra-ocular surgery has almost been unknown. On the basis of Trachoma Campaign carried out in our zone, we found out that, Achromycin in oil now marketed to be more useful for our trachoma cases. Recently steroid substances like Cortisone, hydrocortisone and Prednisolone etc. have been found to be of great value in Irido-cyclitis, interstitial keratitis, allergic infections, scleritis and *rosacea* etc. It will be of importance to mention that cortisone is of no value in Herpes simplex infection rather its use may be harmful. Radiotherapy employed in the form of Beta radiations (500R weekly for 4 weeks) or low voltage X-Rays may be of great help in such herpetic infection of the cornea, because unwanted blood vessels are eradicated, granulation tissue reduced and healing of epithelium promoted. Diamox—an carbonic anhydrase inhibitor—is another therapeutic advancement particularly for the medical treatment of our glaucoma cases and controlling tension in acute case before surgery can be safely undertaken. Recently work is going on some other similar substances particularly Neptazane (Lederle) which is supposed to be more effective than Diamox.

A further progress in ophthalmology is slit Lamp microscopy of the posterior segment of the eye by Hruby's minus 55 D lens or Goldmann's contact lens. It is indeed indispensable for the recognition of topography and exact morphology because all these details can be better recognised in its optic section than in the diffused light of the ophthalmoscope.

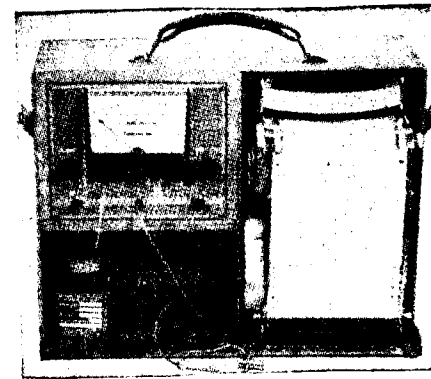


Fig. 8. Complete Tonography unit with electronic tonometer and recorder (V. Mueller & Co.)

Examination with the slit-lamp has also given us new ideas on posterior vitreous detachment and has disclosed numerous previously almost unknown phenomenon in the posterior membrane of the vitreous. It is of immense value in retinal detachment, as it helps in its *diagnosis*, prognosis and treatment and also helps to throw light on the formation of primary retinal tear. In the fundus changes, especially of the disc and central retina, the examination may be very helpful. The distinction between macular cysts with thin wall and a latent perforating macular hole is possible only with the slit-lamp. (Fig. 9)

The description will not be complete without referring to the recent interest shown in the special visual aids for persons with low Vision. All attempts to keep

these visually handicapped depend upon four basic principles, magnification, lighting, field of vision and definition. High

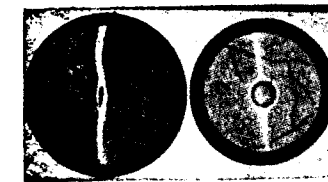
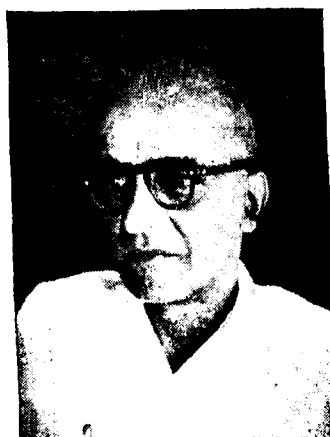


Fig. 9. (a) Macular cyst (b) Macular hole under slit lamp.

magnification may lead to a serious reduction in the field of Vision and it becomes very tedious if only a word or two can be seen at a time in place of the grouped reading of the normal adult. Similarly a loss of definition and brightness does not compensate for a reduction in the visual field.

The fundamental base for all forms of help by optical means to the partially sighted is the Galilean telescope which can be constructed easily from a standard trial case by using a minus 20 Lens as an eyepiece and plus 10 lens as an objective giving a magnification of about two times. This can be often done for testing patients with defective central vision, because if they see better with this instrument or simple opera glass then they stand a very good chance of being benefitted by various visual aids which are now in commercial production.

From time to time articles appear in the lay press describing some spectacular device which will improve failing vision. They all depend upon the four basic principles mentioned already and the claims must be accepted with great care. It is indeed cruel to raise the hopes of visually handicapped by specious advertising.



Paper read at the All India Symposium on Fungus at Calcutta.

By

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Nystatin in the Treatment of Candida Albicans Infections

INTRODUCTION

Candida albicans (monilia albicans) is an anascosporogenous, pseudo mycelium forming yeast isolated from human sources. This organism can be identified by

1. Its morphological characteristics
2. Fermentation of sugars and
3. Animal pathogenicity.

Skin and nail scrapings taken from infected lesions when cleared with 10% Potassium Hydroxide solution and examined under the microscope reveal the organism candida albicans in the form of hyaline, thin walled filaments with typical spores singly or in clusters. Vaginal and mucous membrane smears are examined in the same manner or are stained by Gram's stain or Acid Schiff stain. They can also be cultured in special media sabourauds agar, wherein they grow as spherical white colonies with a characteristic yeast odour on Nickersons medium (Ortho). (We have used this medium in our study) where they are identified as brown or black colonies on Littman ox gall agar medium where they grow as dark blue and purple colonies.

Candida albicans is highly pathogenic to laboratory animals. One c.c. of a heavy saline suspension of the organism when injected intra peritoneally into mice or into the ear vein of a rabbit produces usually death of the animal in five days. On Autopsy liver and kidney abscesses are seen and stained sections of these reveal great masses of the organism.

Infection with candida albicans both cutaneous and mucous membrane are quite common and usually are symptom free and passed off un-noticed. Candida albicans form part of the normal flora of the gastro intestinal and vaginal mucous membrane. With the advent of anti-bacterial antibiotics the incidence of clinical moniliasis has remarkably increased. The antibiotics are thought to eliminate from the Gastro intestinal tract a large segment of saprophytic bacteria which appear to have a suppressive effect on the growth of candida albicans probably by competing for the available food supply or by some other means at present not-understood. Quite recently Dr. Frank Roth of Miami University has demonstrated that the combination of a tetracycline compound with candida albicans in addition to removing the competing bacteria has also directly enhanced the virulence of the monilia for animals. New comer et al have proved that tetracycline in doses of 1000 mgm. per day increased the yeast flora of the gastro-intestinal tract and which was considerably reduced by the addition of Nystatin to the Tetracycline compounds.

Cortico steroids lowering the normal defence mechanism of the body tend to increase the yeast flora. A reduced synthesis of Vitamins B and K also play an important part in monilial infections.

PREDISPOSING FACTORS

Apart from heavy antibiotic and cortico steroids therapy the usual causative factors that enhance candidal over growth are

JUNE '59

Diabetes, Leukemia and other chronic and debilitating illness and premature birth. Monilial infections occur with increased frequency in Diabetes because of the increased glycogen content of the skin. Bernstein and Rakoff³ have shown the increase of monilial infection during pregnancy due to increased glycogen content of the vaginal mucous membrane.

Tissue injury, hot humid climate and blood dyscrasias have also contributed towards monilial infection.

Clinically moniliasis is seen as infecting (1) the skin and (2) mucous membrane.

On the skin they are seen to start in warm moist areas such as crural and axillary regions, interdigital areas under the breasts, angles of the mouth, between the toes etc. Mucous membrane lesions are seen as vulvovaginitis, thrush gastrointestinal lesions etc. Serious infections are rare such as pyelonephritis, pulmonary infections, endocarditis blood stream infections, kidney infections etc. Often they are quiet and in most cases clinical symptoms are not made out even though the smear exhibits candida albicans. Hence Harvey Blank has rightly named it as a frequent companion and occasional foe.

THERAPY

Various remedies have been tried from time to time and are still being used. As stated earlier much importance was not paid to clinical moniliasis in the past because before the wide scale use of antibiotics clinical types of monilial infections were milder, innocuous and nontoxic. In fact toxicity was found to be directly in proportion to the amount of antibiotics taken. As was indicated earlier the presence of candida albicans does not necessarily mean clinical moniliasis since no drug can completely get rid of the infection from the human skin and mucous membrane. Indeed even after the subsidence

133

of all clinical symptoms with treatment candida albicans can still be identified in smears.

Gentian violet (Methyl rosaniline chloride N.F.) One percent aqueous solution has been the treatment of choice for a long time ⁴. The results of this therapy has long been quite unsatisfactory and unreliable and in some cases have caused irritation also. Moreover to most patients it is quite unacceptable due to its cosmetic disfiguring properties. Nystatin an anti-fungal antibiotic first isolated by Hazen and Brown in 1949 from *Streptomyces Noursei* ⁽⁵⁾ has been extensively used in the treatment of clinical moniliasis. Nystatin could be applied to the mucous membranes of the mouth and the vaginal areas for prolonged periods in high concentration without sensitivity or irritation. Nystatin has been widely used for skin ⁶ and mucous membrane ⁷ lesions with excellent results.

Amphotericin B is one of two anti-fungal antibiotics recently recovered from the culture broth of a streptomyces isolated from a South American soil sample ⁸. This antibiotic has not been much used and is awaiting further research studies. The results thus far achieved are good. Other drugs that are being tried and still in the experimental stage are Trichomycin and Eulicin ⁹. These are also derived from *Streptomyces*.

CHOICE OF CASES AND OUR STUDY.

Sixty four (64) cases were chosen for study and only thirty one (31) cases with positive culture for candidiasis were chosen for therapy. We have used Ortho's Nickerson's medium for culture. These are available as small sealed test tubes with media and all one has to do is to take a smear from any of the skin or mucous membrane lesions with a sterile swab which is also supplied and dab over the medium and watch for results. If the smear is positive brown to black colonies develop within 4 to 6 days and incubation is carried out at room temperature. Only members of the genus candida grow in this medium and it does not support any bacterial growth. This medium is very convenient and practical.

Candida positive cases were treated with external application of Mycostatin ointment in which 100,000 units of Nystatin are incorporated in one Gram of Hydrocarbon Gel. (Plastibase Squibb). The patients were asked to apply this ointment twice daily. Tolerance was quite good and sensitivity to the drug or the base was not encountered in any case. Treatment was carried out over a period of ten to twenty days and the results were uniformly good and are appended below.

TABLE—I.

Total cases studied	...	...	Sixty four
Positive culture cases	...	...	Thirty one
CASES	NUMBER	RESULTS	
1. Perleche	18	14 cases completely healed up.	
2. Vulvo vaginitis	3	All healed up.	
3. Thrush (children)	2	All healed up.	
4. Nail infections.	4	Very slight improvement in all cases.	
5. Interdigital Candidiasis	2	Both improved to some extent.	
6. Intertrigo	1	Healed up.	
7. Nutritional Dermatitis (Scrotum)	2	Healed up completely. Had Vitamin B 12 and B Complex als.	

