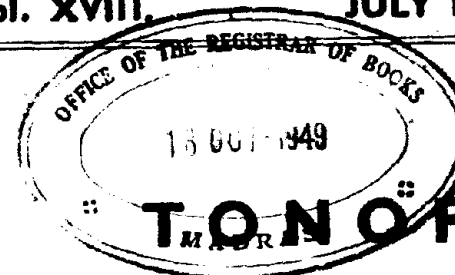


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PROLONGED LABOR*

EDWIN J. DeCOSTA, M.D.

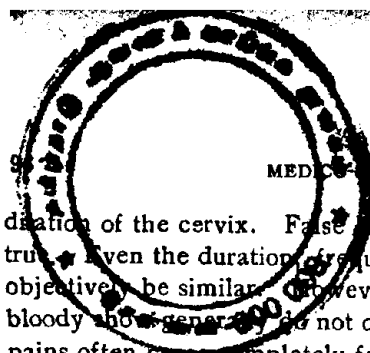
Chicago.

What is "prolonged labor?" An answer cannot be given without a little consideration. The accepted text books (Stander and DeLee-Greenhill) tell us that in the primigrabida the average duration of labor is eighteen hours. Calkins, on the other hand, finds labor to average only thirteen to fourteen hours. Accepting the fact that averages are made up of unders and overs, it becomes obvious that few labors should exceed twenty-four hours. Labor that exceeds the normally expected duration is considered prolonged. Reid considers this to be over twenty hours. Some authorities have arbitrarily chosen twenty-four hours. Others have selected thirty hours while still others even thirty-six hours. There is no unanimity as to the number of elapsed hours that constitutes prolonged labor. Perhaps this confusion is responsible for the variation in the reports of incidence of prolonged labor which, even under management is prevent its occurrence, varies from 2 per cent to 6.3 per cent in frequency.

Before further discussion of prolonged labor, it will be helpful to consider normal labor. The cause of the onset of labor is not known. There are certain observed facts, however, that are known. Generally, 280 days after the first day of the last menstrual period the uterus develops rhythmic, forceful, and painful contractions that lead to complete effacement and dilatation of the cervix, resulting in expulsion of the fetus. Yet labor may occur long before the accepted end of gestation and be normal in all other respects.

Rupture of the membranes at any time during pregnancy usually does something to initiate labor within a relatively short time, even when the pregnancy is not mature. Intra-uterine death of the fetus does not necessarily mean that labor will soon follow. In some women, the cervix has become effaced and partially dilated long before the onset of painful contractions; in others, this preparation is not evident. The patient is in true labor only when there is progressive effacement and

*Read before the Utah State Medical Association Annual Meeting September, 1948
From the Michael Reese Hospital, Chicago.



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dilation of the cervix. False labor may subjectively closely resemble true labor. Even the duration, frequency, and intensity of contractions may objectively be similar. However, descent of the presenting part and bloody show generally do not occur with false pains. Furthermore, false pains often cease completely for varying periods of time. Occasionally, false labor pains change abruptly into true labor pains.

The diagnosis of prolonged labor can be made when labor exceeds an arbitrary preconceived number of hours. Or it may be made by observing the evolution and progress of labour in the individual patient. In the latter, the diagnosis of prolonged labour will depend on whether or not progress is as anticipated in a particular patient. Arrest or delay may occur either in the first or second stage, though practically all prolonged labors are associated with prolongation of the first stage. While the second stage may continue to several times the usual one to three hours, in prolonged labor the total elapsed time in the second stage must always be a small part of the total labor. Operative interference can obviously shorten the duration of the second stage. Thus in prolonged labor we are primarily concerned with the first stage.

To manage labor properly, one must know the patient as well as know how to perform various technical maneuvers. This "knowing" begins with the first prenatal examination and continues until delivery is satisfactorily completed. Unless the patient is first seen in advanced labor, the management of prolonged labor begins with proper care throughout pregnancy. There are certain specific factors to which attention must be paid in predicting the probable evolution of labor. These factors, operating singly or in combination, will influence its course. Labor will be prolonged if many unfavorable factors are present. Knowing these ahead of time, we can wait with complacency or act quickly as the occasion demands.

The age of the patient does not appear to be too important a factor. However, in primigravidas over 35, labor frequently exceeds the normal average. Parity is most important. In Reid's series, 96.6 per cent of labors over twenty hours occurred in primigravidas. The general physical make-up of the patient can be exceedingly important. A short, chunky, muscular habitus—the so-called dystocia dystrophy type—often leads to poor labor while a thin, lithe habitus is usually associated with easy labor. The general health of the patient plays a minor role in the production of prolonged labor. The psychic or emotional constitution is of tremendous importance. The well-educated, introspective, fearful patient often has false pains, poor pains and prolonged labor.

The size of the baby is obviously important, and it is difficult accurately to estimate the fetal size either by abdominal palpation or x-ray fetometry. Presentation and position must not be ignored. Breech, particularly frank, and occiput transverse and posterior are often associated with prolonged labor. Errors in attitude can be important

factors. Duration of the pregnancy must be kept in mind; post-maturity may lead to difficulties.

The state of the membranes at the onset of labor can influence its course. Premature rupture of the membranes of itself is not important but it often aggravates the situation when associated with other factors of dystocia. Artificial rupture of the membranes is one of our most effective methods of including labor but there is a great difference between spontaneous and artificial rupture. In the latter the trained obstetrician insists that the cervix be ripe, partially effaced and dilated, and the presenting part engaged or engaging. He effects rupture at the most dependent portion and completely drains off the liquor. In spontaneous rupture, the cervix may be long, closed and firm, the presenting part high and the drainage incomplete.

The condition of the cervix at the onset of labor affects the duration. Calkins, who has been particularly interested in the state of the cervix, has shown that a firm cervix in the primigravida requires about three hours longer to dilate than a soft one. Effacement requires an additional three hours on the average. A closed cervix requires more time to open than one already partially dilated.

The station of the head at the onset of labor affects the duration of labor. In the absence of disproportion a floating head requires at least an hour longer than does an engaged head. Engagement gives the comforting knowledge that there is no inlet disproportion.

The size and configuration of the entire pelvis must be known. Pelvic capacity is concerned with more than knowledge of just the bony inlet or outlet. There are three bony barriers to the advance of the fetal head. A practical estimate of the adequacy of the pelvis may be summarized as follows: If the sacral promontory is not accessible to the examining finger and the sacrum has its normal biconcavity, there is usually no inlet obstruction. If one or both spines of the ischium do not protrude noticeably into the birth canal, there is no midplane obstruction. If the descending rami of the pubic bones form an arch and not an acute angle and if the knuckles of the clenched fist can be accommodated between the tuberosities of the ischium, there is no outlet obstruction. The value of pelvic measurements is well known; x-ray examination of the pelvis is of value in establishing pelvic inlet configuration. To date, x-ray pelvimetry has not been of value to us as a means of estimating pelvic capacity nor as a means of forecasting the proper management of the patient. Mobility of pelvic joints and the effect of the soft tissues can only be estimated by competent observation during labor.

The influence of the age, size, presentation, position and attitude of the fetus on labor is more or less predictable before the onset of labor. The most important fetal factor, however, is the extent to which the head will be molded. A good test of labor is the only way I know to determine the degree to which the head can be altered to accommodate itself to the birth passages. This factor is of paramount importance in relative

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degrees of cephalopelvic disproportion and in unfavorable position and presentation.

So far little mention has been made of the most outstanding factor in the evolution of labor, namely, the competence of the expulsive force. The uterine musculature deserves especial consideration because the association of the aforementioned factors with anomalies of uterine function leads to dystocia. We do not know the causes of primary or secondary uterine inertia, but weak, short and irregular pains are certainly often observed in association with other deviations from the normal. Whether or not the endocrines are responsible, faulty uterine development, anomalies of innervation or what not, the fact remains that in subsequent pregnancies inertia usually does not recur.

The essential difference between the primi- and multi-gravida lies in the fact that dilatation of the cervix and of the birth canal has occurred in one and not in the other. If vaginal delivery has been successful, the resistance of the birth canal has been tried and overcome.

Most authors are agreed that the cervix per se is rarely a cause of prolonged labor except when diseased, as by new growth or extensive scarring. On occasion, with ruptured membranes and moderate cephalopelvic disproportion the cervix may become wedged between the head and bony ring, leading to edema and even necrosis; ultimately avulsion may occur. Occasionally, fine circular fibers in the region of the external os prevent dilatation even though effacement is complete and contractions are forceful. This condition may be considered a type of conglutination although the external os is slightly dilated. The position of the cervical os with relation to the presenting part seems to influence the time required for effacement and dilatation. Sometimes the os lies either well anterior or posterior to the line of force. A shift in position may hasten dilatation. Finally and more commonly, we observe a dysynergism whereby the lower uterine segment and cervix seem to oppose the contraction of the upper segment. Pain is intense but progress is slow. Sympathetic factors seem to predispose to dysynergism and probably play an important role in its production.

Additional factors operate during the second stage. Among these are a rigid pelvic floor due to anatomic or psychic causes, poor abdominal muscles, lack of proper use of these muscles, or lack of proper instruction and co-operation from the patient.

Let us now put our knowledge to test. The patient was a 36-year-old para 4, one week past term. Previous labors, easy; largest baby, seven pounds, two ounces. She entered the hospital with ruptured membranes and in early labor. Uterine contractions appeared moderately strong, recurring regularly every three minutes. Yet after sixteen hours of such pains, she was still undelivered. The cervix was completely dilated and the head at +1 station. There had been no evidence of progress for the past two hours. Is this prolonged labor? I would unhesitatingly answer "yes" for

the following reasons: This patient had previously given birth to four children without undue difficulty. We would anticipate a similar experience now, and yet after sixteen hours of good labor she had not accomplished what we expected of her. When we then carefully evaluated the pelvic capacity we found it to be relatively small, and the baby quite large in a deflexed attitude. Had we considered all factors in advance we would have expected a long drawn out labor. Perhaps our management would have been the same, but at least we would have known what to expect.

Let us consider another patient. A 28-year-old primigravida at term. She had enjoyed robust health and in all respects appeared quite normal. She was a college graduate, a Phi Beta Kappa, and had read several books on childbirth. At each prenatal visit, she invariably had a long list of questions and generally complained of backache. She entered the hospital having severe seven minute contractions. Position LOA, membranes intact, station 0, cervix long, firm, not effaced and closed. After a few hours and a warm enema, pains became more intense and recurred every five minutes. At the end of eighteen hours, however, there was no evidence of advance, cervical effacement or dilatation. The patient was tired out and her family—father, mother and husband—were convinced that something was wrong. Is this patient really in labor? If so, what is wrong? Should we do a caesarean? Are we going to be stampeded into unwarranted and ill-advised interference? This patient is having false pains; she needs sedation and rest.

It becomes obvious that the management of prolonged labor requires understanding, patience, and stamina. Prolonged labor properly managed is attended by slightly greater danger to mother and baby than normal labor. It is essential to distinguish early between true and false pains. If there is no evidence of cervical change within a reasonable period, it must be assumed that the pains are false. The treatment is simple: the administration of adequate analgesia, preferably morphine or demerol. At times under the influence of such sedation, false pains become true and labor progresses normally.

Prolonged labor associated with good uterine contractions does not introduce serious problems if we understand the patient. As long as progress is definite and mother and fetus remain in good condition, one can afford to wait. During this period the nutritional and fluid requirements of the mother must be met and at least eight hours rest provided in each twenty-four by suitable sedation. If, however, progress is not obvious, the cause of delay must be determined.

The course of labor has been followed by abdominal and rectal examination. It now becomes necessary to examine the patient vaginally, such examination being made under strict aseptic technic. The levator muscles, the bony pelvis and the cervix are palpated. The presentation and position of the head as well as the station are determined. Further,

the effect of the contractions on both the presenting part and cervix is observed. It is necessary to decide whether or not the head can come through the pelvis. The impression method of Mueller, or a modification, is helpful in indicating cephalo-pelvic disproportion.

