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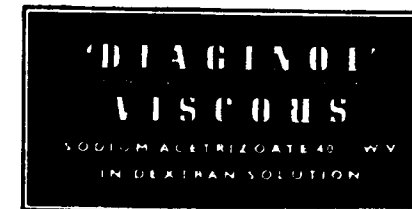
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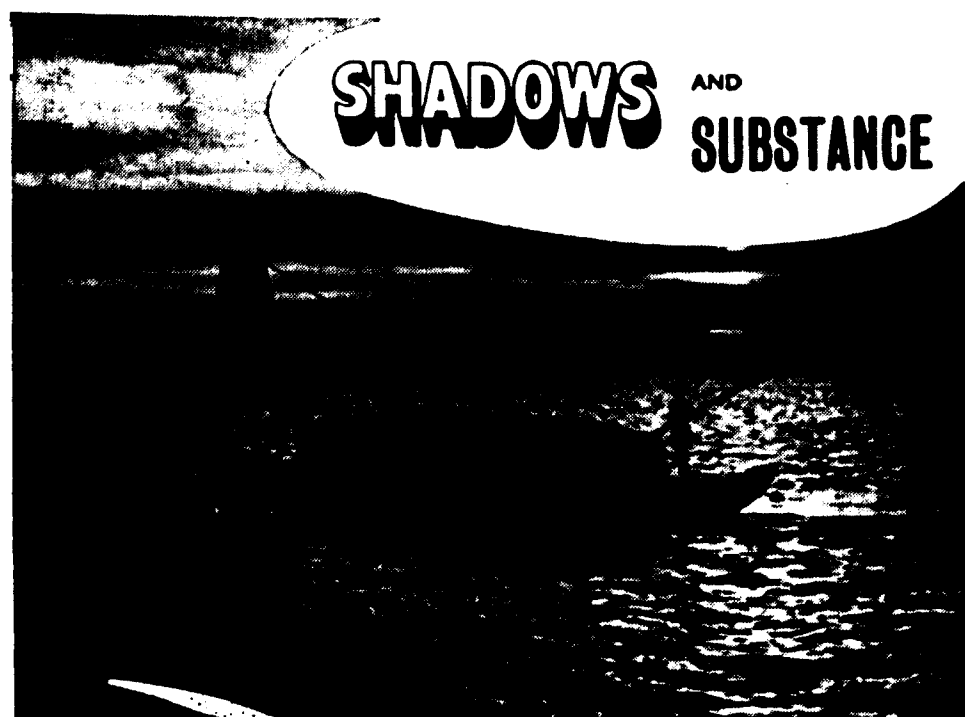
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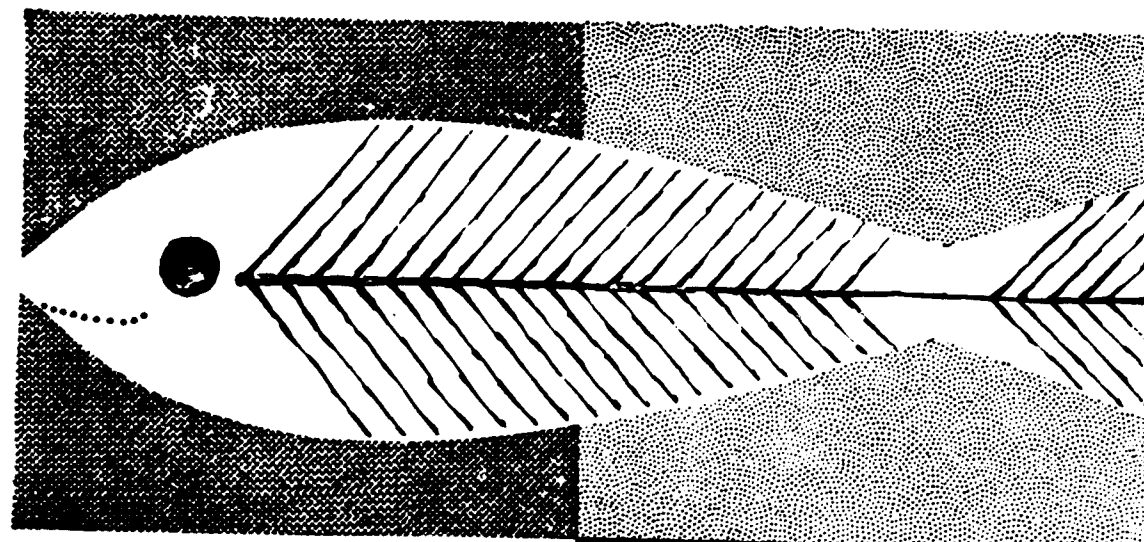
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Editorial