CONCLUSION:

Thus 22 out of 31 cases responded exceedingly well to Nystatin therapy. Only the Nutritional Dermatitis cases were supplemented with Vitamin B ¹² and B Complex. Nail infections and inter-digital candidiasis showed poor response probably due to occupational trauma. Repeated cultures were taken as and when possible during the course of the treatment to evaluate the therapeutic efficacy of Nystatin. We have carried out this work using only Mycostatin ointment and none of our cases were supplemented with Nystatin orally.

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SPECIAL ARTICLE

Prepared for Mediscope

By

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Essentials for Clinical Research in Medicine

Disease is as old as living matter and disease of some kind has always afflicted man and led him to search for means of easing pain and curing disabilities. For this purpose he obtained knowledge of drugs. With the passage of time this became the speciality of certain individuals known as "The Medicine Man." Not only this but religion and magic were also introduced to cure such diseases which were not cured by drugs. So medicine, religion and magic have been associated for the alleviation of human sufferings. The faith healing procedures of religion and magic help in restoring the harmony in the functions of the body through removal of some source of disharmony in the mind.

Doctors engaged in practice of medicine are doing practical work. The largest group is of private practitioners but some work in hospitals; various branches of Public Health and in numerous specialities like radiology and pathology etc. Gairdner in 1888 laid stress on the classical derivation of the word "Physician" and acclaimed him as essentially a student of nature. The same idea was developed by John Ryle in his book "The Natural History of Disease". The natural history of disease remains the basis of all good medical practice. Careful clinical history of the patient and close search for symptoms and signs of disease frequently help us to arrive at a complete diagnosis even in out-patient department. But we fail to make an accurate diagnosis on many occasions and a further laboratory and radiological investigations are essential to confirm the original diagnosis. The

advances in medicine during the past fifty years have led to great expansion of laboratories and institutions for clinical investigations. Both help in making an accurate diagnosis and correct treatment. Thus both the study of natural history of disease and new scientific method of investigation are carefully blended for the benefit of the patients.

The physician is a teacher. He is instructing his patients during illness and also on how to keep well. Original meaning of the word "Doctor" is teacher. Medical research interests all of us; the word "Research" means search and research for the explanation of natural phenomena and how to control or alter them. Many of the problems of fundamental research are so difficult that they can be undertaken only in Universities or special research institutions with expensive apparatus. Research in general practice is a more difficult problem, but it should give great satisfaction to any one to have built in firmly even one stone in the wall of research, thus to have continued to the final success. In the words of Sir John McNee "Opportunity for discovery of new syndroms by simple observational method of naturalist are not yet over, although they are limited." Inspired with these thoughts the British Physicians have established the "College of General Practitioners" to extend opportunities to undertake research in general practice.

Constitution of WORLD HEALTH ORGANIZATION defines health as "State of complete physical, mental and social well being." This is followed by the statement that "The highest attainable standard of health is one of the fundamental right of every human being without distinction of race; religion, political belief, economic and social condition." This is somewhat idealistic; only a pious expression of faith. More teaching of preventive methods are

required not only to the doctors, medical students but by doctors to lay-man. Epidemiology has been presented as the diagnostic discipline of Public Health (Gorden 1254), the means by which mass disease is measured, evaluated, and prognosis determined. Along with clinical medicine and experimental pathology, it is one of the three general method by which progress is directed towards improved prevention and a better clinical management of disease. Mass disease is looked upon as the interaction of a triad, the host (man), an agent of disease and the intricate complex of environment. The basis of all the epidemiological enquiry is the vital statistics supplied by practitioners and medical officers of health; and analysed by the Registrar General. The collection and dissection of vital statistics is essential for the development of biostatistics which ultimately leads to the public health measures for prevention of disease. The basic scheme involves field survey with the object to find the prevalence of particular disease at a particular time and to find out the focus of disease with the aim to trace the line of transmission and formulate principles for control directed towards limitation of death, defect and disability. *Laboratory methods* are combined with epidemiological study. To-day we study other diseases like diabetes, heart diseases, nutritional disorders and other many conditions on epidemiological lines.

After this brief survey of the activities of Medical Man of today as a Naturalist, diagnostician with experimental pathological and radiological techniques and a student of epidemiology, we should consider the conditions existing in our country. We have a large population and much less number of scientifically trained doctors. The greater share of the population is in the villages. Due to inconveniences in rural areas, lack of facilities of education to children and modern amenities of life, doctors do not settle there. Even in small towns having

police stations or Tehsils, we hardly find a doctor settled in private practice. Some of these small towns have Government dispensaries. Thus the rural medical care is mostly dependent on the Vaid, Hakeems and Homoeopaths etc. The people of villages are poor and ignorant and prefer indigenous system of medicine, magic cure or prayers and visits to holy shrines. The medical men working in dispensaries have no facilities for investigating patients to confirm or disprove their diagnosis. Their medical practice is entirely dependent on clinical knowledge and therapeutic effect of drugs. The facilities of surgical work are negligible. There is hardly any maternity aid.

In urban areas and District centres there is overcrowding of doctors as private practitioners. Besides there are state hospitals having meagre facilities of pathological and radiological examination. The accommodation in these hospitals is much less in comparison to the demand of the growing population. The hands to run these hospitals are few in comparison to the pressure of work, therefore, on various occasions medical men working in these hospitals are not able to do justice to their profession. The medical officers of these hospitals have to run the pathological and radiological work also. There are no facilities for confirming the diagnosis and occasionally a wrong diagnosis leads to much waste of money, human energy and even life which could have been saved if we had the modern facilities for accurate diagnosis and correct treatment. Thus we are only naturalists and lack the help of modern laboratories and radiological investigations. In the present state of affairs the doctors neither have the opportunity to clearly understand many diseases which require investigation nor they are able to extend correct treatment in obscure cases.

Our preventive medicine is also in deplorable state. We have only few hands to

work. There are no laboratory facilities for the workers. Our Government have decided to have community projects which will work to study disease as they affect population, but unfortunately these will have no laboratories which are essential for such studies. In other countries epidemiological study made greatest progress only when laboratory methods were combined with field study. This may be said to have started when Robert Koch left his laboratory to study cholera in Egypt. This principle has governed epidemic study in communicable diseases ever since; Communicable diseases have first rank and will continue for long unless we work vigorously in survey of whole population, designed to determine the prevalence of disease; focus of infection, and line of transmission which will give us effective direction for control and prevention.

The medical colleges in India have limited accommodation and the laboratories are also not fully equipped with modern apparatus to carry on the fundamental research which cannot be carried out without a special research institution unfortunately not existing in this country.

The medical knowledge has increased very rapidly in recent years. The vast contribution of radiology and clinical laboratory goes down to the roots of the medical diagnosis. In chest diseases, bronchoscopy, tomography and thoracoscopy have helped in the growth of chest surgery. In heart diseases, angiocardiology and cardiac catheterisation have led to more precise diagnosis that can be attacked surgically. The electrocardiography has helped in the diagnosis of coronary disease. The air-encephalography, arteriography and electroencephalography have given aid to the development of neuro-surgery. Studies in electrolyte and water balance with their extensive laboratory facilities have proved of great therapeutic importance in many medical and surgical conditions.

Keeping in view the present day conditions of medical facilities in our country and the difficulty of funds, poor economic position, I suggest that if you start developing the following four bodies the problem will be solved, as these are essentially required for clinical research in medicine:

I. Zonal Hospitals: It is essential that we should have some hospitals capable to carry on all the above mentioned investigations. These may be called ZONAL HOSPITALS. They should be situated in the centre of three or four districts so each State may be divided into ten or twelve zones with a big hospital at each centre.

The hospitals should have the following sections:—

- (a) *Surgical Unit* consisting of General Orthopaedic, Ear, Nose and Throat, Thoracic and Neuro Surgeons.
- (b) *Medical Unit* consisting of General Physicians, Paediatrician, Cardiologist, Neurologist, Psychiatrist, Dermatologist and Tuberculosis Specialist,
- (c) *Ophthalmic Unit*,
- (d) *Gynaecology and Maternity Unit* consisting of Gynaecologist and Obstetrician,
- (e) *Dental department*,
- (f) *Laboratory:* This should have sections of clinical pathology, Bacteriology, Biochemistry and histology.
- (g) *Radiology* consisting of diagnostic section and therapy section.
- (h) *Mobile Unit:* The Mobile Unit of hospital technique should be attached to help the workers to investigate the patients at their homes and to assist in the epidemiological study.
- (i) *Publishing section:* to keep record of all the meetings and discussions on the cases of clinical interest.

(j) Registrar General Sub-Office.

(k) Health and preventive medicine section.

Doctors in Government service stationed in the Zone should be placed periodically for one or two years to work in these hospitals under the guidance of specialists in various sections in rotation so that their knowledge will become up-to-date and they will get practical experience. On an average in each zone if there are 100 officers posted, twenty-five may be posted periodically every 5 years for one year to work in these Zonal hospitals.

The activities of these hospitals should be:—

- (1) Investigation of cases and establishing the accurate diagnosis,
- (2) Help in the epidemiological study of diseases in the Zone,
- (3) Teaching:—
 - (a) Post-graduate Medical study:
 - (1) Doctors working the Zone,
 - (2) Private practitioners desirous to have modern knowledge.
 - (b) Nurses, Almoners, Compounders, Health visitors and Mid-wives etc.,
 - (c) Vaid and Hakeems and Homoeopaths must be trained on the scientific lines in the basic subjects like Applied Anatomy, Physiology, Pathology and Hygiene so that they may be able to understand the human problem better.
- (4) *Research Work:*—It should be carried out on common problems of the Zone.

II. Medical Research Council:

In every state of India there should be a Medical Research Council. The function of this body should be to help in establishing the fundamental Research work in the Zonal hospitals. This should infuse enthusiasm in the workers and guide them to the ultimate success.

III. National College of Physicians and Surgeons :

Each State should have its own National College of Physicians and Surgeons on the same pattern as in United Kingdom. These colleges are examining bodies. The examination is conducted and the Board of Censors allow those candidates to be elected as members who satisfy them by the adequate knowledge and experience.

The Board of Censors through their good office may direct the Zonal hospitals and see that at these places proper and upto date post graduate training is carried out.

IV. Registrar General :

Statistical study of diseases and causes of death requires an office to keep records of all the reported diseases and deaths. This will help in studying the disease on epidemiological lines. Each Zonal hospital should have a sub-divisional Registrar General Office where records of all the cases from the Zones should be collected and epidemiological study is carried out.

Thus these four bodies namely (1) Zonal hospitals with Mobile Units (2) Medical Research Council (3) National colleges and (4) Registrar General's office will have the following advantages :—

- (1) They will make doctors better clinician and diagnostician and investigator into the ordinary problem of research. They will have a facility for postgraduate study.
- (2) They will help us in understanding the disease better making correct diagnosis and giving modern treatment.
- (3) The problem of mass disease will be studied and progress will be directed towards prevention and better clinical management.
- (4) The wide spread interest which these will create in the medical education will lead to better civilisation as it will strengthen one of its basis.