If an effaced cervix with little or no dilation is found, the passage of the finger through the external os may rupture the circular fibers that can so effectively interfere with dilatation. If dilatation has reached 5-6 cm., with an engaged head, rupture of the membranes may permit descent and more rapid progress. If during a contraction little pressure is exerted on the presenting part and the partially dilated cervix lies loosely over the presenting part, the possibility of constriction ring dystocia must be considered. Although rare, a constriction ring is a serious problem. If it does not relax under anesthesia and adrenalin, abdominal delivery is indicated. If the external os is found far posterior or anterior to the presenting part, an attempt may be made to bring the cervix into the axis of the birth canal. One thing must never be done: that is manual laceration of the cervix, more familiarly called manual dilatation. If for some reason delivery becomes urgent when the head is engaged and the cervix is dilated 6-7 cm., multiple cervical incisions (Dührssen's) may be performed.

We will now consider the management of the group of patients in whom prolonged labor is associated with ineffectual uterine contractions—so-called uterine inertia. As we follow these patients we have the feeling that all our troubles would cease if they would only have a few good pains. Uterine inertia may be manifest from the onset of labor—the pains are not effective, as a result of infrequency or lack of intensity, and progress is slow. Or inertia may appear secondarily after effective pains have been established. Secondary inertia can be produced by too early and injudicious use of analgesia or as the result of exhaustion. Here, as in the primary type, is psychogenic.

There are two distinct approaches to the factors play a tremendous role.

Treatment of these patients. One is based on the premise that eventually the patient will deliver if given sufficient time. Treatment is primarily supportive—adequate fluids and rest to maintain the patient's nutrition, water balance and strength. This can be accomplished most safely by parenteral 5 per cent glucose solution. In the absence of specific indication for interference, this policy of "hopeful expectancy" is generally followed throughout the country with brilliant results, such as those reported by Schmitz, in 5,599 patients the incidence of labor lasting over 24 hours was only 4 per cent. There was not a single high forceps, not a single Dührssen's incision for prolonged labor, and no maternal mortality! Delivery was not attempted in any case until the cervix was completely dilated. Only 6 per cent of prolonged labors exceeded sixty hours. This is an enviable record.

The second approach as advocated in the literature is based on the belief that once true labor has started, progress should be definite and sustained until delivery is effected. The uterus is stimulated by small doses of posterior pituitary extract whenever inertia is recognized, without respect to the stage of labor. The chief limitation, according to Reid, lies not in the danger of its usage but rather in the lack of physiologic effect in some patients; they just do not respond. Reid's results are excellent. His incidence of labor lasting over twenty hours is only 2 per cent. However, midforceps and other operative procedures were frequently employed. Caesarean section was used in 12.9 per cent of ward patients with prolonged labor. Reid's infant mortality in clinic patients was 11.65 per cent, Schmitz's only 6.4 per cent. Finally Reid states that pituitrin can be used to ascertain whether one can expect further progress. He assumes that the uterus which fails to respond to pituitrin is refractory to further progress of labor and hence the pregnancy should be terminated by suitable means (Dührssen's, forceps, or caesarean section) without subjecting the mother to further useless labor and the baby to irreparable damage.

If Reid's logic is sound, it is impossible to reconcile his results with those of Schmitz, Calkins, Cosgrove and others. The latter apparently seldom see patients in whom time and care will not lead to progress.

To recapitulate, the management of prolonged labor should be conservative. The women in labor will be cared for with the understanding that:

1. The total duration of labor is of little importance provided that the patient has been carefully evaluated, intelligently observed, and well managed.
2. Time is our greatest ally. Delay rarely leads to disaster and often solves or simplifies difficult problems.
3. Unwarranted interference may lead to irreparable damage.
4. When interference is indicated, every effort is made to minimize trauma.
5. Following delivery, all birth injuries are repaired.

The great majority of patients will deliver spontaneously or with a little help well within the expected average number of hours of labor. A small group of patients will present accidental or complicating pathology which necessitates radical interference before many hours have gone by. In this group too are those patients with probable fetopelvic disproportion. Here elective interference limits the duration of labor. Finally there is the group in which delivery potential is considered normal but in which labor performance is not determined until the duration exceeds the normal average. It is with the last group that we are specifically concerned.

Throughout labor six sources of trouble should be continually kept in mind. Management of patients should be directed to reduce the danger from these sources: FEAR is allayed by encouragement and

reassurance of both patient and family. DEHYDRATION is controlled by fluid replacement, preferably parenterally. INANITION is combatted by giving liquid nourishment, again preferably parenterally. FATIGUE and EXHAUSTION are avoided by providing adequate rest with sedative drugs. The danger from HEMORRHAGE is minimized by maintaining fluid balance and avoiding exhaustion. In addition, it is advisable to type the patient and have blood available should it be needed. Finally, INFECTION is guarded against by avoiding unnecessary rectal and vaginal examinations. If infection is probable, or if membranes have been ruptured a long time, penicillin should be given prophylactically.

All details should be carefully rechecked and every effort made to establish the cause of delay. If progress is evident and mother and baby are in good condition, there is no reason for interference. If on the other hand contractions have ceased or become desultory, a real rest period is indicated. Following the rest, if pains do not spontaneously recur, an attempt to stimulate contractions may be made by using castor oil and warm enemas. Quinine is never used to stimulate labor because it occasionally leads to auditory nerve injury and deafness. In rare instances quinine seems to have caused intra-uterine fetal death.

On occasions at the Michael Reese Maternity we may use small doses ($\frac{1}{2}$ to a maximum of 2 minims) of pitocin or pituitrin. As a general rule, pituitrin is used only when secondary inertia develops in the second stage and the head is well engaged. Even then the patient is prepared for delivery and an anesthetist is available, should tetanic contraction occur.

What we do next will depend upon the indications, conditions, our own capabilities and the availability of hospital facilities. Perhaps from the re-evaluation it is apparent that vaginal delivery is unlikely. Caesarean section should be performed. Occasionally caesarean section may have to be postponed for many hours or cannot be carried out at all. The parturient's life and future health should not be jeopardized by ill-advised attempts at vaginal delivery. Time still may solve the problem. At worst, the baby may be sacrificed.

If hospital facilities are readily available and abdominal delivery can be undertaken, we possess a method of terminating pregnancy when the head is not engaged and/or the cervix not dilated. The choice of the type of caesarean section will rest somewhat on the experience of the operator. At Michael Reese, the classical section is curiosity and the extraperitoneal type of caesarean section is seldom performed. We find the low cervical section meets all our needs, even when the patient is potentially infected and forceps delivery has been attempted and failed. The frankly infected mother has a much better chance of survival if caesarean hysterectomy is used.

Perhaps from the re-evaluation it is apparent that vaginal delivery of a living child can be accomplished. In the absence of indication for

interference, labor is permitted to continue. However in the presence of indications, the method of interference will depend upon the existing conditions.

Let us assume dilatation is not quite complete and the head presents no disproportion. Multiple incision of the cervix, followed by properly applied forceps may save the baby's life. If, on the other hand, dilatation is complete and the head is engaged, the baby can be delivered by forceps and episiotomy. In transverse or posterior position, either manual or instrumental rotation may be necessary. If the baby is dead, craniotomy is preferable to a difficult forceps operation.

If progress ceases in frank breech presentation, the breech is dislodged and the legs brought down. To accomplish this general anesthesia must be used. Forceps may be necessary to deliver the after-coming head.

The third stage of prolonged labor carries an added risk of postpartum hemorrhage. The same factors which have produced uterine inertia and/or exhaustion continue to act, thus interfering with the normal contraction and retraction of the uterine muscle. The patient should be observed for at least one hour while still in the delivery room. During this time the uterus is frequently palpated. Blood should be available for immediate use; however, plasma may be used in an emergency until proper blood can be obtained.

Finally, we must not forget the infant. Asphyxia is common. Tracheal catheterization may be required. These babies are potentially and often actually infected at birth. The administration of penicillin during the first week of life will lower the neonatal death rate from this cause. The value of vitamin K in the prevention of cerebral hemorrhage is doubtful but it can do no harm. It may be administered antepartum to the mother or postpartum to the baby.

The guiding principle in the conduct of prolonged labor is intelligent, conservative obstetrics, irrespective of the passage of time. Pressure from patient or family must never be allowed to warp the judgment of the obstetrician.

Rocky Mountain Medical Journal, May 1949.

Extracts.

DEVELOPMENT OF PERSONALITY DURING THE PHALLIC STAGES.

By Laxmi Chandra, M. A. Delhi University.

The third stage of development of human personality starts at the age of three and lasts up to the age of six. By this time the oral pleasures have lost their charm and the child has mastered the toilet training. The child's mind is expanding and his curiosity about general things in life is increasing day by day, and it is no wonder that he becomes interested in the question of sex and reproduction also. The chief characteristic of this period is the appearance of active sexual interest in the child's mind. This is apparent by the following :—

1. Questioning about sex.
2. Oedipus complex.
3. Masturbation.

1. *Questioning about sex.* The child usually asks questions about the genitals and their function or about the birth of babies. When such questions are asked by the child, the parents should answer the child in a frank, calm and natural way. It is always wise to tell the truth but in doing so giving of complete theory of sex or reproduction which is beyond child's grasp may not be necessary. Very often parents make a problem for themselves by not giving right sort of sexual knowledge desired by the child.

2. *Oedipus complex.* According to Freud, Oedipus complex is a universal phenomenon in a child during the phallic stage, though its existence has been denied in a certain proportion of cases by other psychologists lately. By Oedipus complex is meant an emotional bond tinged erotically between the child and the parent of the opposite sex. The child passes through a minor love affair with the mother, if the child is a boy and with the father if the child is a girl.

3. *Masturbation.* Genital organs are part of the erogenous zones, which when stimulated are capable of giving pleasure. The child learns that handling or manipulating the genital organs gives pleasure and it is during this third phase of development that phenomenon of masturbation appears almost universally in children. Parents are apt to be shocked at this but it must be emphasized that *masturbation is a universal and normal phenomenon necessary to human growth and development.* Masturbation in itself is not harmful. It does not produce any nervous trouble nor does it weaken the body or the mind. The parents and the society has come to associate certain bad and harmful results with this habit and most of these are purely psychological. The child generally discards the habit automatically but the habit may become persistent and excessive if parents interfere too early and get angry with the child. If the child is at all to be persuaded to leave the

habit, it should be done in a sympathetic way and not by punishment. The child's attention may be diverted from masturbation by creating interest for the child in games and in play with toys and other children.

Psychopathology. The primary needs of a child at this stage may be summarised as follows :—

- (1) He needs the security and backing of parents.
- (2) He needs their love and understanding.
- (3) He needs an optimum period of gratification for his infantile sexual desires.
- (4) He needs opportunities to express his hostilities antagonisms and aggressiveness.

All children develop three fears—fear of being deserted, of not being loved and of being punished. Anything which will prevent the effective satisfaction of needs and which will increase the fears will have a deleterious effect on the child and may produce illness. Such occurrences may be grouped as follows. —

- (1) Absence of one or both the parents
- (2) Parental criticism.
- (3) Premature and excessive sexual stimulation.
- (4) Absence of one or both the parents.

This may occur on account of death, marital separation or separation through other causes. The effect of separation of each or both of the parents is different on boy and the girl.

(a) The effect of the father's absence on the boy.

Every human emotional relationship is ambivalent i.e., of love and hate at the same time and it is from this stand point that we describe the relationship of the boy and his father or mother.

(i) *Love for his father.* The presence of a visible father is most necessary during the first six years of a child's life. The boy's love for his father makes him imitate his father and to identify himself with his father i.e., to do, think and, feel exactly like the father. Lack of father has two effects on the boy :—

(1) There is the disadvantage for the child of meeting life with little real knowledge of how other men think and feel, and still deeper harm comes from :—

(2) Lack of learning renunciation by the identification with his father. This is very serious when we realize that the whole structure of civilized society is built on this renunciation. The ambivalent feeling for his father, love, and jealousy and fear makes the child learn gradually and somewhat painfully how to compete successfully. In later life a child who lacked father finds himself baffled and helpless, given to anxiety or to unsocial manners. Mother may also now become too much attached to the boy since father's death and this doting may spoil the boy.

(ii) *Hate and jealousy for his father.* Oedipus complex in the child makes him hate and fear his father and wishes that father should die so that he can enjoy the love of his mother. At this stage if the father

dies, the child finds that the result is the opposite of what he expected. The death of father has brought great unhappiness to the mother who now does not give the child all the happiness he anticipated. The child is also bereft of the love of his father. Now he realises that his aggressive wishes caused his father's death and consequently sufferings and therefore he develops a feeling of guilt about any aggressive feeling or impulse. This brings failures constantly in later life as a certain amount of aggression is essential for human progress.