OUR LOSS

The sad demise of late Dr. K. P. Mody, one of our most respected and beloved senior radiologist in a hospital in London on 4-6-61 removes from the field of Radiology in India a stalwart and a great pioneer. True, he died full of years and honours, leaving a shining example for the younger generation of radiologists to emulate. At a time when Radiologists were looked down by our more fortunate brethren in the profession as mere technicians, this great savant had the courage and adventure to choose radiology as his speciality and set up the practice of radiology in the city of Bombay and crossed swords with the mightiest in medical profession with dexterity and skill. A born teacher and a fluent speaker, he was responsible for training the present generation of efficient radiologists in the great city and State of Bombay. A gentleman in every sense of the word, he gained the respect and love of his colleagues as well as his patients. He had laid the foundation of radiology in India in general and Bombay in particular truly and well. His services to Indian Radiological Association and its mouth piece, the Indian Journal of Radiology are too many to mention in the course of this brief editorial. He was the President of the Indian Radiological Association, the Editor-in-Chief of the Indian Journal of Radiology and Sir Jagadesh Bose Memorial Lecturer in the year 1958 thus remaining today as the only member of our Association who had won the triple crown. How richly he deserved these token of honours, from his comrades in the Association is too well known to all of us. At a very difficult period, he assumed the Editorship of our Journal and conducted it for many years with dignity, efficiency and high standard. His many scientific contributions and articles in the pages of our Journal and other journals will testify to his scholarship and research capacity. He led the Indian delegation to the International Congress of Radiology on several occasions besides attending almost every session of the Indian Congress of Radiology upto 1960 where he always played a very active and useful role. Although an elder Radiologist occupying the highest position open to Radiologists, he always had a word of cheer and encouragement to the struggling juniors in the Speciality. He always had an aura of culture and benevolence around him. We miss his dignified and friendly presence in all our conferences for a long time to come. A great Radiologist; a true gentleman and a scientific leader, he has left a shining tradition for us to emulate, and the grief of this great loss will be shared by us, his fellow radiologists as keenly as the members of his family. In the golden chain of the radiological progress in our motherland, his will remain as a solid link.

A. N. K. Menon.

MEMOIR



Dr. KAIKHUSROO PEROSHAW MODY

B.A., L.M.S. (BOM.), F.C.P.S. (BOM.), D.M.R. (ENG.), F.A.C.R. (U.S.A.)

Dr. K. P. Mody, one of our senior and eminent Radiologist passed away on 4-6-1961 in a hospital in London at the age of 75.

Dr. Mody was born in Bombay in November 1885. He had his education in Bombay and London. He was one of the pioneers of Radiology and had started his practice in Bombay in 1914. After graduation from the Grant Medical College, he served as a lecturer in the same College for some time. He was Hony. Radiologist to the Gokuldas Tejpal Hospital, from 1923 to 1940. He obtained his F.C.P.S. (Bom.) in 1933 and D.M.R. (Eng.) in July 1936. After retiring from the G. T. Hospital, he joined the Tata Memorial Hospital and was the Director of the Dept. of Radiology, from 1940 till the date of his death in 1961.

In recognition of his distinguished services to the science of Radiology, he was appointed Hony. member of the Royal Society of Medicine in 1951 and an Hony. Fellow of the American College of Radiology in 1955. During World War II, he served as Hony. Lt.-Commander to the Royal Indian Navy.

He was the President of the Indian Radiological Association and Editor of the Indian Journal of Radiology, for a long time. He led the Indian delegation to the International Congress of Radiology in London in 1950 and at Copenhagen in 1953.—May his soul rest in peace.

The value of Percutaneous Splenography or Portal Venography (Splenoporto-Hepatography) in study of Portal Circulation as compared to other methods

(1) Portal circulation time estimation (2) Barium meal for oesophageal varices
(3) Wedged hepatic vein pressure tracings and (4) Direct intrapulp-manometry by electronic manometer

BY

M. G. DESAI,

Hon. Asst. Radiologist, J. J. Group of Hospitals, Bombay

(In conjunction with Dr. T. H. Tulpule, Dr. B. J. Vakil, Dr. S. J. Shah, Dr. P. M. Udani).