- (5) The Mobile unit of laboratory and X-ray technique will help us to study the disease at the homes of the patient as advocated by James McStalker in his article on general practice and need for hospital technique in the homes of the patients.

For this type of re-organization and re-orientation, we require a pool of young keen intelligent medical men and the forward policy of the administration in extending financial help in the development of hospitals and research technique. The conservation of funds and attraction of further funds from public philanthropists should be one of our object. More vigorous programme should be carried out for collection of money through hospital seals, a campaign already in existence. The money collected from three or four districts will be enough for building big zonal hospitals. By creating these four bodies we will make the knowledge of our doctors up-to-date and their mission more dynamic. Vaidys, Hakeems and Homoeopaths being trained on scientific lines will understand the disease better and render better medical aid. The mobile unit of hospital technique will extend the mission of modern medical diagnosis even to the remote places.

Thus these bodies aim at achieving the highest standard of medical aid which is existing in most civilised countries of the West like Britain and U.S.A. To-day efforts are being made only to improve and achieve the minimum standard but the aim should be to achieve the highest. In the words of Wangesteen an American surgeon speaking at the American College of Surgeons, "Men are imitative. That which contributes to the growth and development of the best man in any profession also is best therefor for the group as a whole. Some do not believe this. I believe it to be one of the great lesson of life. Much effort of a society frequently is directed at improving the

minimal standards and equal effort directed at the highest level, will I feel, pay greatest dividends, gains and advantages which will accrue to all engaged in the common venture." This reassertion and reapplication of doctrine of aristocracy by a great surgeon of the great American democracy is for us interesting and perhaps timely.

"We needs must love the highest when we see it."

—(Tennyson)

So our aim should be to attain the highest rather than to think of the minimum. Aim should be to attain the highest

standard of modern medicine and to extend all the present day medical facilities to the citizens. By building zone hospitals and creating the Medical Research Council, the National Colleges and the Registrar General's Office in every State of our country, we will extend the message of best modern treatment, the principle of public health measures and of social medicine to every national of this country. The clinical research will be built on sound foundation and every medical man will be stimulated to work for the common good, and happiness for his people.

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SPECIAL ARTICLE

Prepared for Mediscope

By

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Carcinoma of the Fallopian Tube

REPORT OF A CASE

Primary cancer of the Fallopian tube is extremely rare. It comprises 0.5% of all malignant diseases of the female genital organs (Mitchell and Mohler 1945). Only about 500 cases have been reported so far in the literature. The case which we have encountered deserves publication on account of its extreme rarity.

Case Report

A fifty year old woman was admitted into hospital complaining of pain in the right iliac fossa of four months duration. She had also noticed a mass in the right iliac fossa for some time. There was nothing relevant in the gynaecological history except that she had attained menopause 3 years ago. Her obstetric history was non contributory. She had borne three normal live children, the last delivery having taken place 23 years ago.

General examination showed nothing abnormal. An abdominal examination revealed the presence of a firm mass in the right iliac fossa. The mass was arising from the pelvis and reached almost to the level of the umbilicus and was freely mobile. The following were the findings on vaginal examination. The vulva vagina and urethra were healthy. The cervix was pointing forwards and the uterus was retroverted and bulky. Some what antero-laterally a pedunculated mass was felt attached to the uterus and extended to the right iliac fossa. A provisional diagnosis of a subserous fibroid (or a tubo-ovarian mass) was made. After suitable pre-operative preparation a laparotomy was performed under spinal anaesthesia. The uterus was normal in size. A mass which seemed to be tuboovarian in origin was about 7 cm. in diameter and located on the right side. The intestines and omentum were adherent to the mass. The adhesions were carefully released but during this process a part of the mass burst and a serous fluid as well as some necrotic cheesy matter escaped. There was a tubo-ovarian mass on left side which was smaller in size. This was adherent to the colon. The left fallopian tube was distended with fluid.

A total hysterectomy with bilateral salpingo-oophorectomy was done. The patient made an uneventful recovery. Macroscopically the tumour presented a picture of a tubo-ovarian mass. The outer end of the tube was nodular and cystic. It had a thin wall. The inner end was firm and slightly dilated. A section of the tube in this region did not show a distinct tumour but presented a soft fleshy growth which was whitish in colour. Microscopically there was marked proliferation of the villi giving an adenomatous appearance. The covering epithelium was multi-layered and exhibited irregularity in alignment. The nuclear changes suggested malignancy. The muscular wall was not actually invaded. Cancer of the fallopian tube was diagnosed (Figure). The patient had a course of deep x-ray therapy post-operatively.



Courtesy: Department of Pathology,
The Govt. Women and Children's
Hospital, Egmore, Madras

The histological features of Fallopian tube carcinoma are shown in this microphotograph.

Commentary

Cancer of the Fallopian tube may occur at any age but the greatest incidence is from 45 to 55 years of age. A few patients may complain of colicky pain. Intermittent thin watery or blood stained discharge is the symptom from which 25% of cases complain (Ruge 1917). The tumour causes distension of the tube and in rare cases may reach a size enabling it to be palpated per abdomen. Usually vaginal examination reveals a

tender swelling in one of the lateral fornices. In certain cases intermenstrual or post-menopausal bleeding may help in suspecting the condition.

Cancer of the Fallopian tube usually affects the middle or outer third of the tube. In 30% of cases the disease affects both tubes. The degree of enlargement of the tubes varies considerably. The swelling is usually retort shaped being narrow at the isthmus. The tube is free of adhesions unless infection has supervened. When the tube is cut the tumour is generally found filling the lumen. The wall is thin but not usually involved.

In advanced cases fragments of the tumour may be expelled through the fallopian tubes into the abdominal cavity where they may get implanted. It may also spread by way of the lymph or blood stream giving rise to distant metastases in the nodes or other viscera.

Because early diagnosis is not usually made the prognosis is not good; the five year cure rate is in the region of 50%. The accepted line of treatment for fallopian tube cancer is to perform a total hysterectomy and bilateral salpingo-oophorectomy and to follow it up with deep x-ray therapy.

Acknowledgment

I am grateful to Dr. M. K. Krishna Menon, B.A., M. D., Director, Institute of Obstetrics and Gynaecology, The Govt. Hospital for Women and Children, Madras for permission to report this case from his unit, and to Dr. B. M. Venugopal Shetty M. D., Pathologist of the hospital for his valuable guidance concerning the pathological aspects of this case. My thanks are due to Dr. Vishnu Sarma, M. A., M. D. (Cantab), B. Chir., M. R. C. S. (Eng.) L. R. C. P. (Lond.), D. G. O. (Madras), Tutor in Obstetrics and Gynaecology, Stanley Medical College for assisting me with this case report.

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SPECIAL ARTICLE

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The Clinical Diagnosis of Foetal Death in Utero with Special Reference to the Value of Radiology

For a variety of reasons a foetus might die within the uterus and the recognition of this event may be of importance in Obstetric practice. In the diagnosis of foetal death in utero one should pay more attention to the clinical features—the history which the patient gives and the physical signs which are elicited. Although the foetus might die it should be remembered that the placental tissue may remain active for some time. As long as there is placental activity hormones will continue to be secreted. Only when placental activity ceases, hormonal action wanes and finally disappears so that many of the manifestations of pregnancy gradually recede. The lack of growth of the foetus and hence that of the uterus also, in size is an important sign of foetal death. Secondly there may be considerable disparity between the period of gestation and the size of the uterus. If foetal death has occurred the dead foetus may be retained for some time. The foetus shrinks and hence the uterus also becomes smaller. The size of the uterus will not correspond to the duration of amenorrhoea which the patient gives. The patient herself may have noticed certain subjective symptoms most of which are related to the cessation of hormonal activity. Breast activity may diminish. If the foetus is dead the patient may notice that foetal movements are absent. If gestation has been of some duration and the foetal heart was heard at one time it may now disappear. Occasionally there may be some vaginal discharge which is a sign that the uterus is attempting to expell its contents.

Eucharius Rosslin (1526) describes some of the subjective symptoms and physical signs which characterise foetal death thus:

Signes then that the birth is dead in the Mothers Wombe, be these.

1. First, if the mothers brestes doe suddenly slake, as I touched before.
2. If it moove it selfe no more, being wont before to stirre.
3. If when the mother turneth her from the one side to the other, shee feele it falling from one side to the other like a dead weight.
4. If her belly and Navell begin to waxe cold, which before was wont to be temperately hot.
5. If any stinking and filthy humours flow from the Matrix and chiefly after some fell disease.
6. If the womans eyes were hollow, and that her colour change from white, to swarte and dunne colour, and that her eyes and nose ware astinied, and have not their right use, and her lips ware wanne.
7. If beneath the Navell and about the secret parts shee feele great throng and paine, the colour of her face changing into worse and worse, otherwise then it was wont to doe.
8. If she have appetite to eate such things which be against nature, and not wont to be eaten or drunken.
9. If she be in her sleepe vexed with vaine and terrible dreames.
10. If she be pained continually with the strangury, or that she inforce her selfe much to the stoole, and with all her power and yet cannot doe anything.
11. If her breath being to stinke, the which thing lightly happeneth two or three dayes after the byrth be dead.

12. If the hands be put into very warme water, and then layd on the womans belly, and the child stirre not, is a sign that it is dead.

13. Of all these signes now, the more that come together of them at one time and in one person, the surer may ye be that the byrth is dead, the which being once dead, all diligence must be had that it may be expelled out of the womans body."

If the foetus has been dead for some time and has become macerated it is possible by compressing the foetal head per abdomen to elicit crepitations as the skull bones override. This sign is very characteristic of foetal death. When a patient goes into labour vaginal examination may show the amniotic sac to protrude through the cervical opening like a sausage shaped bag. Later when the cervix is dilated it may be possible by the feel of the foetal skull to recognize that the child has been dead for some time. Sometimes gross over-riding of the vault bones may be recognized. However useful they may be most of these signs may be elicited only when the child has been dead for some time. The most reliable special method of confirming that foetal death has occurred is by radiography.

Radiological diagnosis.