It is from father that the child learns how to temper and exercise his feelings of aggression and love.

Legal separation or prolonged absence of father have effects similar to death.

The effect of the mother's absence on the boy. This is not so serious as that of the father's absence.

The mother is the main love object of the boy and her absence affects the erotic relationships of the child. There is a tendency in such a child to become homosexual later on. The leaving of mother from any cause, death or separation is interpreted by the child as that the mother does not love him and therefore she has gone away. This feeling retards his development and may produce regressive effects giving rise to feeding difficulties, bed wetting etc. He gets fets of temper, is unhappy and constantly demands attention of adults. These harmful effects are cured if some other woman acting as a substitute for the mother looks after the child. But even then the repressed pain of the interlude may remain as a governing factor in the child's future life. A tendency to avoid any close relationship with a woman may remain in his behaviour. He may desert his beloved simply to take revenge for the injury caused to him by his mother.

The girl also experiences the same sort of difficulties in the absence of either of the parents as the boy. For the girl the death of her mother is more injurious than father's.

It was learned during the II World War that separation from parents had an exceedingly traumatic effect on the child mentally. Separation from the mother is more traumatic for small children than separation from the father.

A child separated from a parent passes through a period of sorrow but the child's sorrow finds expression quite differently from that of the adult. It may result in disturbances of the gastro-intestinal tract:—vomiting, diarrhea, etc., or in naughty behaviour. The child should be treated kindly and made to express his feelings and not be subjected to scolding or punishment.

The effects of illness on the child.

Frequent, prolonged, painful or crippling illness produces neurosis in children. Parents generally have an over-solicitous attitude towards the child during its illness. This engenders a habit of making demands on his parents even to an unreasonable extent. If the demands are not

satisfied the child suffers emotionally thinking that he is not loved. The child may also react by becoming in frequently and this reaction may continue in adult life. The child's progress also may be interfered with by illness.

Illness resulting in an organic defect such as paralysis or valvular defect produces an inferiority complex in the child. The child will try to compensate this defect by developing other modes of obtaining success.

Surgical operations are always associated with psychic shock in children. This affects child's behaviour and his reaction patterns in the future. Therefore surgical operations in children should be performed only if absolutely necessary. The psychic shock can be prevented by explaining beforehand the operation i. e. what will be done and how he will feel as a result, and by allowing him to express his ideas concerning the operation after it has taken place.

The effect of the Birth of a Sibling:—The birth of a new body in the family produces psychic trauma to the child. The mother gives most of her time and attention to the new comer and therefore the older child feels jealous and disappointed as he has lost his former privileges.

This jealousy manifests itself by an actual attack on the new baby or derogatory remarks about the new comer.

If the child feels guilty of his jealousy, he may try to compensate it by showing love and adoration for the new baby.

The child becomes hostile to his mother as well. This may find expression in his developing feeding difficulty, or starting to wet or soil himself again.

(2) *The effects adverse Parental Attitudes:*—(1) Parental hatred. A child who is hated by the parents is often subjected to nagging, scolding and thrashing. The child is mal treated. As a result the child develop's a feeling of fear and hatred toward the parent. The child tries not to do anything lest it may bring him punishment and in this way he loses all initiative and individuality. He behaves either in a rebellious or hostile manner or in complete submission. Father's rejection injures the child's masculine activities, the mother's rejection affects child's relationship with the opposite sex.

He may start hating all women and become homosexual. The effect of harsh, domineering parents is similar.

Parental Indulgence:—Parental indulgence retards the development of the child who does not learn to tolerate the many frustrations and deprivations so necessary in every body's life. The effects of an indulgent father are similar to those of a harsh, rejecting father because the child cannot engender any hostile feelings to such a kind and considerate father.

(8) *The effect of premature or excessive sexual stimulation.* A child may be stimulated sexually when the genitals are washed and bathed. This gives him pleasure and also a sense of fear and guilt because the

mother disapproves any physical reaction like erections. This may have detrimental effect on the future sexual life.

A child may be seduced by an adult or an older child. A child experiences a degree of pleasure during seduction but reactions of fear guilt and excitement are also there. There is great excitement and tenseness as complete gratification and relaxation are absent. He attempts to repeat the experience in order to get complete gratification which never comes and therefore he is left completely frustrated. This may retard his other activities and development and may cause him to repress all his sexual feelings. In adult life he becomes mal-adjusted sexually.

The observation of parental intercourse by the child brings a traumatic experience to the child. It brings a sense of fright, bewilderment, interest and excitement which he has to repress and the effects will last through his adult life as well.

Effect of psychic trauma. Traumatic experience gives rise to neurosis. A traumatic experience is one which arouses intense feelings and strong emotional reactions which cannot be dealt with satisfactorily. It will engender anxiety attack and as this is painful, he will try to avoid pain by repressing the memory of the traumatic experience. The repression may break through. The feelings of fear usually break through giving rise to repeated anxiety attacks. Similarly feelings of guilt may break through and this may either make the child docile as he does not want to add to the guilty feeling or may become naughty in order to assuage his guilty feeling. The repression of impulses may result in regression i. e. obtaining gratification in a way that was satisfactory younger age or perversion i. e. in an infantile form of sexual gratification at an age when sexual gratification should be obtained in a more adult way. If there is feeling of antipathy for gratification through a perversion there may result functional disturbance of the organ of gratification. Frustration of the optimum period of gratification or prolongation of the period of gratification with any zone will result in fixation on that zone.

The emotional illnesses of the phallic period.

These are :—1. Phobias.

2. Temper tantrums.

(1) *Phobias.* When the libido fails to invest itself in external objects i. e. when all love objects are missed in the external world then the libido changes into free floating fear which attaches itself with three kinds of external objects in the presence of which the personality shows symptoms of fear. These objects are :—

(1) Darkness.

(2) Close spaces.

(3) Strange objects or persons.

The mental world of the child is full of fears. Children during the phallic period are commonly afraid of strange objects, persons, situations

noises and animals. Boys are more commonly afraid of bodily injury, and girls of the dark, solitude and strange sights and noises. All little children have phobias. Generally the child grows out of them. All these phobias merit consideration because phobias indicate that the child is having difficulty in coming to terms with his inner strivings. There are several methods of dealing with the phobias.

Whatever methods are used they should be used slowly and gradually. According to Freud, phobias usually centre round the Oedipus situation which must be solved. The solution lies in decreasing the physical attention by the parent of the opposite sex. The child should be encouraged to do things for himself and should spend more time with other children. Sleeping with the parent of the opposite sex should be discouraged and child's hostility against the parent of the same sex allowed expression.

Temper Tantrums. Temper tantrums result from a simple deprivation or frustration and are universal in childhood. If they are frequent severe or prolonged they retard the child's development.

They become pathological by over indulgence or strict premature training of the child.

INFANTILE GASTROENTERITIS WITH ORAL STREPTOMYCIN.

JAMES AND OTHERS (*Lancet*, 2:555, 1948) write that streptomycin was given by mouth in thirty cases of infantile gastro-enteritis. Its effects were most striking in the critically ill cases, in cases of recurrent diarrhoea and vomiting, and in neonatal gastro-enteritis. Vomiting ceased early, weight was rapidly gained, the appetite returned, the stools improved and there was almost immediate improvement in the general condition.

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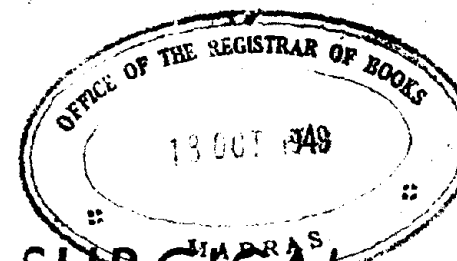
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MEDICO-SURGICAL SUGGESTIONS

(Established 1932.)

VOL. XVIII

AUGUST 1949

No. 8

THE GENERAL MANAGEMENT OF PATIENTS WITH SURGICAL DISEASES OF THE CHEST

By

Dr. S. SUNDARARAMAN, M.B., B.S.,

The operative part of any surgical condition is only an incident in the treatment and proper pre-operative preparation and post-operative care are equally essential for success. This is particularly borne out in surgical diseases of the chest. A wide basic knowledge of chest medicine, anatomy and physiology is of importance. Proper investigation and correct diagnosis follow next. The pre-operative selection of the case and its preparation for operation come next. Lastly, a properly performed operation under skilled anesthesia must be succeeded by efficient post-operative care and rehabilitation. These non-operative considerations in the surgery of the thorax can be neglected only at the cost of high mortality or morbidity. It is practically impossible to cover the whole range of the non-operative considerations. Hence only the important features in the pre-operative preparation and the post-operative management of these cases could be cited.

Pre-operative Management

This begins immediately the patient becomes a candidate for operation.

1. **Correction of Defects.**—Any patient with chronic infection or a malignant neoplasm has a secondary anaemia which needs correction. A complete blood examination followed by administration of Iron in some form or other is essential. In severe cases of anaemia *Blood Transfusions* help to build the patient for surgery. Here properly-matched blood preferably of the homologous group given in small quantities (about 150 c.cs.) once a week for two to three weeks is the ideal. Large transfusions should be avoided since it taxes the myocardium and are apt to produce cardiac failure. General malnutrition is always seen in our patients in subclinical stages. Patients with chronic suppuration and those with malignant disease have hypoproteinaemia as a rule. An estimation of plasma proteins is essential. The patient must get a *Diet High in Protein* and also high in carbohydrates. If patients cannot be

fed properly as in carcinoma of esophagus, a preliminary feeding jejunostomy or gastrostomy is indicated. Patient is given orally *Protein Hydrolysate* and if required intravenous administration of preparations containing protein and aminoacids (Amigen) to combat the hypoproteinaemia. Subclinical vitamin deficiencies are corrected by prescribing *multivitamin tablets*. It is now well known that *Ascorbic acid* plays an important part in wound healing. The proper administration of ascorbic acid helps in proper healing of the bronchial stump or an esophageal anastomosis. It should be given in doses of 1 gram per day for about two weeks before operation.

2. **Respiratory Function.**—This is of the greatest importance in chest surgery. This is done by estimation of the vital capacity and also by roentgenographic and fluoroscopic studies of the chest. The *Vital Capacity* must be estimated in different positions for the patient. The most important thing is to estimate the vital capacity in the position in which the patient is going to be operated. This value must be nearly normal. Vital capacity alone is not enough to assess the respiratory function and it is useful only in the broadest sense. *Roentgenograms* of the chest showing emphysema, fibrosis or pleural damage also aid in assessing respiratory function. *Fluoroscopically* the movements of the diaphragm, ribs and inspection of the movements of the chest during deep breathing also give additional information. To aid the assessing of the function the response to exercises should be judged by taking pulse and respiration rates before and after. No one point is enough, all the points should be considered together in assessing the respiratory function. In cases where respiratory reserve is not up to the mark patients must get *Breathing Exercises* and also movements of arm and shoulder. The best and the simplest way is to educate the patient to breathe deep keeping his hands on his chest. There are two instances where even though the respiratory reserve could not be brought up to the mark surgery should be carried out. One is suppurative condition of the lung requiring lobectomy. Here the disease itself is dangerous if allowed to prolong and the loss in respiratory reserve is comparatively small after lobectomy and the one is justified in operating after preliminary preparation even though the respiratory function is not up to the mark. The other is carcinoma lung where the patient's life is at stake and nothing useful could be done by prolonging the pre-operative period too much to get a good respiratory reserve.

3. **Condition of the Heart and Kidneys.**—The condition of the heart is judged by physical examination followed by fluoroscopic examination and by exercise tolerance tests as judged by recordings of pulse rate and blood pressure. Patients with compensated cardiac lesions are good operative risks. The rheumatic heart is safer than a syphilitic heart which in turn is safer than an arteriosclerotic heart. Elderly patients with arteriosclerosis and coronary disease can stand a pneumonectomy but there is added risk of the patient developing coronary insufficiency.

Diuretics and Digitalis are used for preparing the patient for operation in cases of congestive failure and also in preparing the cases of constrictive pericarditis for operation. But digitalis in the absence of cardiac failure is not only unnecessary but positively harmful. Patient need not necessarily have rest in bed for they tolerate surgical procedures better if they are allowed to sit and walk for a few minutes daily.

A rough estimation of kidney function by a complete *Examination of Urine* is more than enough. If required it can be supplemented with an estimation of *Blood Urea*.