AND

Dr. A. R. DESHPANDE,

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Before the advancement of method of percutaneous splenography and other methods of estimation of portal pressure, the diagnosis and evaluation in cases of portal hypertension due to cirrhosis and other extra hepatic conditions was solely physician's responsibilities to base his judgement on some clinical findings as history of hematemesis, splenomegaly, presence of ascitis, and abdominal collaterals etc. occasionally supplemented by barium meal study, oesophagoscopy, biochemical test, liver biopsy etc. The radiologist remained happy simply to demonstrate the varices in some cases of hematemesis. Naturally his attention never grew in the proper study of portal system and the hemodynamics of portal circulation. The clinician's study of the subject was never so complete until the horrible episode of bleeding of the varices in the case of severe portal hypertension. The early cases of cirrhosis were more often missed. Some of the newer methods of estimation of portal hypertension have helped to some extent in detecting cases of developing portal hypertension where other methods

failed. Even the information so obtained was inadequate to understand the exact state of portal hypertension, and the basic pathology of the causative factor. None of the methods, however, independently gave more useful information as obtained from percutaneous splenography.

ABEATICI AND CAMPI (1951) showed that the injection direct into the spleen rapidly enters the portal venous system in quantity enough to visualise the portal vein radiographically. The method of portal venography later on rapidly evolved and the works of Nanson (1953), Atkinson Barrett, Sherlock and Steiner (1955) Millness Walker, Middle Miss (1956) are worth mentioning amongst the few who have contributed in the applications of percutaneous splenography for cases of portal hypertension due to suprahepatic, intra-hepatic or sub-hepatic lesions.

To day the method of percutaneous splenography is almost an established and standard procedure and is used in

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investigation of all cases of suspected portal hypertension irrespective of age and condition of the patient. This is particularly so on account of its simplicity of performance, safety of patient during and after the investigation and reliability of the imparted information.

In fact, the spleno-porto-hepatography appears to reveal the secret of portal system and the hemodynamic changes in cases of portal hypertension, which was entirely missing in the essay of portal circulation.

With the increasing application of splenography as well as other methods of estimation of Portal Pressure in cases of portal hypertension, radiologist is actively brought in the picture to study more and more of this subject as a whole so as to assess the merits and demerits of different methods as compared to Splenography and correlate with clinical data. I may not appear to be optimistic to say that in some years to come with the aid of advancing science of Radiology, Radiologist may be a leading person in deciding the diagnosis, prognosis as well as operability in a case of portal hypertension. This is more so since there is an ever increasing enthusiasm of surgeons in exploring their ability of surgical fits on miserable patients with severe bleeding.

In this review I like to put forth the techniques of different methods used in our study and have a comparative evaluation from the results obtained by percutaneous splenography and other methods as (1) Portal circulation time estimation (2) Barium meal for oesophageal varices (3) Wedged hepatic vein pressure tracings and direct intra-splenic-pulpmannometry by electronic manometer. The advantages and disadvantages of Splenography are mentioned.

The material for our study was obtained from J. J. Group of Hospitals, and the study was carried out in conjunction with the Medical Unit - Dr. Tulpule T. H., Dr. B. J. Vakil, Dr. S. J. Shah and Dr. P. M. Udani. It is due to the association with these physicians that I venture to enter in to this difficult clinical subject of portal hypertension.

W. H. V. P. and Portal circulation time study was not carried out in children on account of age factor. Adult patients' age ranged from 24 to 50 years in whom all methods were applied. Amongst the adult cases five were without any liver or portal vein diseases. Three were of supra-hepatic portal hypertension (C. C. F.) and others having clinical evidence of liver diseases (Portal cirrhosis). All the cases were investigated clinically and biochemically. Liver Biopsy was carried out in all the cases including 3 children cases. Patients were checked for normal plasma prothrombin before the study was made. Contrast Medium sensitivity test was carried out on all the patients. The patients were fasted on the day of examination and were given premedication of 50 mgs. of Pethidine and 50 mgs. Iargactil. General anaesthesia was used in children. Bowel wash with simple enema was given in bulky patients. Ascitis was tapped on same day when necessary. Arm to lung time was recorded with ether in all adult cases.