The following points may of great help. The skeletal parts of the foetus appear to be much smaller than might be expected for the period of gestation. Serial radiological examination made over a period of weeks may show absence of continued foetal growth. When the foetus dies it shrinks. At the same time the uterus is pressing on the foetus. The result of this is an overlap or over-riding of the skull bones. (Figures 1 a, b, c, and d.) This sign was named after Spalding who described it (Fig. 2). It is a useful sign but it may take some time for it to appear possibly 4 to 5 days or even 2-3 weeks. It Must be emphasized that the foetus can be



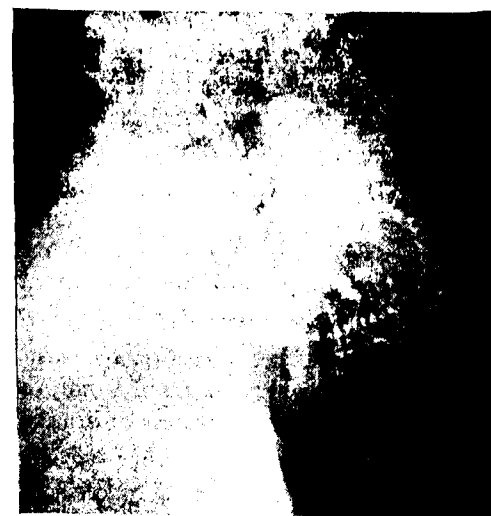
1. A.



1. B.



1. C.



1. D.

Figure 1 A-D (Courtesy: The Govt. Women and Children's Hospital, Egmore, Madras)

This series of x-ray pictures demonstrates the progression in the development of the radiological features of foetal death. Figure A is an x-ray picture taken on the 3rd day after the foetal heart became inaudible. There is no radiological evidence of foetal death. Figure B is a picture taken about 8 days after foetal death. There is definite overlapping of the foetal skull bones. Figure C and D were taken 16 days after foetal death. There is extreme overlapping of the skull bones seen in the antero-posterior view. The lateral view demonstrates hyperflexion of the fetus.

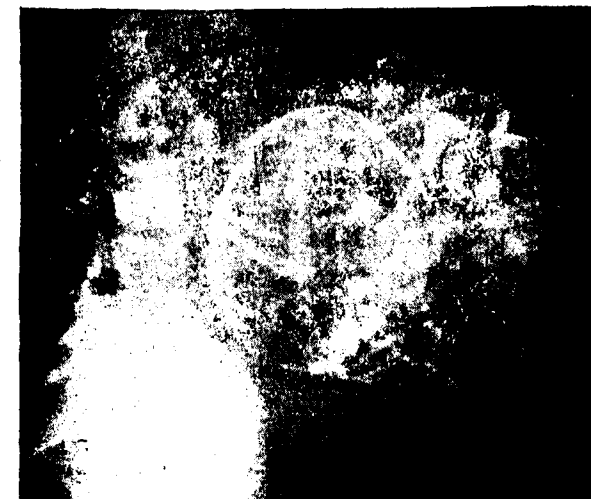


Figure 2 (Courtesy: The Govt. Women and Children's Hospital, Egmore, Madras)

This excellent picture demonstrates Spalding's sign. The skull bones show overlapping. The fetus itself is somewhat oblique in lie.

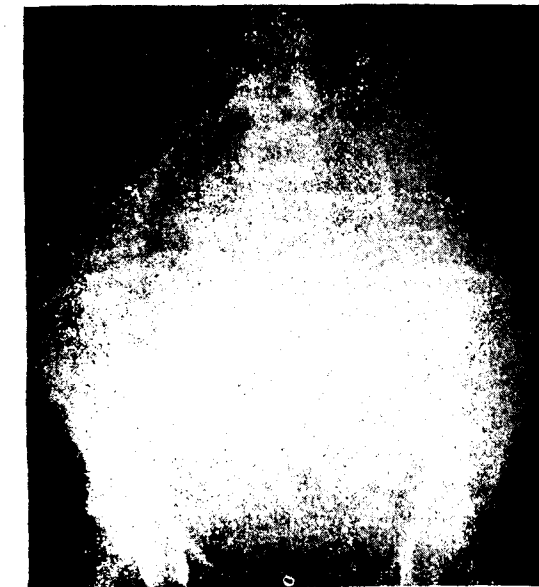


Figure 3 (Courtesy: The Govt. Women and Children's Hospital, Egmore, Madras)

This x-ray demonstrates the presence of two signs of foetal death. There is overlapping of the cranial bones and the fetus is hyperflexed. In a fetus presenting by the breech Spalding's sign is a late finding.

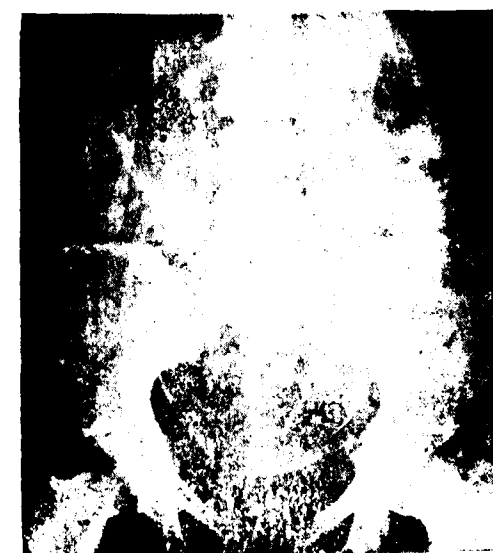


Figure 4 (Courtesy: The Govt. Women and Children's Hospital, Egmore, Madras)

The fetus shown in this x-ray shows disorientation of most of the bones. This is an advanced sign of foetal death.



Figure 5 (Courtesy: The Govt. Women and Children's Hospital, Egmore, Madras)

This unusual x-ray picture shows a spontaneous pneumo-amniogram secondary to foetal death. The gas which has been liberated during the process of maceration has collected in the lumen of the uterus. The patient gave birth to a macerated foetus weighing

dead without over-riding of foetal skull bones being necessarily present. It should be remembered that there may be slight degrees of over riding as the foetal head traverses the birth canal (moulding). It is important in the interpretation of an x-ray picture to know whether the patient is in labour or not. If a foetus presents by the breech over riding of the skull may take longer to develop (Fig. 3). Therefore in breech presentation the over-riding of the skull is a much later development than in vertex presentations.

When a foetus dies it loses its tone and as a result it tends to become hyperflexed or rolled into a ball (ball sign of Hartley) so that it occupies only a small space in the uterus. If after about 24 weeks gestation the foetal heart cannot be heard and foetal death is clinically suspected, radiological evidence of hyperflexion is suggestive of foetal death in utero. This sign is more common in a foetus which presents by the breech.

Some time after death the foetus undergoes a process of maceration. All the bones tend to collapse. This is most strikingly seen in the spinal column which shows angulation in the region of the lumbar and dorsal spines and also in the region of the thorax where the ribs of the thoracic cage collapse (Fig. 4).

When maceration has become well established the foetus is represented by a general haphazard collection of bones without any orientation whatever. Should the foetus happen to lie in an ectopic site it cannot be expelled and may be retained within the abdominal cavity when it undergoes a process which finally ends in the deposition of calcium salts. A calcified foetus is then called a 'lithopedion'.

Kuchenmeister describes three types of lithopedion.

1. Lithokelyphos. In this type, calcification and fatty degeneration occur in the

exudative lymph surrounding the fetal membranes and in the membranes themselves. As a result a stone-like capsule is formed about the foetus, while the foetus itself may undergo slight or massive degenerative changes.

2. Litokelyphopiedion. This is a form in which the fetus becomes adherent to the sac, with both the fetus and sac showing widespread infiltration with lime salts. Kuechenmeister believed that this variety resulted when the amniotic fluid escaped or was absorbed, with the membranes themselves becoming tightly wrapped around the fetus.

3. Lithopedion (stone child or lithotecnion). This includes in general all types of calcified fetuses, although the term refers especially to the form in which the foetus itself undergoes organization and massive calcification. A true lithopedion forms when the fetus escapes unattached into the peritoneal cavity with or without the enveloping membranes.

Depending on the duration of the gestation outside of the uterus, various changes inevitably take place in the fetal structures. Chemical alteration, such as saponification and a drying process, mummification frequently occur. After a time, lime salts are deposited in the fetal tissues or in the membranes, with the result that stone like masses are finally produced. With these phenomena present, a fetus is designated a lithopedion.

It has been demonstrated that when mummification of an extrauterine fetus occurs, no trace of the placenta or placental tissue can be found. Mummification results from the absorption of fluids, whereupon the remaining soft parts are converted into hard, parchment-like material.

Another sign of importance and some value and which has been described by Roberts (1944) is the demonstration of gas in the foetal blood stream. The gas may be present in

the heart, aorta, iliac vessels, umbilical and liver vessels and even in skull vessels in the still-born infant. The gas is seen in x-rays (especially lateral projection) of the foetus in utero. Even fluid levels may be seen within the heart. It is said that the demonstration of free gas may precede other x-ray signs of death or may sometimes be the only sign that appears. The gas may disappear before delivery or become reduced in amount. The presence of the gas may be demonstrable at any time between 3 days and 2 to 3 weeks after the foetal heart ceases to be heard. The free gas is believed to be nitrogen.

Another interesting sign is that gas may escape into the amniotic cavity and outline the cavity of uterus (Spontaneous pneumo-amniogram) (Fig. 5.).

TREATMENT

Once intra uterine death of the foetus has occurred, spontaneous expulsion usually results but this may be delayed. The knowledge that the foetus is dead is unpleasant for the patient and is often a disagreeable sensation to the mother. Both the patient and her obstetrician may wish to hasten the process of expulsion.

J. Y. Simpson wrote "When the foetus labours under any morbid state which proves fatal during its abode in utero, there generally elapses an interval of 5-25 days before uterine contractions, necessary for its expulsion, supervene, but that during

this time a number of changes are liable to occur" "not only must account be taken of changes within the dead foetus closely resembling those occurring in the dead body of an adult, but that there are additional effects of the endosmosis of the liquor amnii through the dead tissues of its body, and the continued maceration of those tissues".

Surgical procedures for evacuating the uterus are risky and the use of endocrines have been advocated and used effectively. Jeffcoate reports 87 % success. Perhaps in the great majority of cases no harm results from the retention of a dead foetus in utero for a time. The modern view is that a long period of retention (that is for more than four weeks) is not without danger there being a remote but nevertheless important risk of the complication of inducing a blood clotting defect (hypo or afibrinogen-aemia). The amniotic fluid of a patient whose foetus has been dead some weeks has fibrinolytic properties (Vecchiotti 1953). The level of free oestrogen rapidly falls after foetal death and it is believed that the administration of oestrogen may stimulate the uterus to contract.

It is the object of the author in this brief but profusely illustrated article to depict some of the radiological features of foetal death, and to do so effectively, free use has been made of clinical and radiological material from the Government Women and Children's Hospital, Egmore, Madras.