4. Minimising Infection

(a) *Elimination of sources of infection in upper respiratory tract and any gross oral sepsis* is undertaken first.

(b) In diseases with pulmonary suppuration as in lung abscess, bronchiectasis, infected pulmonary cysts, etc., *Postural Drainage* is used as a fundamental treatment for 1—2 weeks before operation. The postural drainage is discontinued the day before the operation.

(c) *Bronchoscopic aspirations.*—This is a useful adjunct to postural drainage. In many cases postural drainage alone is not enough to clear the bronchial tree especially if large amounts of sputum are raised. Bronchoscopic aspirations done on alternate days aid to clear the bronchial tree and this can be done just before operation and is always continued during the operation. Bronchoscopy is done under local anesthesia by spraying 2 per cent Amethocaine to the throat.

(d) *Anti-biotics and Sputum Culture.*—Sputum cultures should be done as a routine for both aerobic and anaerobic organisms and also for penicillin resistant strains. Sputum examination for acid fast bacillus by concentration method should also be done.

The local instillation of penicillin (50,000 units in 10 c.c. of normal saline) into the bronchial tree reduces the quantity of sputum, makes it less purulent and offensive. After 4 or 5 instillations gram positive cocci are reduced to a minimum. If the patient has gram negative bacillus, then these increase in number after penicillin instillation at the expense of the Gram positive Cocci. Hence in these cases whose sputum is also positive for A.F.B. local instillations of streptomycin ($\frac{1}{2}$ gram in 5 c.c.) along with penicillin is done to diminish the bacterial flora.

These are best instilled through the bronchoscope after aspiration of the pus every alternate day. If this procedure is tiresome to the patient it can be instilled by an intratracheal catheter under local anesthesia. While instilling the patient is kept with the head slightly raised up and turned on the side of the lesion so that the drug will flow into the diseased side. Patient also gets aerosol penicillin thrice daily. Along with this penicillin must be given parenterally in all suppurative lung conditions. The usual dose is 100,000 units I.M. morning and evening for one week before operation. Penicillin may be combined with sulphadiazole (sulphathiazole in the usual dose) in the treatment of lung abscess.

Early cases of empyema can be aborted by penicillin. Instillation of penicillin after aspiration of the empyema preoperatively for three days lessens the toxicity of the patient and makes him fit for surgical drainage.

Streptomycin parenterally used in cases of pulmonary tuberculosis in doses of $\frac{1}{2}$ gram morning and $\frac{1}{2}$ gram evening will reduce the spread of the disease post-operatively.

Penicillin and streptomycin can be started a week before operation and can be continued post-operatively. The sulpha drugs on the other hand cannot be continued for such a long period. Hence it should be started the day before operation after some interval of non-therapy.

5. **Optimum time for Operation.**—The surgeon must always wait for the optimum time for operations of a major nature. In tuberculosis this is specially important and operation at the wrong time will often prove disastrous. Any tuberculous patient must be under observation medically for at least two months before any major surgery is done. In cases of bronchiectasis one must wait till the quantity of sputum gets minimum and the inflammation of the tracheobronchial tree is at the minimum. It is wise to postpone operation at least 2 weeks after doing a bronchogram since the iodised oil may cause a febrile reaction or a lipoid pneumonia or even a post-operative collapse of the lung. So also in empyema one should wait till the pus becomes thicker for safer drainage.

6. **A.P. before Pneumonectomy.**—Some surgeons prefer to collapse the lung by artificial pneumothorax before operation and maintain a collapsed lung. It is of course an advantage to find a small dark collapsed lung at operation and there is also some cardio-respiratory compensation has occurred. But in many cases there is no collapse due to adhesions and this A.P. may precipitate fluid formation in the pleural cavity. Majority of surgeons do not consider an A.P. necessarily.

7. **A Bit of Psychology.**—The mind plays as important a part in healing as the drugs and surgical measures. Hence one must try to get the confidence of the patient and must reassure him. A brief explanation of the nature of the disease in him and the nature of the operation going to be done will go a long way for the proper co-operation of the patient.

The Management During Operation

1. **Preparation.**—Patient gets an enema and a preparation of the skin a day before. On the operation day, the patient gets a second preparation of the skin. Patient is not starved if the anesthesia is going to be local.

2. **Sedation.**—About two hours before the operation a sedative of suitable dose is given. Usually 2 capsules of seconal sodium $1\frac{1}{2}$ grains each.

9. **Anesthesia.**—For minor operations like empyema drainage, drainage of a lung abscess, etc., the ideal is regional block with Anethane

1 in 4,000. For major operations like thoracoplasty, lobectomy, pneumonectomy, etc., any one of the following three according to the ability of the anesthetist and the nature of the patient:

1. Local anesthesia—Paravertebral and intercostal block with anethane 1 in 2,000 (5 c.c. in each space)

2. General anesthesia—Ether and cyclopropane used alone or together in closed circuit in combination with oxygen.

3. Spinal anesthesia limited to the side of operation.

Whatever may be the type of anesthesia the following points must be satisfied: (1) An adequate airway with high proportion of oxygen administered. (2) The dangerous reflexes produced by the surgeon by intrathoracic manipulations must be abolished. (3) A scrupulous cleansing of the tracheobronchial tree.

An intratracheal tube must always be used for all major operations. This aids the anesthetist with a control over respiration and also aids suction of the bronchial secretions using a small Catheter attached to the suction apparatus.

4. **Blood and Saline.**—In any big intrathoracic operations blood transfusions are given as a routine since the blood loss is considerable. It is a great help in major cases to give 750—1,500 c.c.s of blood on the table. When the bleeding is great as may be when adhesions are present the blood loss should be corrected at once and should not be deferred. If there are massive haemorrhages the blood replacement should be volume to volume rapidly done. One should never wait for symptoms of shock, but must try to avert it. One should not also be too enthusiastic since too much of blood is also dangerous. The blood can be diluted with 5 per cent glucose saline by 1/3 of its volume and about 2 litres of saline can be used. Too much of saline will cause pulmonary edema.

The best way to administer is to use a forearm vein. Saline is started by open method using a good-sized cannula. The blood is given from the bottle fitted with a tubing and a side-nozzle syringe, connected to the rubber tubing in the saline set. While the blood is flowing saline is stopped. Once the blood bottle is empty the bottle alone is changed for a fresh one without changing the tubing. It is necessary to incorporate the forearm in a moulded slab of plaster of paris to prevent the cannula slipping out. The forearm must be kept slightly bent at the elbow. A Thomas splint should be avoided to fix forearm.

5. **Position of the Patient.**—The patient is usually in the face down position in major thoracic operations. If the patient is shocked about 20° Trendelenberg position is given. Trendelenberg position also helps in aiding the tracheobronchial secretions to flow out. In minor operations the position of the patient is according to the convenience of the surgeon.

6. **Watching the Patient's Condition.**—Every 10 minutes during the operation the pulse rate, the rate of respiration and blood pressure are recorded. The surgeon is informed now and then of the patient's condition so that he can proceed further according to the condition of the patient.

7. The Closure of the Pleura.

(a) After the operation the pleural space is washed with plenty of warm normal saline and thoroughly cleaned before closure. About 300,000 units of Penicillin in 15 c.c. of saline is instilled into the pleural cavity before closure, after major intrathoracic operations as a prophylaxis against pleural infection and subsequent empyema. This is very important in cases of lobectomy for septic lung conditions and after pneumonectomy where the bronchial stump is a potential source of infection.

(b) *Pleural drain.*—After lobectomy the pleural space should be drained for three to four days or more if found necessary for the following reasons. There is always some collection of blood or serum in the pleural space. This collection is liable to get infected and to remain infected causing an empyema. The drain also helps to maintain a negative pressure in the pleural space and this aids the lung to expand and obliterate the dead space. An expanded lung which obliterates all the dead space is surest protection against an empyema.

After pneumonectomy the opinion is divided as to the use of a pleural drainage tube. Those who are not in favour of it argue that the organising exudate help to fill the space, a high concentration of penicillin in the pleural space is left and that it avoids infection through the drain. The only danger is the shift of the mediastinum to the opposite side due to accumulation of exudates and rarely due to increased positive pressure in the hemithorax. This can be averted by a paracentesis required at the time. Those who are in favour of it argue that you have a control over the hydropneumodynamics inside the hemithorax and you can control infection by aspirating the exudate and instilling penicillin and more than all these one need not submit the patient to any tiresome procedure as paracentesis in the post-operative period. If a drainage tube is used it is kept bandaged by some inside the dressings and all manipulations done aseptically in the theatre. Others connect it to an underwater seal and maintain suction for 3—5 days.

It is said that in operations carried on mediastinal structures no drainage of the pleura is necessary. Perhaps it is safe even in these cases to drain the pleura so that if there is an effusion it could be tapped and penicillin instilled; and also a continuous negative pressure maintained by suction to allow the lung to expand properly.

(c) *Pleural pressure.*—After the closure of the pleura the intra-pleural pressure should be measured on the table at the end of any open pleural operation using a pneumothorax apparatus. If the pressure is high it should be adjusted to a negative pressure of 1—2 cm. of water by withdrawing air, so that the lung may expand fully.

8. *Cleansing of the Tracheobronchial tree.*—A small rubber Catheter preferably gum elastic is passed through the intratracheal tube and the tracheobronchial secretions are aspirated. After this the intratracheal

tube can be removed. If however, the secretions are of a considerable volume it can be left in place till the patient comes round and the ward house surgeon can be instructed to aspirate the secretions.

In every one of these cases undergoing some form of pulmonary resection bronchoscopy should be done as a routine. Any clots or bits of growth seen should be removed. All these are done with the idea of maintaining a free airway and proper re-expansion of the remaining pulmonary tissue. An uneventful post-operative course is largely dependent on the maintenance of a free airway and prompt complete pulmonary expansion.

Post-operative Management

1. *Position of the Patient.*—Until the patient regains consciousness, he should be placed in the Trendelenberg position with the operated side resting on the bed. This helps the bronchial secretions to flow down rather than to accumulate in the depths. This position is also preferable when the patient is shocked. Once the patient comes round he can be in any position which he finds comfortable. It is better the patient is propped up a bit for they are able to 'reach' their secretions better in the sitting posture and cough it out.

2. *Oxygen Carbondioxide and Steam.*—The prevention of anoxia is of the paramount importance in the post-operative period. Oxygen should be given in all cases of pulmonary resection. One should not wait for dyspnoea and cyanosis since they are signs of great oxygen want. The best way of administering oxygen in these cases is by use of an oxygen tent. About 8 litres of oxygen are run per minute and the temperature kept a few degrees above the surrounding temperature and the oxygen is kept moist. The B.L.B. mask is not usually tolerated by our patients. The nasal catheter is not dependable. If one is forced to use the nasal catheter one should take care to see that the tip of the catheter is in the pharynx.

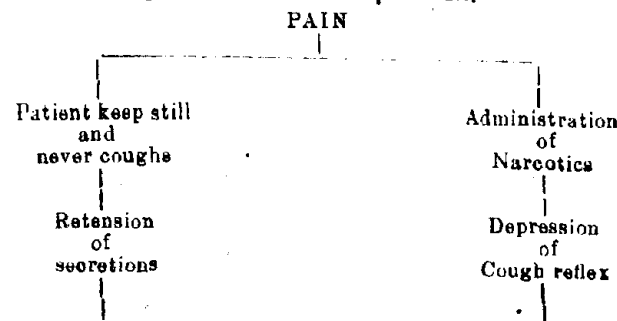
The oxygen is usually continued for 24—48 hours in all cases except in pneumonectomy where it can be continued for 1 more day. After this period oxygen should be discontinued in the absence of any definite indication for its use. The deeper breathing that takes place in a normal atmosphere is advantageous in that it encourages more rapid re-expansion of the remaining pulmonary tissue. Oxygen also thickens the bronchial secretions by making them dry and the patient is unable to cough it out. To overcome this defect carbondioxide can be used as a liquefying agent. This should be administered with care at the rate of 1 litre per minute for 10 minutes every 2 hours (5 per cent carbondioxide). The liquefying can also be helped by steam inhalations.

3. *Antibiotics.*—These are continued post-operatively. Only a word about the dosage of penicillin. It is not enough to give penicillin in the usual dosage in major cases. The dosage should be 800,000 units to start with and 100,000 units every 6 hours given I.M. The local use of antibiotics in the pleural space has already been mentioned. The use

and the method of combining sulpha dose with the penicillin (2 gram to start and sulphadiazine is given orally in the usual dose with penicillin (2) gram to start and 1 gram every 6 hours up to a maximum of 20 grams). The use of streptomycin is indicated in the post-operative period in cases of tuberculosis as well as in cases with penicillin resistant organisms grown in culture. The dose being $\frac{1}{2}$ gram morning and evening I.M.