The following studies were made:

(1) *Splenic Pulp Manometry*: A fine lumbar puncture needle of 18 gauge was inserted through 9th left intercostal space in mid or posterior axillary line in a cephalo direction at an angle of 45 degrees to the transverse plane, after a local infiltration with novocaine. Resistance was met with when the spleen was punctured. The needle position was ascertained by slow dripping of blood.

TABLE I
SUMMARY OF RESULTS

Condition	Liver	Oesophageal varices Ba-Barium X-ray	Circulation time Arm to lung	Spleen to lung	Splenic pressure mm. Hg.	Wedged hepatic vein pressure mm. Hg.	Free hepatic vein pressure mm. Hg.	Intra-venous pressure mm. Hg.	Spleno- gram	Remarks
1	Without Liver or Portal Vein disease.	Nil	7	8	14	11	10	10	11	12
2	do.	Nil	0	0	*	4.5	4	3	Failed	Splenectomy was done previously.
3	do.	Nil	4	4	11	10	10	4	N.A. D.	Hæmaturia due to Pethidine.
4	do.	Nil	8	7	8	6	6.5	5	N.A. D.	
5	do.	Nil	6	7	10	7.5	8	7.5	N.A. D.	Cor. Pulmonalis Emphysema
6	Supra-hepatic Portal hypertension.	Nil	16	18	19	17.5	12.5	7.5	N.A. D.	C. C. F.
7	do.	Nil	18	18	14	12.5	11	9.5	N.A. D.	C. C. F.
8	do.	Nil	12	12	16	11	5	4	Operated Portal Vein. Pressure 15 mm. Hg.	
9	Cirrhosis	+++	8	10	19	13	16	12	+	Patent umbilical vein. Portal Vein pressure 37.5 mm. Hg.
10	do.	+++	9	8	23	30	17	12	+	Unsuspected Splenomegaly (C. C. F.)
11	do.	+++	9	8	21	20.5	6	3	+	Coronary Azygos collateral.
12	do.	+++	11	11	30	26	8	6	+	Patent umbilical vein.
13	do.	+++	5	7	15	10	5	3	+	Coronary Azygos collateral.
14	do.	+	11	12	13	11	8	3	+	
15	do.	+	5	8	20	20	8	5	+	
16	do.	+++	3	5	20	10	4	2	+	
17	do.	+++	6	12	18	17.5	*	15	+	
18	do.	+++	4	4	21	25	12	5.5	+	PR. 200 mm. Hg. by water manometer.
19	do.	+++	4	7	27	25	19	7	+	mm. Water 210
20	Cirrhosis Spleen +	+++	5	5	11	11	11	11	+	
21	Cirrhosis (Liver +)	+++	5	5	11	11	11	11	+	
22	do.	++								
23	do.	++								
Abdominal Collateral Seen										

N: Normal.

+: Positive.

—: Negative.

N.A. D.: Nothing abnormal detected.

*: Could not be done.

A sample of splenic smear was collected for examination and a needle was connected with the strain gauge by a polythene tubing. Pressure was recorded on electromanometer through the stathamgauge pressure transducer with the patient breathing quietly. In all cases the needle was further advanced by half a centimetre and pressure verified. In children the pressure was measured by using a conventional spinal water manometer.

(2) *The Portal Circulation Time.*—One c.c. of diluted ether was injected through the

same needle directly in this spleen and time noted when patient recognized the smell.

(3) *Percutaneous Splenography.*—The same needle was used for carrying out splenography immediately. The needle was connected with a 50 c.c. syringe by a polythene tube. 40 c.c. of 76 per cent Urografin was injected rapidly in the spleen. Before connecting the syringe a good flow of blood was ascertained. The average time taken for complete injection was about 10 to 12 seconds. The first plate was taken just when last 5 c.c. were being pushed. The second