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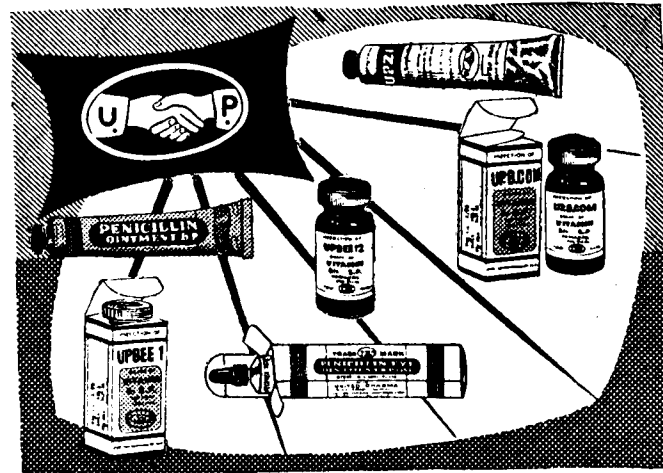
BOOK SECTION - I

(Contd.)

PLASTIC SURGERY FOR MEDICAL STUDENTS AND DOCTORS

BY

Dr. R. J. MANEKSHA, F.R.C.S. (Eng.)
SPECIALIST IN PLASTIC SURGERY



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Defects of the ear

What are the defects that occur from birth ?

- (1) Absence of the external ear.
- (2) Absence of the canal.
- (3) Projecting or “ aeroplane ” ears.
- (4) Unequal size of ears.

What is the cause of an absent ear ?

The ear may be underdeveloped or may be absent when there is a developmental defect of that part of the face which is the mandibular (jaw) arch.

A small remnant of the ear is generally present which is at a lower level than the opposite ear.

Can a person with such a defect hear properly ?

Yes, as the inner ear is generally normal.

At what age should such operation be undertaken ?

The ideal age is about 14 years, because the opposite ear has reached its proper size at that time. Usually the parents of the child are very anxious from birth that something should be done and it is for this reason that plastic operations are undertaken at a younger age keeping in mind that the ear should be made bigger than the one on the opposite side at that age.

What is the exact nature of the operation that is done ?

A skin tube is raised on the abdomen back or on the chest which is then transferred in stages to form the rim or margin of the ear (helix).

Will such a tube resemble the ear ?

To a certain extent yes. It cannot resemble the ear perfectly.

Is anything inserted in that skin tube?

Yes. Moulded cartilage or a plastic implant is inserted latter on into the skin tube which gives it the shape of the ear.

If the ear canal is absent is a new one made?

No. This is not necessary.

What are "aeroplane" ears?

The normal ear stands out at a certain angle from the face. When they stand out very prominently, the defect is often called 'aeroplane ears' or 'tea cup handles'.

Why are ear deformities more distressing in males?

Deformities of the external ear derive a certain distinction from the fact that they are the only deformities which are more distressing to men than to women. The fair sex can find a way of draping the hair over the ear—men have no such resources. Men's ear must face the pitiless test of complete exposure. Woe betide the unhappy male if his auricular appendage stands off at right angles to his face, resembling the renowned cauliflower too closely. Unlike most deformities it provokes mirth rather than compassion. People with normal features sometimes fail to realise the mental distress of patients with such ears—children often develop a complex when at school. The torture is mental than physical.

Why does it stand out like that?

W. H. Lockett of New York pointed out in 1910 that the main cause of prominent ears was due to the absence of the Antihelix fold and hence devised this operation, in which the Antihelix is recreated by the operation to be described below:—

Defects of the ear

There is a defect in the formation of the antihelix. The antihelix folds the ear upon itself to give its normal shape. When the antihelix is absent, the ear is unfolded and thus it stands out at right angles to the face.

What are the four types of prominent ears?

Cases of prominent ears are divided into four types in order of increasing deformity.

Type 1: Here the Antihelix is formed but is not folded back as in the normal ear and scaphoconchal angle is widened. When the ear is large it appears to stick out.

Type 2: Here the superior crust of the Antihelix is absent and the ear is prominent in the upper part.

Type 3: The whole antihelix is poorly formed and the superior crust is absent. The ear stands out at the right angle. This is the most common type met with for surgery.

Type 4: The Antihelix is totally absent. The ear is of foetal type and is often associated with microtia. This type affecting the top portion of the ear is called "shell" ears.

Why does a ear appear prominent in a young child?

The ear reaches its full size when the child is 7 years old and may look prominent at this age due to their relatively large size. As the age increases and head continues to grow they no longer appear prominent.

Can this defect be treated?

Yes. The best age of correction is after four years.

Various Methods of Treatment have been attempted with results.

1. Methods which partially obliterates the post auricular suturs.

(a) Monk's Operation of simple skin excision from the Cephalo-auricular angle.

(b) Combined skin and conchal cartilage excision of the same level by Morestin and later by Joseph.

(c) Attempts to pin the ear at the back with cartilage flaps or the fascial strips.

As will be seen none of these operations have attempted the formation of absent antihelix.

Luckett's operation is performed as follows. With a few minor alterations used by the author. The patient is kept in the prone position and the area carefully cleaned and draped. The ear is folded back and the correct line for the antihelix and the crura is immediately realised. This is marked out with Bonneys Blue on the outer surface of the ear. Next the skin is infiltrated with local anaesthesia with adrenaline in the inner and the outer surface of the ear. The skin incision is made on the posterior surface and about 5 m.m. away and along the helix curve. The skin is undermined sufficiently. Three needles dipped in Bonney's Blue transfix the ear from the anterior surface and along the line of the marked antihelix. With the needles in position the cartilage is cut from posteriorly thus forming the antihelix and the crura, as the ear is folded backwards. Inferiorly, incision should be to the antitragus. Damage to the skin anteriorly is carefully avoided but is separated from the cartilage unless a ear is a very big one. With the ear folded backwards the redundant elliptical segment of posterior skin is next excised. Three mattress sutures are passed from the anterior surface going through an anterior skin and

Defects of the ear

the folded cartilage ends are tied over cotton swabs. The posterior skin is next closed by a subcuticular stitch or horizontal mattress sutures.

Dressing with flavine paraffin wool and a firm creape bandage complete the operation. Patient can be sent home after operation. The mattress sutures are removed on the 5th day, the subcuticular stitch on the 8th day. For the next one week the crepe bandage is put on at night and then discarded.



Fig. 1.
Partial Loss of ear

Fig. 2.
After Repair

What anaesthesia is required?

If the child is very small it is done under general anaesthesia. After the age of 8 or 9 years this operation can be done under local anaesthesia.

What are the recurrence rate?

In some rare cases if the cartilage is not properly removed there might be a recurrence of the defect which can be cured by a second operation.

Are any marks left after the operation?

No. Since the operation is done from behind the ear, no marks are seen except when somebody particularly looks for it behind the ear where a line will be seen.

Plastic Surgery for Medical Students & Doctors

Is hospitalisation necessary?

When treated under general anaesthesia, one or two days stay in hospital is advisable. Cut under local anaesthesia the patient may be able to go home.

Is the part bandaged?

Yes. And the bandage is generally kept for ten to fifteen days and then it can be removed for the day but is reapplied for the night for another 15 days.

What is the cause of unequal size of the ears?

There is no definite cause but some children are born with this defect.

Can anything be done for them?

Yes. The bigger ear is generally reduced by removing a wedge of tissue i.e., skin and cartilage from the bigger ear and the margin joint so that both the ears are equal in size now.

Is any defect left after this operation?

Usually not.

Acquired Defects of the Ear.

Partial loss of the ear.

What are the causes of partial loss of the ear?

The ear may be partially destroyed in cases of accidents, burns, leprosy and in a condition called lupus.

Are there any psychological effects of such a loss?

Yes. The person who suffers from an accidental injury or from any disease which destroys a part of the ear is bound to suffer from an inferiority complex and may constantly avoid exposing the defective ear.

Defects of the ear

Can anything be done for such cases?

Yes. Plastic reconstruction of the lost part is possible, after any infection is under control. The exact method of restoring the part depends upon the amount of tissue lost and there are various methods of bringing extra tissue or that ear. At first the skin is restored and at a second operation a piece of cartilage is put inside to make up the shape.

How long does it require to do this operation?

Since this operation cannot be done in one stage, it requires a period of three to six months before all the stages could be completed.

Complete loss of the ear.

When does this occur?

The causes are the same as mentioned above but the cause is more severe so as to destroy the whole ear.

Is it possible to make a fresh ear again?

It is possible in the same way as for partial losses. But to make a complete new ear is the most difficult problem of plastic surgery and hence it is sometimes advisable to give an artificial ear made of plastic material which can be fixed by adhesive which can be reapplied daily or the artificial ear is fixed to the side of the face by making two small skin loops to which the artificial ear is clipped on.

Does the artificial ear made of plastic resemble the normal ear?

To a certain extent yes, as the artificial ear is painted to the skin colour.

How long does an artificial ear made of plastic last?

The usual life is about two to three years when it has to be remade.

Torn Ear Lobules.

What is the cause of torn ear lobules?

It occurs after wearing of very heavy ear clips where the opening gradually becomes bigger and bigger till ultimately the lobule is separated into two parts

How is this defect treated?

It is possible to reconstruct the lobule again by delicate suturing of the torn skin flaps after freshening the edges. Sometimes it is necessary to make the hole in another place.

CYSTS OF THE EAR

What are the swellings that occur on the ear either on the front or the back side?

These swellings are cysts of the cartilage which can occur on either side of the ear and produce small marble like swellings which are hard to the touch.

Can anything be done for them?

Yes. They could be easily removed without leaving any defect behind.

CHAPTER 8

Paralysis of Half of one Side of the Face

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FACIAL PARALYSIS

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What is facial paralysis and what is it due to?

The muscles of the face which produce expression are supplied by the nerve which is called the facial nerve (VII th Cranial nerve) which comes from the brain, travels behind the ear and then divides into five branches which spread out on the face like the fingers of the hand to supply all the muscles of expression on the face. When the nerve is damaged due to any injury along its path, or is infected the muscles of the expression stop working giving rise to a peculiar asymmetry of the face.

What is the appearance of a person with facial paralysis?

The normal furrows of the face are absent on the affected side and when the patient smiles the angle of the mouth is not properly raised up. The person is unable to whistle, nor can the patient shut the affected eye when the eyeball is seen to roll outwards.

What is the commonest cause of facial paralysis?

Very often due to exposure to cold on the face the nerve becomes temporarily paralysed. This can occur suddenly in one night also. Injury to nerve may occur during mastoid operations.

What is the treatment of such a facial paralysis?

In early cases when no permanent damage to the nerve is suspected, medical treatment with vitamin B1 injections and heat to the nerve is advised.

What is the treatment of late cases of facial paralysis?

Different types of plastic operation are done in these cases.

(1) Grafting of the nerve, or nerve anastomosis.

(2) Graftings of tendon and fascia lata to act as static or dynamic slings.

What is the actual operation of nerve grafting?

The facial nerve is sometimes injured in operations behind the ear or when the parotid gland is operated on. If a large part of the nerve is damaged it is not possible to join the two ends together then a nerve graft from the thigh is put in between the two ends or the lower end of the nerve is joined to another nerve in the neck which supplies the



Facial Paralysis

Fig. 1. Before

Fig. 2. After Repair

control of the nerve and the muscle from the brain. Hypoglossal nerve is often used.