4. **Ascorbic Acid and Proteins.**—The administration of ascorbic acid and maintainance of a good level of plasma proteins aids proper wound healing after operation. Ascorbic acid must be administered parenterally in doses of $\frac{1}{2}$ gram twice daily. Proteins are given either orally as protein hydrolysate or by intravenous administration of Amigen (contains proteins and amino-acids) in required quantities. Blood or plasma transfusions are more often required in the second post-operative week to correct the blood plasma level and blood hæmoglobin level.

5. **Tracheobronchial Toilet and Atelectasis.**—Atelectasis is aided by retention of the bronchial secretions and the inability to evacuate them properly. The most important factor that favours the retention of bronchial secretion is pain at the site of operation.



If this sequence of pain spasm and cough suppression is not broken a wet lung syndrome develops.

There are other factors which aid retention of secretions as pulmonary emphysema, paralysed hemidiaphragm, a large pleural drain and a bronchopleural fistulæ. Keeping these points in mind one should try to keep clean the bronchial tree by the following methods:—

(a) **Nursing.**—Once in every 10 minutes the patient must be encouraged to cough out while the nurse or the other doctor keeps holding the wound. Of course it need not be said that a pleural drain must be closed before making him cough out. Patient should also be encouraged to change his positions in bed as often as possible. These simple procedures very often help even a collapsed lung to re-expand.

(b) **By relief of pain.**—If the pain at the site of operation is relieved the patient coughs out his secretions without fear. The use of morphia for relief of pain is to be avoided, since it depresses cough reflex and encourages retention of secretions. If required it should be given in small doses of $\frac{1}{8}$ grain every 8 hours. The other method of effectively checking pain is by injection of 2 per cent novocaine or proctocaine to

block the intercostal nerve above and below the incision. This is of immense help but the effect does not last longer than about 8 hours. These injections can be repeated every 8 hours to maintain relief from pain. People are now using injections of nupercaine in oil, whose actions are supposed to last longer. The practice of crushing the intercostal nerves during the operation is to be avoided, since it leads to severe intercostal neuralgia and also causes an annoying weakness of the upper abdominal muscles on the side of crush.

6. **Suction Drainage.**—But the ideal type of suction drainage is the Steidmann's electric suction apparatus. This is very small and could be attached to the cot. This works efficiently and continuously without getting heated for days together and keeps a low negative pressure of about 8 cm. of water.

In closed drainage of an empyema the suction drainage is of immense help not only to evacuate the pus but also to maintain a good negative pressure (100 cm. of water even) so that the lung may expand properly. This suction will fail if there is a bronchopleural fistulæ. Even high negative pressures are tolerated by the patients in empyema.

After lobectomy the catheter introduced into the pleural space is connected to an underwater drainage with moderate negative pressure of 4–8 cm. of water. This suction helps to keep the pleural space free from fluid and hence from infection and also helps the remaining pulmonary tissue to expand and obliterate the dead space. The drainage tube is withdrawn in 2 to 3 days after the lung has expanded and the pleural space obliterated as verified by skiagrams. In some instances it is necessary to retain the drainage tube longer if there is still evidence of leakage of air from the pulmonary surface.

After pneumonectomy some prefer to keep a constant suction of about 4–8 cm. of water to keep the hemithorax free from fluid and hence from infection and more than this to keep the mediastinum in position. But others prefer not to have any suction but to resort to paracentesis when there is a necessity for it.

In other open pleural operations if there is sign of fluid and collapse of lung as a result of effusion, a continuous suction by a pleural drain is indicated to keep the lung functioning. One more point about the drainage is that it should be temporarily stopped for about six hours if penicillin is instilled into the pleural cavity to prevent infection. After six hours the continuous suction can be restarted.

7. **Daily Examination of the Chest.**—A proper physical examination of the chest daily supplemented by roentgenography and fluoroscopy is a part of the post-operative care. If there is any doubt the medical consultant should be called upon in time to give advice.

8. **A Few Emergencies.**—

(1) **Surgical emphysema—Mediastinal emphysema.**—Surgical emphysema is due to improper closure of the chest. This is harmless except in the mediastinum. Mediastinal emphysema usually follows

scopies or operations on the mediastinum. The emphysema is seen in front of the neck alone limited by the pretracheal fascia. The treatment is to immediately let out the air. Under local infiltration anesthesia with 2 per cent Novocaine a transverse incision at the inlet of the thorax is made. After cutting into the proper plane, 2 fingers are plunged into the mediastinum and the loculated air let out.

(2) *Tension Pneumothorax*.—This should be recognised early and air should be let out under local anesthesia by inserting a needle, attached to a long rubber tube, into the pleural space and allowing the air to bubble through a basin containing sterile water.

(3) Collapse lung following a bronchial plug :—

(a) Simple change of position and making the patient cough out is tried first.

(b) Local spray of 2 per cent Amethocaine to throat. This sometimes helps him to cough the plug out.

(c) If these simple procedures fail aspiration through an intratracheal Catheter using nupercaine ointment as local anesthetic should be tried.

(d) If all these fail bronchoscopic aspiration, under local anesthesia using a spray of Amethocaine 2 per cent to the throat, should be done.

(4) *Secondary Haemorrhage*.—If the site of the bleeding point is seen it is caught and ligatured. If it is not seen and occurs through a cavity it should be packed with vaseline gauze. Gel foam can be tried in stopping the haemorrhage. If it is severe blood transfusions are started and the surgeon should be sent for.

9. *After Care*.—Patients must be encouraged during the second week to abduct their hands and also to breathe well to expand their chest. After suture removal regular exercise are given to expand the chest and to regain the lost vital capacity so that they may return to life as normal human beings.

I am indebted to Dr. R. Mahadevan, M.S., F.R.C.S., for going through this article and giving valuable suggestions.

(Journal of the Stanley Medical College, March 1949.)

Extracts.

THE USE AND ABUSE OF ESTROGENS

By R.A. KIMBROUGH, M.D. AND S. LEON ISRAEL, M.D.

Estrogens should be used after preliminary physical examination of the patient and after taking into consideration the menstrual physiology and pharmacology of the drug. The patients should be selected.

Use of Estrogen:—The indications of estrogen therapy are :—1 to achieve growth of all or part of the genital tract.

2. To depress temporarily the function of the anterior lobe of the pituitary and to effect an anti-androgenic action.

3. temporary resolution of the metastatic lesions of prostatic carcinoma and the restraint of post-operative erections following penile plastic operations.

Atrophic Vaginitis:—At menopause the ovaries cease to produce estrogens which have a trophic effect on vagina. The mucosa becomes atrophic and vulnerable to trauma and infection. Supply of estrogen will restore the vaginal epithelium to its former height and state of resistance. For this purpose the dosage of estrogen is in very small quantities. Oral use of diethylstilbestrol in 0.5 mg. doses or estrone sulfate 0.625 mg. Daily for several weeks is needed. It should be discontinued after a month and repeated if required.

Secondary Amenorrhea:—In these cases, treatment with estrogen alone is unsatisfactory. The cause must be found out and dealt with. If there is uterine hypoplasia, estrogens are indicated. It is better to use in these cases estrogen and progestin, separately or in combination. If combined therapy is to be used. 2.5 mg. of estradiol benzoate and 12.5 mg. of progesterone are combined and injected intramuscularly on two successive days. In the other method 1.5 mg. of estradiol benzoate is injected intramuscularly every third day for five doses and followed immediately with five daily injections of 10 mg. of progesterone. This is repeated for three consecutive months.

Oral method may also be used. 2 mg. of diethylstilbestrol is given daily for fifteen days followed by 60. mg. of pregnenolone daily for five days.

Puerperal Engorgement of the Breast:—If estrogen is started immediately after delivery, there is generally entire freedom from pain and engorgement, as well as distinct depression of lactation. If sucking is not allowed, there is rarely any lactation. If estrogens are used after lactation has been established, relief from engorgement and subsidence of lactation are hastened. Dose for this purpose is small 1. mg. of diethylstilbestrol thrice daily for a week suffices. Then estrogens are stopped gradually.

Menopausal Syndrome:—In most cases treatment for menopausal syndrome is not required. In most of the cases a mild sedative usually

suffices. If the symptoms are toruble-some oral use of estrogens in small doses is indicated. A daily dose of 0.5 mg. of diethylstilbestrol or 0.625 mg. of estronesulfate, or 0.02 mg. of ethinyl estradiol may be used. This dose is used for a limited period and is then gradually withdrawn. To use it continuously for indefinite period is to abuse estrogen therapy. This may cause uterine bleeding. Sudden withdrawal of estrogen may also cause bleeding. The aim should be to aid the patient's adjustment to the diminution and cessation of ovarine function. Post menopausal uterine bleeding evoked by estrogen is most often caused by faulty dosage and incorrect method of withdrawal. But it may also occur in well controlled cases in whom the endometrium is sensitive to estrogens. In all cases of post menopausal uterine bleeding cancer must be kept in mind and estrogen therapy by causing bleeding has become responsible for many instances of neglected carcinoma of the uterus.

Estrogens should never be administered in anticipation of menopausal symptoms.

Prostatic Carcinoma:—Estrogens alleviate the symptoms of the metastases, particularly the pain of osseous lesions, and also lowers the serum acid phosphatase. The latter is a definite reflection of the regression and lessened activity of the cancer metastases. But the improvement is temporary.

Dosage:—This is empirical. Diethylstilbestrol is given in dosage of 1.2 mg. three times a day. Estradiol benzoate or estradiol dipropionate may be given intramuscularly in the beginning of treatment in 5 mg. doses twice weekly. The duration of treatment is determined by the disappearance of clinical evidence of the disease and by the degree of gynecomastia.

Abuses of Estrogens:—Estrogens must not be used in the following conditions: 1. Premenopausal Menstrual irregularity. Vasomotor symptoms near the menopause with irregular menstruation are contraindications to estrogens as bleeding will be increased by this form of treatment.

2. Residual endometriosis. In women who have undergone removal of both ovaries because of endometriosis, there are foci of ectopic endometrium in the pelvic tissue and these foci may be reactivated by the use of estrogens. If for instance such foci were present in the rectum, estrogens will produce intestinal hemorrhage.

3. Carcinoma Background. Estrogen is said to be carcinogenic. It is safer not to use estrogen in a patient with a clearcut history of multiple instances of either mammary or uterine cancer in her family.

4. Palpable benign tumours. Fibro-adenoma of the breast, and uterine fibroids are also contraindications to estrogens as these growths are stimulated by the drug.

5. Hepatic Insufficiency. It is safer to avoid the use of estrogen in patients giving a recent history of hepatitis.

(Abstracted from the J.A.M.A. 25: 12, 48 p. 1216—1930).

ANKYLOSTOMIASIS AS IT FACES THE PRACTITIONER

By J. C. PATEL,

Symptoms. These are protean. Clinical symptoms can be divided:—

(1) Symptoms of ankylostoma infection as it travels through the body.

(2) Symptoms as the infection affects system by system.

Symptoms of the infection as it travels through the body. Infection is by skin route. Locally itching is produced but there may or may not be a pimple at the point of entrance of a larva. If there is superadded bacterial infection present, local symptoms are marked. The first symptom of a true ground itch is an itching, usually between the toes. Itching begins immediately after wading through mud, a macular rash, papule or vesicle may be present. This may last for a week or a few weeks and make the walking difficult. This history may be absent.

In severe cases lymphatic glands may be enlarged, painful and tender. When the larvae reach the lungs symptoms like cough and expectoration, sometimes bloody sputum may follow the itch symptoms. Dysphagia, epigastric pain, vomiting, diarrhea and gross intestinal hemorrhage may occur. This infection may become silent for some time, later on giving rise to anemia, progressive weakness and indigestion. In unchecked cases fatty degeneration leads to death.

(2) **Symptoms system by system**

General. These are a sense of fatigue, weakness, indigestion, palpitation, tinnitus, vertigo, depression and liability to syncope. Temperature is usually subnormal, but low fever may occur.