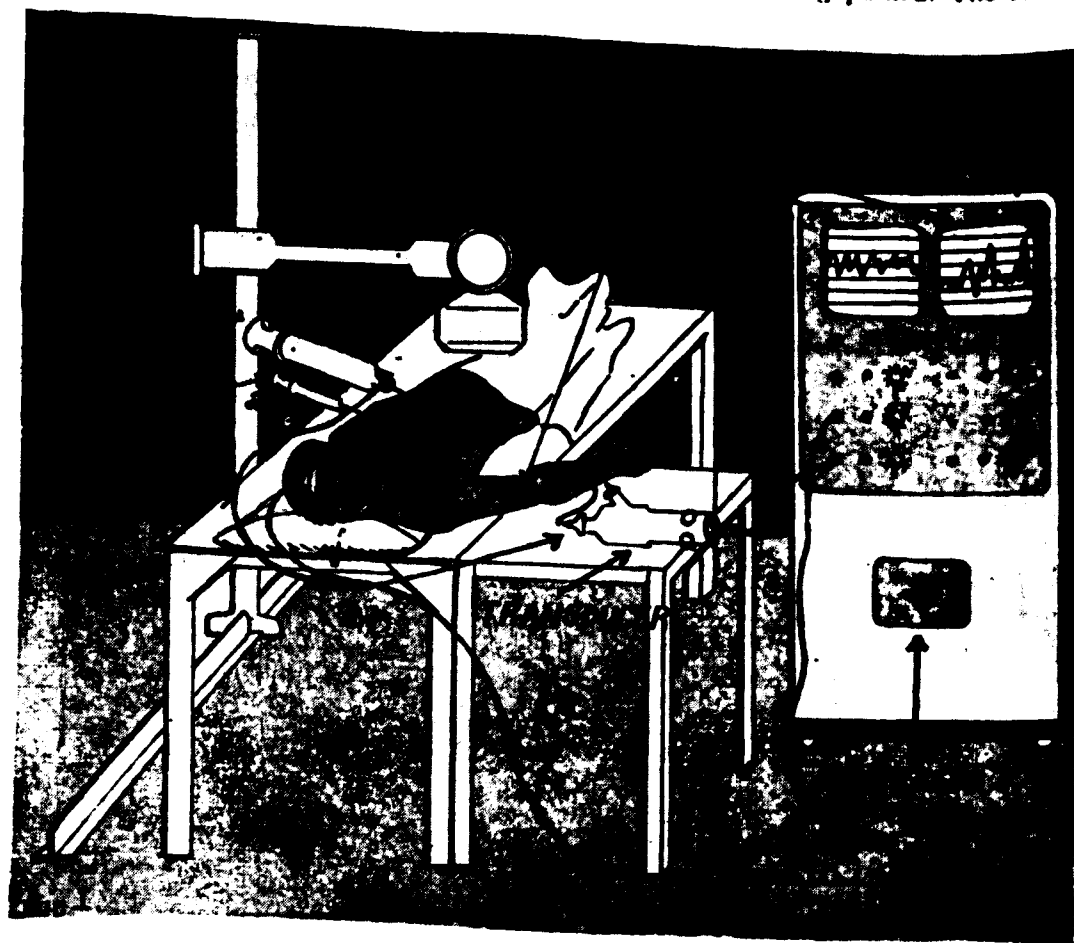


Fig. 1

The diagrammatic plan showing the different methods and instruments used in procedures.

TABLE II
Intrasplenic pressure and hepatic vein pressure in different groups

GROUP	No. of cases	Mean Intra-Splenic pressure mm. Hg.	Mean hepatic vein pressure	
			Wegged	Free
1. Without Liver or Portal Vein Disease	5	10.7 (8-14)*	7.7 (4.5-11)*	7.3 (4-10)*
2. Suprahepatic Portal Vein Lesions (C.C.F.)	3	16.3 (14-19)*	13.7 (12.5-17.5)*	10.5 (8-12.5)*
3. Intra-hepatic Portal Vein Lesions	12	20 (13-30)*	17.3 (10-30)*	9 (5-16)*

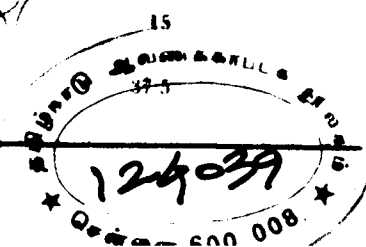
* Range of Pressure.

exposure was made after the completion of the injection. Sometimes, the third one was exposed between 5 to 10 minutes after the injection to get a pyelogram. The patient was every time instructed to hold the breath during the exposure. The average duration of the exposure was not less than 2 seconds. The needle was then withdrawn and the puncture wound was sealed. The exposures were in most of the cases done with the cassette holder for 12 x 10" size films, commonly used for carotid angiography. On account of smaller size of the film great care was taken in centering the liver and splenic areas.