Paralysis of Half or one Side of the Face

What is the tendon or fascia operation? (Sling operation)

This operation is to pull up the paralysed muscles by a series of slings made up of tendon or fascia. The upper end of the sling is fixed to the temporal muscle whilst the lower end is attached to the muscles of the side of the mouth and the upper and lower eyelids.

What is the effect of this operation?

The slings hold the paralysed muscle in a pulled up condition so the symmetry of the face is restored and when the patient smiles or tries to close the eyes the defect is minimised.

Are any scars seen after this operation?

The scar on the temple is not visible because of the hair. But a small cut has to be made near the angle of the mouth and the inner side of the eyes.

What is the cause of paralysis of the upper eyelids?

The upper eyelid is supplied by a thin muscle which comes from behind the eyeball (Levator Superioris) and is fixed to the cartilage plate in the upper eyelid and is known as the elevator muscle of the eyelid. It is supplied by the third Cranial Nerve. When this nerve is not working the person is unable to lift the eyelid (ptosis). In some children it is present from birth and may even attack both the eyelids. Sometimes after injuries to the eyeball the nerve is paralysed. In cases of diseases of the thymus gland there is weakness of both the eyelids which is more marked during the evening time.

What is the treatment of drooping eyelids to paralysis?

Just as in the case of facial paralysis a sling operation is done for the upper eyelid. The two ends of the sling are fixed to the muscle underneath the eyebrow.

Under what anaesthesia is it done?

Generally local except in children.

CHAPTER 9

Deformities of the Hands and Feet

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Fused fingers and toes. What is the cause of this condition ?

This condition occurs from birth, and is due to the non-separation of the fingers from each other during development of the fetus.

What are the symptoms ?

Usually there are no symptoms but the parents of the child bring the infant to the doctor at birth because they have noticed this deformity.

What can be done for such a case ?

The skin of the fingers is separated and stitched thus separating the two fingers. In some cases the skin is short and a skin grafting is required in the raw area.

What anaesthesia is used ?

For a child general anaesthesia but in an adult local anaesthesia is sufficient.

How long does a patient have to stay in a hospital ?

Two to three days stay is necessary as the dressing can be done in the surgery.

Are there chances of the fingers sticking back together ?

If the operation is not performed properly and if adjoining raw areas are left there is a chance of a partial recurrence of this condition.

Deformities of the Hands and Feet

Will the separated fingers work normally ?

Yes.

Double fingers or toes. What is this condition of double fingers (bifed) or toes due to ?

This usually occurs at the end of the fingers or the toes where it is in two parts with two nails. It is due to the last bone dividing into two parts.

Can anything be done for this condition ?

Yes. The smaller bifurcation (separation) is usually removed and the extra bone cut off.

What will be the result ?

The result will be a normal looking finger or a toe.

Constricting bands or rings round the limbs. What is their cause ?

Like the above two conditions, this is also present in a new born child and is supposed to be due to partial cutting off of the part whilst the child is in the uterus due to the umbilical cord although the exact cause is not known.

What is the treatment of such a condition ?

The constriction in the skin is released by a simple plastic operation which is known as the Z operation.

Will the limb be alright after that ?

Yes.

How long does the patient stay in the hospital ?

One weeks stay is necessary in the hospital.

Can it be done at any age ?

Yes.

Can the person use the limb normally after that ?

He can use it better than before after this treatment.

Forked hand. What is it due to ?

This is also a congenital condition, where the palm and the fingers are in two separate blocks with a space in the middle.

Can anything be done for such a condition ?

No.

The Early Management of Hand Injuries In Industry. What is the percentage of hand injury generally ?

The hand is the most important part of the body for a manual worker besides his eyes. Out of every three injury cases, one is that involving the hand. It was found by statistics published in the United States Department of Labour that annually out of two million disabling work injuries three quarters involved some permanent damage to the hand. This figure suggests the immense problem of the proper prevention and management of hand injuries in any country and especially in India where technical aid plays a very important part in the development under the Five Year Plan. In a factory only 40% of the injuries to the hand are due to machinery. The rest of the injuries are due to other accidents like falls, brushing of the hand against any hard object, etc., etc. It is the duty of the industrial medical superintendent to find out those persons who are "accident prone" because it is noticed that there are certain individuals who suffer from accidents repeatedly whilst there are others who are definitely immune to accidents.

What is accident proneness due to ?

Accident proneness may be due to personal factors like physical defects, social and economic instability of the patient.

BOOK SECTION - 2

(Contd.)

Retinal Detachment

AND

Its Modern Treatment

BY

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Retina Detachment and its Modern Treatment

the retina" by Hanseen does not seem to offer a plausible explanation, but it is possible that it may play an indirect role by leading to degeneration of the retina and vitreous which may exercise their influence in the formation of holes thus leading to detachment. (Fig. 6)

8. Chorio-retinal affections :

The chorio-retinal affections which accompany detachment of the retina are of a degenerative or of mild inflammatory nature. Among the first, myopia and senile degeneration of the retina predominate. These two, very similar to each other are manifested by a thinning or an atrophy and fibrous degeneration of the retina with formation of vacuoles (cystic-degeneration).

Acute inflammatory affections may produce a retinal detachment by exudation from the choroid, but it is the chronic mild inflammation which is important and plays a role in idiopathic retinal detachment. Lesions of equatorial or peripheral choroiditis are sometimes seen in an eye with retinal detachment as well as in the fellow eye (Fig 7). The aetiology of this type of chorio-retinitis is in most cases tuberculous (Arruga) or of distinct focal origin. Syphilis rarely figures in the aetiology.

In disseminated choroiditis detachment of the retina is rare because the patches of chorio-retinitis with its intense reaction hold the retina and the Choroid glued together. On the other hand a small patch of peripheral choroiditis involves a weakening or even a complete solution of the retina frequently associated with adhesions to the vitreous body in its immediate neighbourhood ; in these conditions a retinal hole easily results either spontaneously or on the

Aetiology

receipt of a minor trauma. Detachments, due to inflammations, exudative sub-retinal fluid from scleritis, tenonitis, orbital cellulitis etc., or traction by cicatricial fibrous tissue will be discussed else-where.

9. Changes in the Vitreous—particularly its detachment :

During routine slit-lamp microscopy of the posterior part of the eye by Hruby's lens or Goldman's contact lens, one can discover many changes in the vitreous particularly its liquefaction and detachment in many cases of myopia, injuries of the eyes, inflammation of the uvea and cases after intra-ocular operations. This will be dealt fully and in more details by Prof. K. Hruby separately (chapter 4) but it may be enough to mention that detachment of the vitreous (superior, posterior-simple or with collapse etc) is found in almost every case of retinal detachment, (Fig 8) but it should not be presumed from this that every case of detachment of vitreous is dangerous and pre-cursor of retinal detachment. Only that group of cases in which prior to vitreous deatchment, some sort of adhesions or synechiae developed between retina and vitreous at the site of localised degenerative

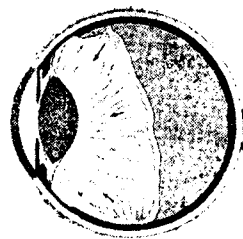


Fig. 9 Detachment of vitreous which is also retracting. Note its adhesions with the retina which will form into a flap hole.

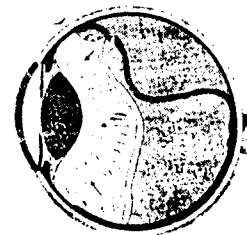


Fig. 10 Flap hole has formed due to adhesions of detached vitreous with the retina.

Retinal Detachment and its Modern Treatment

or peripheral chorio-retinitic spots, constitute a predisposition to later retinal detachment. These adhesions on sudden movement, minor trauma, or physical strain, form a flap hole in the weakened area of the retina by their traction upon it. (Fig 9 and 10). The adhesions between the flap of the hole and posterior phase of detached vitreous can be seen clearly in cases of detachment of the retina by slit-lamp examination of the posterior part of the eye.

Mr. Teng & Chi have drawn distinctions between two types of vitreous liquefaction. The first type is characterized by the fact that it starts from the central core and extends to the periphery and there is no posterior detachment of the hyaloid membrane in this type. The second type is characterized by anterior contracture of the solid portion in a liquid form but there is a usually posterior detachment of the hyaloid membrane in this type. They also distinguished between two types of vitreo-retinal adhesions the senile peripheral adhesion and the local adhesion which forms at the site of congenital rosette. This local type of adhesion often includes some of the immediately adjacent area.

Type II liquefaction of vitreous and a vitreo-retinal adhesion are invariable factors in producing retinal detachment. Any motion which produces traction at the site of the adhesion is believed to be a precipitating factor. It may cause a retinal tear and once this happens fluid vitreous may get behind the retina and separate it from its layer of pigmented epithelium.

10. Trauma :

A definite history of trauma in the aetiology of detachment of the retina is an association which has long been recognised. It must be remembered that a history of this nature is not necessarily reliable, for it is not difficult for a patient to discover some past injury, especially when

JUNE '52

11

14

171

Aetiology

there is a question of a claim for compensation and, conversely, it is as easy to forget the causal injury when it is remembered that the detachment may become obvious only after the lapse of a considerable interval of time.

Injuries to the eye may be divided into (i) Direct, in which are included (a) perforating wounds; (b) intra-ocular foreign bodies; and (c) contusions with or without scleral rupture; and (2) Indirect injuries such as (a) blows and contusions on the head or more rarely, the body; (b) sudden movements or shaking especially of the head; and (c) the increase of local blood pressure due to physical straining such as, typically, the efforts to lift a heavyweight, a sudden increase in abdominal pressure, and so on. To a very large extent these indirect injuries, which are usually small acts, not as the primary cause of detachment, but merely as the precipitating agent in an eye already prone to this accident, the sudden strain determining the formation of a tear in the retina after other factors, such as degenerative or inflammatory processes, have produced a region of weakness. The direct injuries, on the other hand, are more likely to produce a retinal tear and subsequent detachment in eyes otherwise healthy, the perforating injuries and intra-ocular foreign bodies not uncommonly being associated with a primary type of retinal detachment which occurs at the time owing to the trauma itself, and a secondary type which occurs at a later stage and is due to cicatrization and retraction of scar tissue. Contusion injuries, if of sufficient severity, may well be the sole cause of detachment in a healthy eye; the mechanism of such usually being a tearing of the retina from its attachments, either at the ora-serrata or at the optic disc—much more commonly the former, by the sudden distortion of the globe. A localised retinal dialysis of this type at

Retinal Detachment and its Modern Treatment

the ora-serrata and situated typically in the lower temporal quadrant is relatively common, but very extensive tears may occur here extending half-way or even completely around the circumference. An avulsion of the retina from the disc giving rise to a total detachment of the retina is however, much more rare. Alternatively, damage may be done to the retina, involving the immediate or delayed formation of a hole which subsequently leads to a detachment. Such a hole usually occurs in one of three vulnerable positions; (a) at the site of the injury (b) at the macula, which is structurally the weakest part of the retina; or (c) at the point opposite the site of injury the point of contrecoup.