Digestive System. Early symptoms are pain, dysphagia and discomfort in the epigastric region. Taste may be perverted. At first there is hyperacidity, which changes to hypoacidity or achlorhydria as the anemia increases. Appetite may be ravenous, constipation is the rule. Colic, flatulence may occur.

Skin. Dermatitis may be seen on toes and feet. Urticaria may occur all over the body. The hair is dry and scanty.

Circulatory System. Symptoms due to anemia such as palpitation are present. Heart is dilated, pulsations in the neck veins are common. Pulse is rapid. Blood pressure is low.

Respiratory System. Cough, hoarseness, bronchitis and bronchial asthma may occur.

Nervous System. Physical and mental tiredness is a common symptom. Tingling and numbness, dead limbs may occur. In children mental retardation may occur.

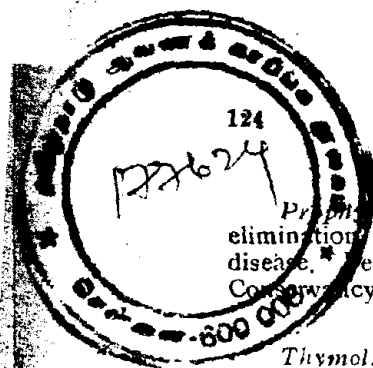
Kidney. Hematuria has been reported. Nephrosis may occur.

Children. In children physical and mental growth is apt to be delayed and stunted.

Pregnancy. Hookworm disease exerts a very harmful effect on pregnancy. Repeated abortions and miscarriage may occur. There is very heavy maternal and fetal mortality. Toxemias of pregnancy are also more common.

Anemia is the most prominent feature. It is of microcytic hypochromic in type.

Laboratory Diagnosis. This is made by finding ova, larva or adult worms in the stools. Charcot-Leyden crystals are often present in stools. Eosinophilia is common. Marked anemia is present.



Treatment

Prophylaxis. This consists in improving the sanitary conditions and elimination of soil pollution. Efficient sewage system will abolish the disease. Fecal contamination of soil and water must be prevented. Conveyance system should be such as to destroy eggs and larvae.

Treatment

Thymol. Maximum dose in an adult should not exceed 60 grs. and 30 grs. in a pregnant woman. It is usually given in 2—8 divided doses of 15, 20, and 30 grs. each at intervals of 1—2 hours followed by a saline purgative. The patient is given a light meal and one ounce of saturated magnesium or sodium sulphate the night before. Then following morning 30 grs. of powdered thymol are given in capsules on an empty stomach at 8-30 a.m. and at 10 a.m. At 11 a.m. 1 ounce of saturated solution of magnesium sulphate is given. No food is allowed till after bowels have moved. The patient should remain in bed and should use a bed pan. The drug should not be repeated for a week. Fats and alcohol are avoided. It should be given with caution in advanced anemia, nephritis, advanced cardiac disease, pregnancy and debility. It acts on hookworms only.

Oil of Chenopodium. It acts on all kinds of intestinal worms. Maximum dose is 3 ml given in 8 doses of 1 ml each at intervals of one hour. The last dose is followed one hour later, by an ounce of concentrated solution of magnesium sulphate. It is given in hard gelatine capsules or with syrup or sugar.

Fixed oils like olive oil prevent toxic effects of the drug. Toxic effects are nausea, vomiting, abdominal pain and distension. Toxic doses cause intoxication, prostration, headache, drowsiness and coma. Large Death may occur. It should be given with caution in heart, kidney, liver and gastro intestinal diseases.

Carbon Tetrachloride. Dose is 3-4 ml. It is given in capsules. The patient takes light supper on the previous evening. Next morning on an empty stomach 3 ml. of the drug are given. Two hours later he is given the saline purgative. The treatment should not be repeated for a week. Contra indications are alcoholism, pulmonary or heart disease, nephritis, pyrexia and calcium deficiency. Toxic effects are a peculiar taste in the mouth, eructations, nausea, diarrhea, giddiness, headache, somnolence, drowsiness, jaundice, hematuria, albuminuria and death.

Tetrachlorethylene. The dose is 3—4 ml. The efficiency of the drug is 95 per cent. It is given in the same way as carbon tetrachloride. Toxic effects are few. They are transient giddiness, drowsiness and occasionally irritation of central nervous system. The patient should abstain from taking alcohol or fat for 2 days before the treatment. There are no contraindications. It is the drug of choice for hookworm infection.

Hexylresorcinol. Dose is 1 gm. It is moderately efficient in eradicating hook worm. The patient is given the saline purge on the night before the day of the treatment. The drug is given on an empty stomach next morning with no food until noon. The purgative is administered next morning. It is very efficient in roundworm infection.

(Abstracted from the *Indian Medical Gazette*, 1923, 18, 1, 100.)

(Abstracted from the Ind. J. MSc May 1919.)

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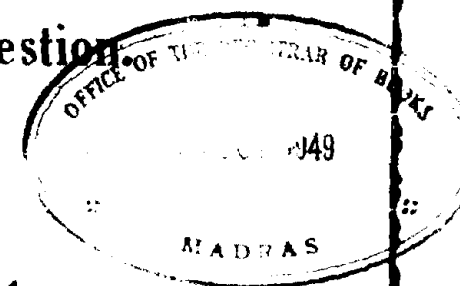
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CURRENT THERAPEUTIC PROCEDURES IN CORONARY DISEASE.*

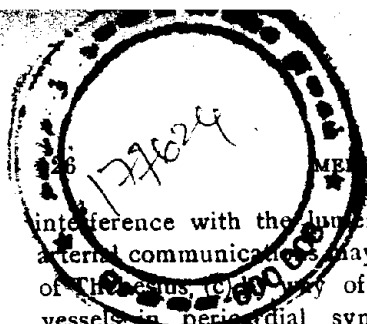
WILLIAM S. MIDDLETON, M.D.

Madison Wisconsin

Much of the present knowledge of coronary disease stems from the clinical studies of contemporary clinicians. Among them George Dock and James B. Herrick in the United States and John Parkinson in England deserve especial notice. Within the span of an active career Herrick has perforce preached first a need for diagnostic consciousness of coronary thrombosis and then the necessity of greater critical judgment. Errors of commission are exceeding errors of omission in its diagnosis. In pressing his thesis he cited some twenty-eight conditions that were mistaken for coronary occlusion. Perhaps selfish abstraction has led the medical profession to serious concern in the prospect of an unusually high incidence of this vascular accident among its own members. For a time Levine and Hindle allayed this fear by adducing evidence that there is no such differential between the physicians and the general population, even though coronary-artery disease is the most frequent cause of death among doctors. Dublin and Spiegelman in a careful analysis of the situation, however, determined that the death rate of male physicians from coronary disease is one and fourfifths times that of white males of the same ages in the general population.

With a clarification of diagnostic criteria interest next centered upon the prognosis of coronary thrombosis. This knowledge opened the door to logical therapy. With this shifting emphasis came renewed attention to the underlying anatomy and physiology of the coronary circulation. The old Weigert-Cohnheim controversy over the fundamental nature of the arterial terminations has resolved itself long since by the demonstration of anastomoses. These connecting channels vary in size and apparently become functional only when the demand arises upon

*From The Department of Medicine, University of Wisconsin Medical School. Read before the Fifty-second Annual Meeting, Utah State Medical Association, September 11, 1947.



interference with the lumen of a normally responsible vessel. Such arterial communications may be (a) intercoronary, (b) through the vessels of the sinus, (c) by way of the arteriae telae adiposae or (d) through vessels in pericardial synechiae. The sympathetic nerves supply vasodilator fibres to the coronary arteries, whereas vasoconstriction is effected through the vagi. The coronary arteries may be the seat of any disease to which the general vascular bed is heir. Early in the inflammation or degeneration of a vascular tube the responses to any stimulus are excessive. Beyond the capacity to respond to such stimuli the artery may anatomically represent a rigid or an occluded tube.

To simplify the discussion, coronary sclerosis with resultant thrombosis may be taken as the type. Obviously there are many other diseases affecting the coronary system. Independently arteriosclerosis may lead to narrowing and occlusion of coronary arterial branches. The customary result of such gradual nutritional encroachment is myocardial fibrosis. In this light coronary thrombosis on an arteriosclerotic basis can never be acute in its pathologic background. Furthermore, the pathologic outcome of coronary thrombosis depends on the size and importance of the vessel occluded, the adequacy of anastomoses and the time factor in the ultimate complete obstruction. Smaller less vital vessels may be occluded without serious consequence, provided there be adequate collateral arterial support and time to bring it into effective play. If these several factors be not favorable and myocardial nutrition fail, infarction ensues. Levine has divided periods of pathologic events subsequent to coronary thrombosis on rather arbitrary but highly practical grounds. Anemia, edema and hemorrhagic extravasation dominate the histologic picture for the first three or four days. Necrosis comes to the fore from the fourth day to the end of the third week. Fibrosis is inconspicuous early and does not take a prominent place until after the third week. Its reparative role is rarely adequate until the fifth or sixth weeks. Deviations from such a formula will be frequent, but they do not detract from its broad application. Dependent upon the ischemia of the epicardium and endocardium adjacent to the myocardial infarct reactive inflammation of these serous membranes may be anticipated. The pericardial reaction proceeds from sero-fibrinous to fibrous stages. As indicated, through such adhesions a potential source of improved nutrition may come. The approximation of the pericardial layers and their sealing may further act as an effective "blowout" patch. Within chambers of the heart at the site of the infarction mural thrombi may occur. Particular is such thrombosis prominent in aneurysms of the heart incident to myocardial infarction. These intracardiac thrombi carry an everpresent threat of remote embolism. On the other hand it is conceivable that they serve an "antileak" function similar to "fillers" in the inner tubes of pneumatic tires.

Translated into the clinical course these pathologic processes find expression in several manners. The gradual encroachment of arteriosclerosis

upon the myocardial nutrition leads to symptoms that are best considered as coronary insufficiency. The most widely recognized among these is angina pectoris. This symptom takes on a more ominous portent when the precipitating cause from a physical standpoint becomes decreasingly less and then assumes the characterization of angina of decubitus. Just as significant of coronary insufficiency is indigestion on effort after eating. Heberden clearly appreciated this relationship in angina pectoris, since he wrote, "They who are afflicted with it, are seized while they are walking (more especially if it be up hill, and soon after eating) with a painful and most disagreeable sensation in the breast." Dyspnea removed from the effort and unexplained weakness are less definite symptoms from this cause; but they must be considered in the composite picture of coronary insufficiency. In gradual myocardial fibrosis from coronary sclerosis congestive failure ultimately eventuates in most subjects. Immediate death upon coronary occlusion depends upon some serious interference with conduction. Surviving this immediate threat the second danger, namely that of rupture of the heart, may be encountered from the third day to the end of third week after the occlusion. A considerable number of patients with acute coronary occlusion and myocardial infarction under my care have died from this on the fifth day. This experience has not been an isolated one. Embolism from mural thrombosis may usually be expected before the fourteenth day. In the experience of the State of Wisconsin General Hospital the greatest mortality from coronary thrombosis is incident to delayed cardiac failure. Obviously this picture is in some measure colored by the exclusion of the group of early fatalities.

With this background the therapeutic attack may be more clearly ordered. The prophylactic approach to the degenerative diseases is not well defined. Obviously underlying constitutional states, such as diabetes mellitus and hypertension, should receive appropriate attention. In the majority of individuals arteriosclerosis is an incidental finding and general hygienic measures alone prevail. Among these, mental and psychological equilibrium are more important than physical protection. Tobacco should be interdicted by reason of its vasopastic effect. While this action may represent an individual idiosyncrasy, its elimination is still justified. Tea and coffee have no contraindication if used in moderation. Alcoholic beverages in small amount need not be denied, if the patient be in the habit of their reasonable use. Indeed, they have the incidental property of vasodilation. The diet requires especial notice. Arteriosclerosis is singularly prevalent in obese individuals. Experimental and clinical evidence supports a cholesterol fault of metabolism in the etiology of arteriosclerosis. Beyond a peradventure weight reduction is a prime indication in obese subjects with arteriosclerosis. Further, the diet for all potential or established coronary patients must take the factor of cholesterol sources under advisement. Let it be borne in mind, however, that the demonstrability of vascular change of this order is

proof of their irreversibility. The prophylaxis should anticipate this point. Perhaps Osler's admonition should be extended to the choice of one's grandparents, for there is a vascular pattern among families. Whether this circumstance depends upon environment or heredity remains to be proved.