So in most of the cases, minor indirect trauma acts as a trigger in starting a chain of events which have already been predetermined by other and more fundamental factors. The practice of all ophthalmologists is full of such incidents as witness the occurrence of a detachment after gymnastic exercises, a train journey, during the tail-spin of an airplane, abdominal straining, the extraction of teeth, and innumerable other such circumstances. On the other hand, when the eye itself is healthy, a retinal detachment from this cause alone is somewhat rare, a fact well seen in the comparative rarity of the occurrence of this accident in the Great War. The choroid, indeed, is more easily ruptured than the healthy retina, and the normal eye can stand the most severe trauma involving even rupture of the sclera and the loss of vitreous without the occurrence of a detachment.

One point noteworthy in connection with contusions as an aetiological factor is the possibility of a considerable interval elapsing between the receipt of an injury and the recognition of symptoms. The occurrence of a

Aetiology

delayed detachment may be due to several reasons, but probably the most common is that the retina is torn at the time of the accident but does not become detached, or so extensively detached as to attract notice, until some time has elapsed. Alternatively, a localized oedema with a circumscribed peripheral shallow detachment occurs at the time, which later on 4-6 weeks after becomes more extensive. Histories dating back several years must, of course, be accepted with reserve, although the sequence is obvious when cicatricial tissue and retracting scars have been formed.

These considerations, of course make the assessment of a claim for compensation in many cases difficult. On the one hand, a patient is ready and wishful to conjure up an accident to account for his symptoms: and on the other hand, an accident of some months priority which has passed unnoticed may be the real cause. Further, in many eyes predisposed to detachment by myopic and senile changes, a strain or considerable exertion sustained at work may prove to be the exciting factor which precipitates the event; and in this case partial compensation would seem the fairest treatment. Again, years after the extraction of a foreign body, a perforating wound, a haemorrhage or the extraction of a traumatic cataract, a detachment may develop long after the claim has been settled and the eye assessed as of considerable use. It is a complex and difficult subject requiring careful consideration.

11. Aphakia:

Detachment occurs quite frequently in Aphakic eyes, Shapland 9.7% Weve 8%. The great majority of such eyes operated on for cataract are myopic. According to Arruge, 1-2% of these operated suffer detachment when they are not

Retinal Detachment and its Modern Treatment

myopic, whereas those who are myopic suffer detachment in 10 to 15 of cases. When the detachment occurs after six months from the date of operation, it is very probable that it has no relation to the operation in itself, although it must be recognised that the greater mobility and frontal displacement of the vitreous are factors that rather favour the detachment. They may be classified into three groups:

(a) After Extra-Capsular Extraction:

In these cases Shapland has found that it occurs in about 2.2% after an average interval of 3 to 4 years a figure which makes this complication of considerable importance in the operation specially in myopes. After the primary operation, the main aetiological factors are loss of vitreous and antecedents myopia. Baurmaum found a detachment following 10% of extractions where vitreous loss occurred and 1.87% where it did not. The typical story in these cases is an Incarceration of vitreous in the wound sometimes accompanied by capsular remains, a gradual contraction of this towards the scar in the process of cicatrization, with resultant traction on the retina in the lower half of the globe by the adherent infero-peripheral portion of the vitreous body which eventually occasions a retinal detachment in this situation.

After needling detachments are more frequent than after the occasion of extraction itself. This may be due to actual tearing of retina by too strenuous manipulation at the time of operation (Csapody) to vitreous prolapse into the anterior chamber, or to bands of vitreous running backwards from the discission scar to the retina (Sinclair, Roberts and Meisner).

Aetiology

(b) After Intra-Capsular Extraction :

The result of frequency of detachment of the retina after extra-capsular and intra-capsular operation has been a source of controversy. The greater number of cases met within this series is due to the fact that Intra-capsular extraction is the routine in most of the clinics. Though it can be easily understood that after intra capsular extraction, the vitreous body is no longer held back by the Zonulo-Capsular septum, but extends forwards and becomes more moveable and that thereby traction on the periphery of the retina easily follows with formation of holes and detachment. But Arnold Knapp who reported 8 cases in 500 extractions by this method is convinced that this complication is less frequent after intra-capsular operation; a belief which is borne out by a consideration of the causes of detachment. Organisation of vitreous bands does not follow after intra-capsular operation, as it sometimes does after discission, this is probably explained by the relative absence of inflammatory reactions in cases of intra-capsular operations unless vitreous is lost or cyclitis develops. Professor Lindner and Weve also uphold this view that intra-capsular extraction if done carefully and with proper precautions, is less harmful than an extra-extraction where subsequent discission is indicated. They also think that thorough study of fundus particularly the periphery where holes are usually found in aphakics become difficult in persons having extra-capsular extractions where slight amount of capsular remains may be present. The incidence of the complication seems to depend on loss of vitreous. It is because of this that it is a routine in our hospital to do extra-capsular extraction in the other eye of the patient who has lost his one eye by detachment. Prof. Franceschetti advocates a prophylactic Diathermic barrage before undertaking surgery of cataract.

Retinal Detachment and its Modern Treatment

(c) After discission of soft cataract :

After this operation retinal detachment is of relatively common occurrence. Mr. Shapland obtained a figure of 10.7% for this from the Moorefields inpatient records, the average interval between discission and onset of retinal detachment being 24.6 years. The majority of these cases had developed what would have been a high degree of myopia had they remained phakics by the time the retina detaches and this would appear to be the chief aetiological factor. Needling for Myopia is especially prone to be followed by this disaster, a fact which should contra-indicate Fukala's operation.

12. Influence of Eye Strain :

The relation of ocular work, as an aetiological factor of retinal detachment is not very clearly established. Some authors consider that ocular work enters into the aetiology of detachment, but any such influence, if at all must be extremely small and unimportant. There are cases of detachment after excessive use of the eyes, yet there are many others in which the affected eye is amblyopic, has advanced myopia and has not been used or according to the patient has been used less than usual for a period of time previous of the onset of the disease. It is interesting that Gonin has noticed the occurrence of detachments following strengthening of the glasses of myopes more frequently than can be accounted for by coincidence. When the ciliary muscle contracts in the act of accommodation, it is known that the retina is slightly pulled forwards as far back as the macula and it is conceivable that this forward movement might precipitate a detachment already imminent. The experimental work done on dogs by Lashley in the clinic of Utrecht is somewhat suggestive.

Aetiology

13. Seasonal variations :

The statistics collected by R. Weekers on the seasonal appearance of 208 cases of so called idiopathic detachment of the retina, show preponderance for summer, but no such observation is made by others. The rise in the incidence of the detachment in spring and in summer in Northern hemisphere has now been proven, but the casual factor of this variation is not known. Light appears to play some role in its aetiology.

14. Psychic & Emotional Disorders :

They have a certain influence in the production of detachment of the retina. The patient very often states that the appearance of the detachment followed immediately upon an unpleasant experience or a strong emotional shock. In these cases, the functional vascular disturbance, and the accompanying physical activity, bring about the detachment in a retina which is almost ready to be ruptured or detached.

15. Hepato-renal insufficiency :

This is sometimes found in patients affected with retinal detachment, probably the functional disturbance of these organs and the consequent intoxication, leads to defective nutrition of the retina, thus favouring degenerative lesions.

16. Dyscrasias :

These are likewise favouring factors for detachment of the retina, and lymphatic diathesis, obesity, gout, arthritis, diabetes etc., may sometimes be found in patients with this disease. The poor constitutional quality of the tissues in general; and the tissues of the eyes are not exception to it.

CHAPTER III

Pathogenesis and Aetiological Theories

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As the causes of retinal detachment are very diverse, therefore, it will be obvious when I say that the pathogenesis is multiple. For the last 50 years or so ophthalmologists have expended their ingenuity in devising new theories to explain this accident and the diversity of these which have been propounded and accepted merely serves to indicate the difficulty and complexity of the problem. Custom has divided these theories into four categories; Distension, Exudation, Traction and Hypotony. No doubt in some cases all authors agree as to the manner in which the retinal detachment is produced (exudative cellulitis, orbital inflammation etc.,) but in Idiopathic retinal detachment, however the opinion have differed greatly. Since Gonin pointed out the importance of retinal rents in the production of detachment of the retina, the pathogenic theories have had definite trend; but at the same time, different interpretations have arisen regarding the mechanism of the formation of the tears and their mode of action on the production of the detachment.

As said before there are many theories which have been put forward by different authors to explain the formation of holes or tears, whose role in the development of retinal detachment is incontestable. Amongst these, theory of cystic degeneration (Vogt's theory) and theory of Vitreous traction or vitreous shock (Leber, Gonin and Lindner's

Pathogenesis and Aetiological Theories

theory) can explain most of the cases of Idiopathic retinal detachment. I will discuss these two in detail and make a passing reference of others at the end.

1. VOGT'S theory of Primary atrophy & cystic degeneration of the retina.

Cystic degeneration of the retina is a passive degenerative process wherein gaps are formed within the tissues owing to the disintegration of its neural elements. This rarefaction of nervous elements of the retina is usually associated with degenerative changes in the capillaries and may occur anywhere in the retina but it shows a predilection for the two places where this tissue is thinnest and least efficiently vascularised that is the periphery and the macula. Cystic degeneration in the first of these sites is very common. (Cystic degeneration of Iwanoff).-It begins at about from 20-30 years of age and is more accentuated temporally than nasally. In senile and myopic eyes it is especially more common.

These degenerative and cystoid spaces usually arise where the supporting structure of the retina is weakest i.e. in the inner part of the outer nuclear layer and the inner nuclear layer. At an early stage they frequently form two parallel rows of small spaces in the two nuclear layers, but as they enlarge, they coalesce forming single row, the individuals of which increase in size so that eventually, as the true retinal layers gradually atrophy, Muller's fibres become elongated by stretching, and finally the retina, which though becomes thickened, is represented merely by pillars of drawn-out fibres, the ends of which are spread out on the two limiting membranes: (Fig. 11) Both these processes of cystic degeneration and atrophy weaken the retina, thus favouring the formation of rents. This may be facilitated by minor traumatias or even pull from the vitreous adhesions.

Retinal Detachment and its Modern Treatment

Periphery of the retina is affected more frequently due to:—

1. It is the area of transition.
2. Insufficient blood supply. Temporal periphery is affected even more, as it is at a greater distance from the disc, which lies on the nasal side.
3. It is frequently the seat of mild infective processes.
4. Ciliary muscle and zonule of zinn may exert some influence.

This cystic degeneration according to Vogt is the main cause of retinal detachment. But careful examination of the patient definitely reveals that it is not the common cause of detachment, although it may be typical and the only cause in certain group of detachments. (Fig 28)

Cystic degeneration of the macula leading to primary macular holes can also be explained by this theory and will be discussed separately.

(2) Theory of retraction of the Vitreous or Vitreous shock (Leber Gonin and Lindner's theory) (Fig. 12).

This was brought forward by Leber in his first theory but he later on abandoned it, as he thought that detachment was brought about by the retraction of a false membrane produced between the hyaloid and the retina (Pre-retinitis). Later on it was presented by Gonin and elaborated by Lindner. This theory can explain most of the cases of Idiopathic retinal detachment. Slit lamp microscopy of the posterior segment of the eye has proved the correctness of their percept. The connections of detached vitreous with a torn flap or a free lip of the retinal tear in the living eyes, is of enough evidence in its favour (Fig 15). One must not,

Pathogenesis and Aetiological Theories

however, overlook the fact that traction of the detached vitreous and degeneration of the retina itself often occur simultaneously.

According to this theory, (Fig 12) the key stone of its pathology is the vitreous, the gelatinous mass which fills the lenticular space of the normal eye. During life several changes of the vitreous develop or may develop.

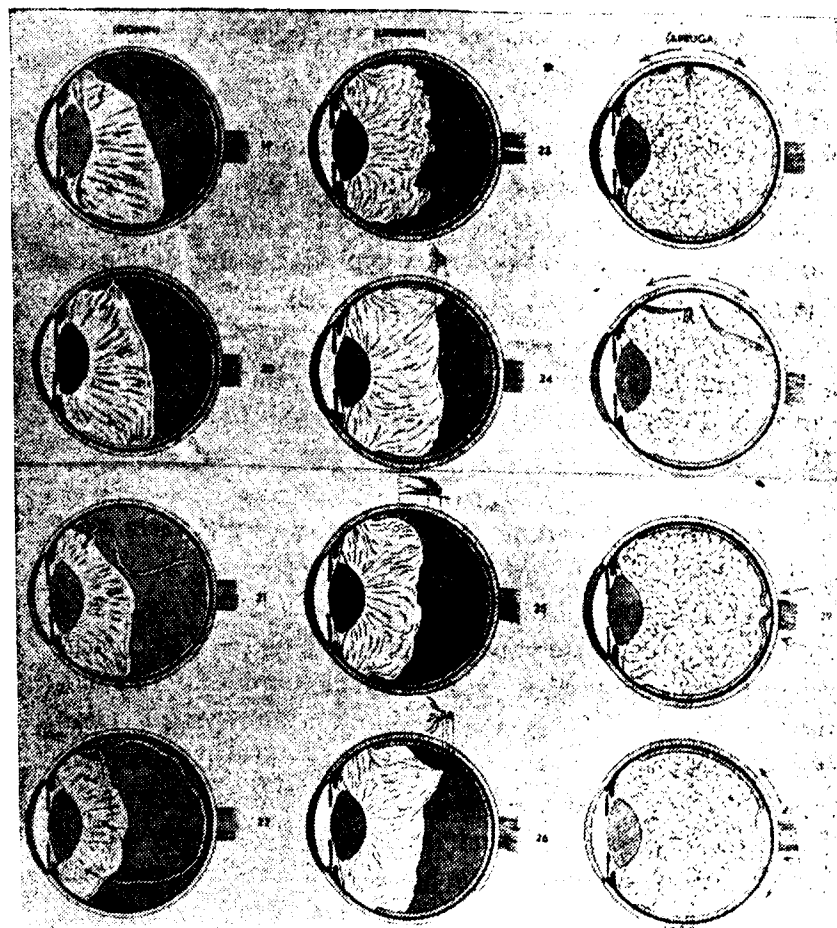


Fig. 12. Pathogenesis of retinal detachment explaining theories of Goinin, Lindner and Arruga.

Retinal Detachment and its Modern Treatment

1. In time, vitreous becomes liquified, the process of liquefaction starting in the centre of the eye. This partial liquefaction may be considered as physiological senile change.

2. The vitreous may become detached from behind and fill the anterior part of the post-lenticular space, while the space behind the detached vitreous is filled with fluid (seen as optically empty zone under slit-lamp examination). (Fig 13 & 14) This detachment of vitreous may be caused by different influences and is quite common. The detached vitreous from behind, still adheres on to the retina nearer or farther away from the ora along a circular line.

Now there exists a group of cases in which the vitreous becomes detached, but prior to its detachment owing to some mild inflammatory process it has become more or less finally adherent to some areas on the retina. There is a simple experiment which will demonstrate the ease with which the vitreous will adhere to the retina when the latter membrane is inflamed. After removal of conjunctiva in a rabbit, and irritation of the sclera at the level of the equator with either chemical or physical agents, if the eye is removed after several days or weeks and placed in a solution of formaldehyde and then in alcohol, the vitreous retracts as a result of dehydration. One can then see that the vitreous is much retracted, but remains adherent to the retina at the place of irritation.

These are the cases with a probable pre-disposition to later retinal detachment. Why is this so? To understand this, we have to study purely mechanical facts. If we look to the left or right, up or down, our eyes perform a very quick rotatory movement. When we go straight ahead and keep our eyes directed straight, the eyes advance with us performing an advancing movement only, but no rotation.

Pathogenesis and Aetiological Theories

If a normal eye rotates, the vitreous in accordance with the law of *Inertia*, cannot follow this rotation at once, but will first stay behind the eyes. But when the eye stops, the vitreous having started in motion later, still continues to rotate. So the vitreous performs movements, which do not correspond to the movements of the eyes. The result of these independent movements is a slight pull from inside the retina everywhere, where the vitreous is adherent. It would be remembered that forward movements of the eyes without rotation cause no such separate movement of the vitreous. This pull in a normal eye (vitreous not detached and adherent) is slight without danger.

Let us now study the cause with detached vitreous. First, the detached vitreous is less elastic than normal vitreous, because it is somewhat shrunken. Secondly, the detached vitreous is limited on its posterior surface by a kind of membrane with little elasticity, the vitreal membrane (the back phase of vitreous). If such an eye looks up or down or rotates, the detached vitreous cannot follow the movements of the eye right away, but lags behind and if its elasticity is exhausted, suddenly pulls on its fastenings on the retina, producing the so called "Vitreous elastic shock". If the vitreous were regularly detached allround, this pull most probably would not do any harm, because it pulls on a curved line, the limit of the attachment of the vitreous to the retina.

But if this detachment of vitreous is irregular on account of individual synechiae between vitreous and retina lying behind the general line of adhesion of vitreous to the retina, this pull concentrates first on these spots. If we may so describe it, the whole living moving force of the detached vitreous attacks one single spot on the retina by traction.



Fig. 13. Detachment with collapse (a) under slit lamp. (b) Diagrammatic (Hruby).

Retinal Detachment and its Modern Treatment

This may happen repeatedly over many years without rupturing the retina. But as we become older and the retina degenerates in this area, all of a sudden given an unusually swift movement of the eye, the pulling vitreous ruptures the retina and causes the sudden appearance of the so called "flap-hole" (Fig 16). In other cases, a round or irregular piece of the retina may be torn away so that sometimes, we can see the piece of the retina floating in front of the tear. (Fig 16) This type of the tear has better prognosis as after operation the hole is sealed and there is no pull exercising on the retina, even after it is attached. In the flap hole we should be careful in proper diathermic application of the base, where detached vitreous is still adherent even after successful operation.

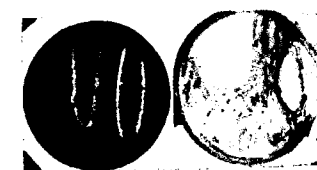


Fig. 14. Superior detachment of vitreous (a) under slit lamp. (b) Diagrammatic (Hruby.)

The sudden rupture of the retina by the vitreal force may rupture blood vessels, and many cases of detachment are first diagnosed as retinal and vitreous haemorrhages. Only when the haemorrhage gets absorbed, the pure character of the disease becoming visible.

Indirect traumatias act by causing a very quick involuntary movement of the eyes upwards for the sake of protection. This unusual quick movement is the ultimate cause of the retinal rupture by traction of the moving vitreous mass.

Mr. Teng and Chi have also remarked that type II liquefaction of vitreous characterised by anterior contracture of solid portion of the vitreous leaving the posterior portion in a liquid form with posterior detachment of the hyaloid membrane and vitreo-retinal adhesions are two fundamental anatomic pre-conditions of retinal detachment and that

Pathogenesis and Aetiological Theories

motion is the precipitating factor. Best emphasised



Fig. 15. Flap hole with adhesions of the posterior phase of vitreous with the flap of the hole.

that every movement of the eye-ball caused movement of the vitreous and this movement would exert traction at the point of vitreo-retinal adhesion. It is known that liquid and solid media react differently to the effect of inertia because liquid is more resistant to movement and stoppage than a solid. (Fig 17 & 18)

Therefore, in an eye with type II liquefaction a sudden motion or stoppage of motion may create traction at the site of the vitreo-retinal adhesion (Fig 12). The effect of momentum will depend upon its speed and direction, so that a quick movement may exert a great deal of force at the point of vitreo-retinal adhesion.

Motion may be either in a straight line or rotatory. If the force which pulls in the direction causing the greatest traction at the point of vitreous retinal adhesion is strong enough; it will precipitate a tear in the retina, especially if the retina is weakened by degeneration or atrophy.

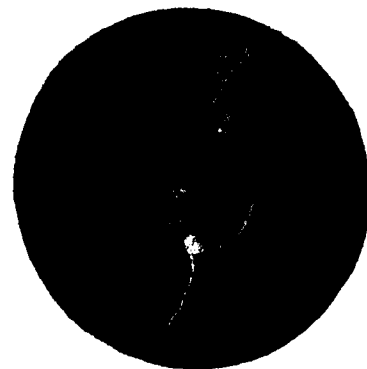


Fig. 16. Flap hole with free flap suspended in vitreous. Note the connections of vitreous with this free flap.

They also think that round or 'U' and 'V' shaped tears are usually the result of a local vitreo-retinal adhesion and that long horizontal tears are due to senile vitreo-retinal adhesion. In some cases the tear may start from a local adhesion and extend to a senile adhesion to form a long tear.

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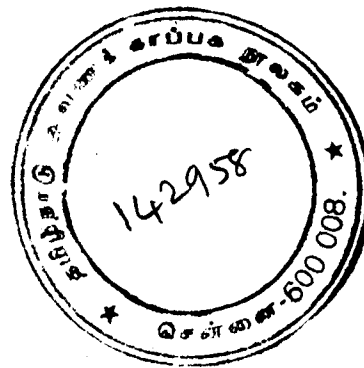
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