From the standpoint of the active therapy of coronary sclerosis the xanthin derivatives have been widely recommended. Their usefulness has been questioned in some quarters, but experimental evidence and clinical experience justify the use of theophyllin 0.1 to 0.2 gram ($1\frac{1}{2}$ to 3 grains), three times a day. Mild sedation, such as phenobarbital 0.015 to 0.030 gram ($\frac{1}{4}$ to $\frac{1}{2}$ grain) three times a day, may supplement psychotherapy and advice in affording relaxation. Nitroglycerin and the nitrites have their traditional position in the treatment of angina. The results from androgens have not justified the early optimism that attended their use. Among the measures advised for the reduction of the circulatory requirement the most radical was total thyroidectomy, its unphysiologic principles should have condemned this procedure a priori. More recently thiouracil and propylthiouracil have been proposed with the same design. They have the virtue of simplicity, control, and reversibility. Further trial of these drugs is necessary to establish their availability in coronary insufficiency. When cardiac failure becomes the dominant expression of coronary sclerosis appropriate measures of physical rest, diet digitalis and other details of cardiac support will be invoked.

With the warning of the symptoms and signs of coronary insufficiency frank coronary thrombosis may be postponed or averted. On the other hand this accident in all of its classical features may occur without premonitory signals of distress. Conversely the atypical and silent forms may baffle the most astute diagnostician. The therapeutic targets are specific, namely, control of pain and hypoxia, sedation, protection of the myocardium, improvement of the coronary blood flow, prevention of embolism and of propagation of the thrombus, preservation or restoration of normal conduction and maintenance of minute volume output of the heart (control of cardiac decompensation). Absolute bed rest, with mental as well as physical relaxation, is the first indication in the treatment of acute coronary occlusion. Ordinary sedatives and analgesics do not suffice to meet this demand. Morphine sulfate (0.015 gram— $\frac{1}{4}$ grain) should be given intravenously. The hypodermic route will require several times this dose without an assurance of satisfactory results. The repetition of morphine will depend upon the effective control of mental unrest and pain. Since papaverin alone of the alkaloids of opium gives smooth muscle relaxation, it has been recommended in place of morphine in the connection. The earlier dosage (0.030 to 0.060 gram) did not give adequate control, but the more recently advised 0.060 to 0.2 gram (1 to 3 grains) doses, intravenously, have been efficacious. Oxygen has been one of the most satisfactory agents for the control of the pain of coronary

occlusion. At the same time dyspnea and systemic hypoxia are combatted. The approved dosage is 6 liters per minute by the oro-pharyngeal route until equilibrium is established. Thereupon the flow may be reduced to 4 liters per minute. As a rule in the State of Wisconsin General Hospital oxygen is administered routinely at levels of 4 to 6 liters per minute for the first fifteen days to three weeks after coronary thrombosis. The philosophy of this procedure lies in the histologic evidence of the curve of myocardial necrosis. A much more extended experience will be required to establish the validity of this position. Practically most of the patients are much more comfortable; but the question is not susceptible of experimental resolution since the general vascular picture in the coronary arterial system cannot be duplicated in animals. Attendant upon vascular occlusion are waves of nerve impulses. The vagal response leads to vasoconstriction. To block this possible contribution to coronary impairment atropine has been used. The recommended dose of 0.001 gram (1/60 grain) is precariously close to the level for vagal release. If it be repeated as recommended, serious tachycardia may occur. Aminophyllin (0.5 gram) intravenously is advised early in the course of coronary thrombosis. Later it may be given by mouth in doses of 0.1 to 0.2 gram ($1\frac{1}{2}$ to 3 grains) three times a day.

The incidence of embolism, remote thrombosis and the propagation of a coronary thrombus has been variously estimated at from 10 to 35 per cent. Certainly these thrombo-embolic complications of coronary occlusion constitute a considerable problem. With the availability of anticoagulant agents a clinical attack has been made. Peters, Guyther and Brambel reported a controlled series of patients with coronary thrombosis treated with dicumarol. Embolic phenomena were reduced to one-eighth and the mortality to one-fifth of the untreated group. In general the extending experience has confirmed this report. Meyer, Bingham and Axelrod recommended 5 mgm. of dicumarol per kilo as an initial dose by mouth and 1.5 mgm. per kilo sufficiently frequently to keep the prothrombin level between 25 and 35 per cent. Subsequently the general rule has made 300 mgm. of dicumarol the first dose. If the prothrombin percentage is above 20 per cent on the succeeding day, 200 mgm. is given. If the value is below 20 per cent, no dicumarol is given on the second day. If the curve of decline of prothrombin has been slow the dose of dicumarol is increased. If rapid, the subsequent doses should be decreased or the interval lengthened. This anticoagulant therapy should be continued through the period of bedfastness in patients with coronary thrombosis. The technical difficulties in the laboratory control of dicumarol effect by repeated prothrombin determinations, in the judgment of some clinicians, outweigh the advantage of an effective anti-coagulant that can be administered by mouth. Its occasional hazard in hemorrhage can be controlled by transfusion of fresh whole blood or more specifically by the intravenous injection of 40 to 60 mgm. of synthetic vitamin K.

Since the initiation of the depression of prothrombin is delayed for twenty-four to forty-eight hours after the oral administration of dicumarol, the support or promptly acting heparin has been evoked in conjoint therapy. Given intravenously, heparin leads to an immediate prolongation of the clotting time (10 minutes) and its effect is lost within two or three hours. Hence heparin may be used to initiate anti-coagulant therapy in the prospect of a continuation of this basic action by dicumarol. The advised dose of heparin for intravenous use is 50 mgm. every four hours. Continuous intravenous drip methods are too difficult for a wide acceptance. The therapeutic objective is a prolongation of clotting at least twice normal time (to 12 or 15 minutes). This plan presupposes the discontinuance of heparin as soon as the prothrombin falls to 80 per cent under the concurrently administered dicumarol. Loewe and Rosenthal's suggestion of Pitkin's menstruum as a vehicle for heparin permits deep subcutaneous injection and prolonged therapeutic action through slow absorption. The effect of a single subcutaneous injection will last for eighteen to forty-eight hours. Hence it offers the prospect of a more easily controlled anti-coagulant for long continued use in coronary thrombosis. Much wider experience in its use is required before heparin in Pitkin's menstruum will replace dicumarol. The antidote for heparin is protamine. Multiple transfusions of fresh blood are likewise efficacious.

The diet of a patient subsequent to coronary thrombosis requires especial attention. Early, especially if the stomach be unretentive, perenteral fluids should be administered. To avoid the risk of right heart embarrassment, isotonic solution of glucose is preferred. Five hundred cubic centimeters of 5 per cent glucose may be given slowly by the intravenous route three times a day. Although the caloric value of this nutrient source is small, it represents rapidly available energy for the lamed myocardium. Food by mouth should be offered in small quantities, preferably in five small rather than the customary three average meals. To observe the above implied indication an adequate carbohydrate intake should be especially preserved. Should edema be a presenting manifestation, low sodium intake will become a prime indication. The patient on low sodium may take fluids as he desires. Mercurial diuretics with or without preparatory ammonium chloride may later be required.

Although most of the contraindications to digitalis are theoretically it should be reserved for frank or impending decompensation. Rarely will these indications require rapid digitalization. As a rule the course may be planned with a three-day objective of therapeutic action. Cardiac arrhythmias are potential sources of serious danger in coronary thrombosis. Nevertheless the prophylactic use of quinidine has not seemed justified. A small minority of these patients experience such faults of conduction and the action of quinidine is so rapid (10 to 15 minutes by the oral route) that little added hazard exists in its deferment until the development of the arrhythmia. A fixed formula for it

administration has proved especially useful. Bearing in mind the fact that the action of quinidine is exerted for only two hours the pattern is:

a. Quinidine sulfate 130 mgm (2 grains); repeated in two hours as a test for quinine idiosyncrasy. b. Quinidine sulfate 260 mgm. (4 grains) every two hours day and night for thirty six hours, or until the normal sinus rhythm is restored, if it be before that period. Experience has proved that continuance of these doses beyond thirty-six hours is usually unavailing. c. Maintenance levels are established first by reducing the individual dose and then by lengthening the interval. Usually complete withdrawal is possible; but a gradual reduction after the suggested plan makes it possible to retrace one step at a time rather than to repeat the entire course of quinidine in event of an escape from therapeutic control.

Surgery has made material contributions to the treatment of coronary disease. In general most of the surgical procedures coronary circulation through new pericardial sources. Thorel established the existence of fresh blood supply in pericardial adhesions. Beck pursued this approach by suturing the pectorals major to the epicardium. O'Shaughnessy brought the omentum through the diaphragm for the same purpose. Subsequent suggestions have included a series of measures to create artificial synechiae between the layers of the pericardium. Divergent from this plan have been Fauteux's direct attacks upon the coronary system. By the application of the Leriche. Principle of pericardial sympathectomy to the coronary artery and simultaneous ligation of the great cardiac vein he has shown a distinct circulatory advantage to the myocardium of experimental animals. Carried over into clinical experience the results have been promising; but a much wider application of the method will be required to establish its place in practice. Most recently Vineberg and Jewett have suggested transplanation of the internal mammary artery into the wall of the left ventricle for the purpose of improving its nutrition. These experimental studies have not yet been supported by clinical trial, but new vascular channels have appeared in the myocardium of dogs after the transplant. Attempts to transfer the prospects of any operative procedure from the experimental animal to the human subject with coronary disease must always take into account the usual widespread vascular handicap in the latter. Until it is possible to duplicate this condition in animals and from that baseline to induce coronary occlusion, the clinical projection and application of experimental studies will be presumptive and the results relatively fortuitous.

The convalescence from a coronary accident is frequently tedious. Recognizing every grade of myocardial handicap, minor episodes admittedly escape notice or progress to an uneventful convalescence without unusual protection. On the other hand, serious degrees of disability to fatality may succeed initially inconsequential manifestations. The prognosis of coronary thrombosis is beset by many pitfalls. Accordingly conservatism is the best policy. Physical rest in bed must be enjoined

for six weeks in the average subject. Compromises in the reduction of this period may be made in the victims of lesser attacks under carefully controlled conditions. Conversely, a certain number with severe reactions must remain in bed for several months to insure the establishment of a maximal collateral circulation and myocardial reserve. Physical inactivity can be carried to inordinate extremes. The period of recuperation may be reached when carefully graduated exercise becomes the key to more adequate myocardial recovery. Mental rest must likewise be insured. Detachment from business and family cares is essential. Tobacco in all forms must be eschewed by reason of its vasoconstrictor influence. Although this effect is much more profound in some individuals than in others, it is the safest plan to generalize. Alcohol, tea and coffee have a vasodilator effect and may be used in moderation. With freedom from symptoms of coronary insufficiency and an improvement in myocardial reserve will come increasing interest in mental and physical outlets. This period carries a grave responsibility for the physician. Whereas up to this point the patient has been protected from a real knowledge of the exact conditions, now the physician must make him a partner in the ultimate plan of campaign. The anatomic, physiologic, and pathologic factors in the situation are outlined in principle. The coronary handicap is cited, usually somewhat on the optimistic side. The myocardial reserve is discussed as an element which may be spent extravagantly or protected by judicious living. Always the patient must be informed of the penalty of probable invalidism incident to wasteful expenditure of this reserve. Conversely, the prospect of years of comfortable useful living under careful control should leave no doubt in his mind as to the physician's position; but such conferences must be sympathetically realistic. As Longcope said, "Why ward off death if in the attempt we kill living?"

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QUALIFICATIONS FOR A DOCTOR IN INDIA

BY DR. SAV ARIRAYAN JESUDASON, F.R.C.S.E.

The above subject reduces itself in my mind to the selection and training of Medical Students in India, because "prevention is better than cure": I know that in spite of the greatest carefulness in the selection of medical students there is yet the possibility of their proving failures later on. Yet that need not discourage us from doing our best to give a right start. One of the most disappointing features of modern education in India has been (as has been repeatedly pointed out by our great national leaders like Mahatma Gandhi and others) the fact that it is so very little related to the ordinary life of the villagers (*i.e.* 90 per cent of the people of India) and the urgent needs that surround us. To use a modern expression it has no "environmental bias". Our Universities and Colleges are being maintained at an enormous expense from money collected from our rural population who get very little return from the compulsory investment they make in the higher education of these young people. It is this earnest longing and urge to relate general education to the needs of the ordinary people that is the driving force behind the "Basic Education" scheme. Now all this applies with even more tremendous force to medical education and therefore let us first look at the pressing medical and sanitary needs of our country and the general conditions of our millions before attempting to consider the essential qualifications for Doctors in India. Let me first draw a rough picture of the situation and then consider the qualifications needed to meet the situation. One of the most colossal problems that a real lover of India has to face is the prevalence of acute epidemics that carry away literally millions of our people in the prime of life, often in a matter of a few hours. In the part of the rural areas where our own Ashram has been working for now nearly 27 years, malarial epidemics have been becoming worse in recent years and whole village populations have been prostrated with them. "Benign" types are no more benign and malignant types have assumed monstrous forms that perplex and confuse the physician. While in our younger days we were taught that malaria only prepared men for the grave without itself being the direct assassin now it has become diabolically a straightforward murderer.

At least 100 millions suffer from malaria every year and 37 per cent of deaths between 1932 and 1941 were due to it. Again even in the case of deaths from other causes malaria plays a part in so undermining the vitality of its sufferers that they easily fall a prey to any other acute disease attacking them. Even in our Ashram we have spent nearly Rs. 2000 worth quinine bought from the Government within the past two years for treating our malarial patients. But without a simultaneous vigorous effort on a large scale to carry on anti-malarial measures in our villages all this seems waste of money and energy merely to undertake curative measures. The poor people go back to their mosquito ridden

villages to get a fresh dose of infection. Their stagnant pools become the maternity centres for the mosquito larvae and the thick shrubs and undergrowths an excellent nursery for the adult mosquitoes. An army of workers well trained are needed in anti-malarial measures to grapple with this problem.

Deaths from cholera vary from year to year ranging from lakh and a half to nearly four and a half lakhs per year. This does not include the deaths in the States. Here is a serious problem of pure drinking water supply. If we except large cities the vast majority of villages have no protected water supply at all for drinking purposes. Most of the wells are open wells used for irrigation, drinking water and for washing their clothes. I know by experience that this is the commonest source of infection during cholera epidemic as well as for other water-borne disease like enteric fever, dysentery etc.

I need not dwell long on these and other kinds of epidemic like plague, small-pox, etc., which carry away millions of people as you are all familiar with the statistics often quoted by several writers on this subject. Maternal and infant mortality form another terrible problem. Two lakhs of mothers die during confinement every year in India, excluding the States. Four million women suffer from gynaecological trouble after child birth. About 25 per cent of the children born die during the first year of their life and nearly 50 per cent die before they attain their tenth year. That is terrible; hence it is that the average expectation of life in India is only round about 25 years while in Britain it is 58 and in Japan 44. Complicating these, there are other closely allied problems created by the illiteracy, ignorance, poverty and the low vitality of millions due to an insufficient and illbalanced diet. The war brought many evils in its train and now its aftermath seems to have dragged us all into an even worse plight. Just now matters are getting more complicated and distressing owing to "Civil commotions, communal fights and refuge problems".

Also we need a large number of well-trained people to meet the ordinary illness, surgical and medical. The urgent need for men trained to meet the problems in a practical way, men with capacity to rise equal to any emergencies is very pressing. They have to be doctors, teachers, guides, philosophers and friends all in one. There are 47,000 doctors in India including graduates and licentiates. But the great majority of them are practising in urban areas and vast rural areas are left without any qualified medical help. To deal efficiently with the health needs of all people there should be at least one doctor for 1,000 persons. At this rate India needs at least four lakhs of doctors, i.e., nearly ten times more doctors than now available. Considering the greater incidence of epidemics the actual need is for even more qualified men and women doctors. There are only approximately about 7,000 qualified nurses. Considering the enormous maternal and infant mortality as well as the great need of good general nursing for other illnesses, we need at least

80,000 nurses during the next ten years. Desperate situations demand desperate remedies and emergency measures must be adopted. This could only be done by immediately converting every suitable hospital into a training institution. I would earnestly urge headquarters district hospital or mission or private charitable hospital with at least 200 beds, and possessing the minimum necessary modern equipments such as a good laboratory, X-ray installation, etc., be made a centre for training medical student, nurses, dispensers and sanitary inspectors. Taluq head quarters or mission hospital with a minimum of about 100 beds be made a centre for training nurses, dispensers and Sanitary inspectors. Every charitable hospital with at least 75 beds be recognised as a training institution for dispensers who shall be given training also in male nursing. The matter is very urgent and does not brook any delay because millions of people are perishing for want of the most elementary medical and sanitary aid.

The long talked of Medical Colleges at Madura, Coimbatore, Guntur, Cocanada, Calicut (Ernakulam a very much better centre for Kerala) should be opened at these places. It is no use talking about starting a medical college at Madura but in actual practice admitting students into a College at Madras. All talks about want of finance and equipments are irrelevant in face of the present desperate need. The present slavish imitation of Western ultra scientific standards and the laying of an undue emphasis upon theoretical training of medical students must be given up. They must be admitted straight into our hospitals immediately after selection for working as nurses and made to do the humblest of ward work under direct supervision for at least six months. This should form the probationary pre-registration period and might extend from July till December. Personal contact of the most intimate kind might thus be established between professors and students by this and the student should only be registered as a regular medical student after probationary period if passed by a board consisting of the professor in charge of the ward, one of the first year professors, and the Principal of the College. Before students are selected for the College this condition of a probationary period must be explained to them. All theoretical or purely scientific subjects such as Physics, Chemistry, Biology (or Organic Chemistry), etc., should be finished in an Arts College before the students are selected by the University having appeared medical Intermediate Examination, for those intending to join the Medical College. All who teach in a Medical College must be "practising doctors" who are in charge of hospital wards. I cannot understand the wisdom e.g., a Professor of Anatomy not being an operating Surgeon or a Professor of Pharmacology not being an active Physician in charge of medical wards. How could a teacher be really an efficient "Basic" teacher (that I have already insisted on) if he does not base his teaching on actual experience of his work in the wards and this demonstration of his lectures by helping the students to see in a practical way how his theories work in practice

among human patients? It is only this Basic method of instruction based on practical work for the patients that could develop originality and the spirit of personal investigation and research in the minds of the students. By multiplying the training institutions we reduce also the number of students in each and this will promote more direct contact between teacher and the taught. The actual training period of a medical student in a College should be four years, a nurse or a dispenser cum nurse three years, and Sanitary Inspectors (who should be also given some training in first aid and dispensing) two years. But all of them should work at least one year in a Rural Centre before they are given their degree or diploma. This will add a year to their training period before they are declared qualified. There should be a special bias towards a working knowledge of sanitation and preventive medicine in the training of all students. From what I have said some might wrongly assume that I am advocating the revival of the Old Licentiate Diploma for doctors. No, I am entirely against caste distinctions even in the realm of medical qualifications. My plea is to make medical education more practical and realistic and to produce a superior type of doctors because a practical man who can stem an epidemic from destroying people is an infinitely superior man to one whose head is merely loaded with scientific theories that do not work in practice or are forgotten even before the man completes his medical course. On the other hand plenty of provision should be made for *post graduate training* for men whose aptitude fits the form more advanced training in those special subjects for which they have a special talent. They will also be in a better position to decide about this after they have had some experience in professional life and practice.

Now let me detail definitely the qualifications needed for a doctor. The training of women doctors should be on somewhat different lines from that of men emphasis being placed on Midwifery, Child Welfare, Diseases of Children and Gynaecology.

(1) A doctor's central interest should be in his patients and in getting them treated as efficiently and successfully as he could and not in the remuneration he will get for his work. He must have a high sense of vocation and realise that his profession requires the greatest amount of self-sacrifice and unselfishness. Medical profession is not for the money-minded person. This would tend to make a man heartless and indifferent towards those who are unable to satisfy his financial greed. Among the crowds of poor villagers who flock to our out-patients' dispensary are some who come from stations where there are hospitals and private practitioners. When we protest that our work is mainly intended for helpless villages all round, they answer they are driven to us by the exacting demands for money from doctors in their own places. Remember the utter poverty of our suffering millions of our land.

(2) The doctor must develop the spirit of right approach to his patients. It is an axiomatic truth that a doctor's character should be above suspicion. Patients' confidence in the doctor is a *sine qua non*

for successful treatment. We are not veterinary surgeons. But I suppose even animals need the right approach. We are dealing with human beings bestowed with the spirit of reasoning and understanding and also sensitive to respond either favourably or unfavourably according to the way they are dealt with. Mind and body act and interact upon each other. You are dealing with a person and not merely with a 'case'. Psychology plays a great part in treatment. A doctor must have an understanding and sympathising heart. A friendly smiling face means a great deal to a patient inspiring hope and improvement in his mind and body. I have sometimes found a joke or an encouraging word act better than a sleeping draught. A long faced or peevish doctor or a nurse is a misfit. Once when the great Surgeon and father of asepsis, Lord Lister, was asked by some one, "What is the secret to success in surgery?", he paused for a while and then replied: "*A Feeling Heart*". Also patients, both men and women, confide often to a doctor things which they will not reveal even to their dearest and nearest ones. You must be worthy of this great human confidence.

(3) A doctor must carry about him a calm and a cool spirit that will not lose its balance in a moment of emergency. Unexpected complications might suddenly rise and he must be prepared to deal in a practical way with such emergencies. A doctor that loses his presence of mind at such occasions will soon lose the confidence of his patients. Villagers like children are often unable to explain clearly their real trouble and might even put you on the wrong track with regard to the diagnosis. A doctor must have grace to patiently explain things even when the patient seems unreasonable and hard to please. This is why often where an intellectually clever and more highly qualified doctor fails an ordinary doctor gifted with more commonsense and good spirit succeeds.

(4) In this land of poverty, a doctor must be able to do efficient work with the simplest of equipments. Plain living and high doing are *sine qua non* for doctors in our land. Do not try to impress upon patients by using expensive and unknown drugs. Let your own personal life be a model of simplicity. A spirit of indomitable hope and perseverance is a great asset to a doctor. He must not easily give up hope about his patients. I know of patients about whom sometimes even a specialist has given up hope, recovering wonderfully well by perseverance on the part of a less highly qualified doctor combined with earnest faith in God on the part of the patient and his relations. A spiritually minded doctor can do great things. I know a doctor in Europe who firmly believes that no really satisfactory cure can be obtained unless the doctor goes into not only the physical but also the spiritual history of his patient. This is my own experience.

(5) A doctor must be a man of studious habits, careful observation and systematic worker. He has to be a lifelong student for medical science is something that is always advancing into newer realms of knowledge and helpfulness for relieving suffering. Truth showers her

blessing only on her earnest and persevering devotees. The more pains a medical man takes to go very carefully and systematically into the history of his patient noting down every detail the more likely he is at arriving at last very near correct diagnosis "Slipshod work" is not only bad but might prove dangerous not only to the patient's well-being but also to the doctor's name.

(6) A medical man's life brings him into constant contact with pain and suffering and so must be a man with other diversions to keep up his spirit and save him from cynical outlook. Hence the best medical men have always been those who let their extra energy flow into other joyful useful diversions, such as historical investigations, music, art, politics, etc., e. g., Dr. Luke, the biographer of Jesus, Dr. Bose, the author of the "The Rise of the Christian Power in India", Dr. Sweitzer, the great German Musician and pioneer missionary in the primeval forest of Africa, Dr. Nair, the founder of the Justice Party in Madras, Dr. Khan Sahib a Dr. Roy, the Politicians, and so on. Develop therefore a helpful "hobby".

Medical profession has had its own heroes and martyrs of science. I would like to conclude with the story of the famous physician, John Hunter. He wanted to experimentally demonstrate the action of the virus of Syphilis upon the body. He very bravely inoculated himself with that virus. As a result he developed arterio sclerosis and resultant abnormal increase of blood pressure. This gave rise to irritable temper. John Hunter used therefore to say: "My life is in the hands of any rascal who chooses to annoy me". And so one day he got up in a fit of rage from a meeting in which some one had contradicted him and died as he was entering the next room.

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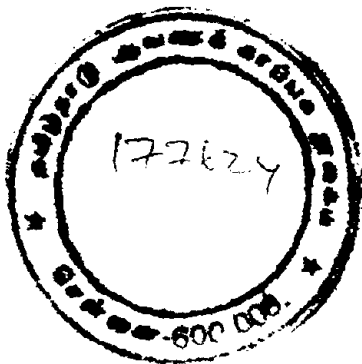
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