(4) *Wegged Occluded Hepatic Vein Pressure Measurement.*—After local anaesthesia a median antecubital vein of right arm was cut down and separated. Under fluoroscopic control a radio-opaque "Nylon" catheter No. 8 with curved tip was passed through it into the right atrium. The catheter was manoeuvred to enter inferior vena cava by pointing its tip to right and posteriorly. The catheter was advanced further by one to two cms. beyond the atrio-caval junction when it would enter the right hepatic vein. Generally it is easy to enter the right hepatic vein. The catheter then was advanced to the periphery of

TABLE III
Showing portal vein pressure estimated by different methods in two cases

Case No.	Intrasplenic Pressure mm. Hg.	Mean hepatic vein		Portal Vein tributary pressure at operation mm. Hg.
		Wegged mm. Hg.	Free mm. Hg.	
9	19	13	5	15
12	30	26	8	17.5



the liver as far as possible until it was wedged in one of the venules. The following criteria are used for successful wedging:

- (1) That the catheter was in periphery of the liver and could not be advanced any further.
- (2) That there was a sudden fall in pressure when catheter was withdrawn from the wedged position to free position.
- (3) That an abrupt 'giving' sensation was felt when the catheter is withdrawn from wedged position.

The pressure was recorded on electronic-manometer through the Statham-gauge pressure transducer, the zero-level being taken at a point 5 cm. below the sternal angle. After the wedged pressure is recorded, catheter is withdrawn to free position under fluoroscopic control, continuously recording the pressure. Pressure in

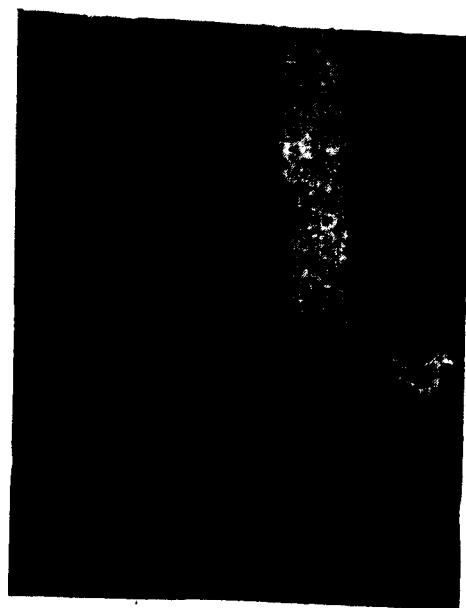


Fig. 2
Normal splenogram showing splenic and portal veins and normal intrahepatic portal branches.

inferior vena cava and right atrium were recorded while taking out the catheter.

(5) *Barium Meal Study* Barium meal study was carried out on fasting stomach, with simple barium sulphate powder of moderately thick consistency. Atropinisation was done in most of the cases. Plates were taken in supine and right oblique positions in deep inspiration.

Results

1. *Portal circulation time.* Portal circulation time was found to be inconsistent and unreliable. In normal subjects portal circulation time was slightly more than arm to lung time in one case and same or less than arm to lung time in 3 cases. In portal hypertension group, in six cases portal circulation time was same or less than arm to lung time whereas in other nine it was more. Obvious difficulties in fairly sedated patients in this procedure need not be stressed.

2. *Barium Meal Study.* Only in four cases of portal hypertension, the varices were demonstrated, as compared to 11 cases where collaterals were revealed in splenography. In one child the varices were detected. Two attempted.

3. *Intra-splenic - pulp - manometry* The mean intra-splenic pressure in cases without liver or portal vein diseases was 10.7 mm. Hg. 3 to 14 mm. Hg. The intrasplenic pressure in portal cirrhosis ranged from 13 to 30 mm. Hg. Mean 20 mm. Hg. All patients of this group showed pressure higher than the mean pressure of normal cases. In three patients of supra-hepatic portal hypertension due to C.C.F., intra-hepatic pressure varied between 14 to 19 mm. Hg. and the mean value was 16.3 mm. Hg. In three patients (case No. 12, 14 & 15) the pressure was only moderately raised which just over lapped the upper limit of that found in group without liver disease.

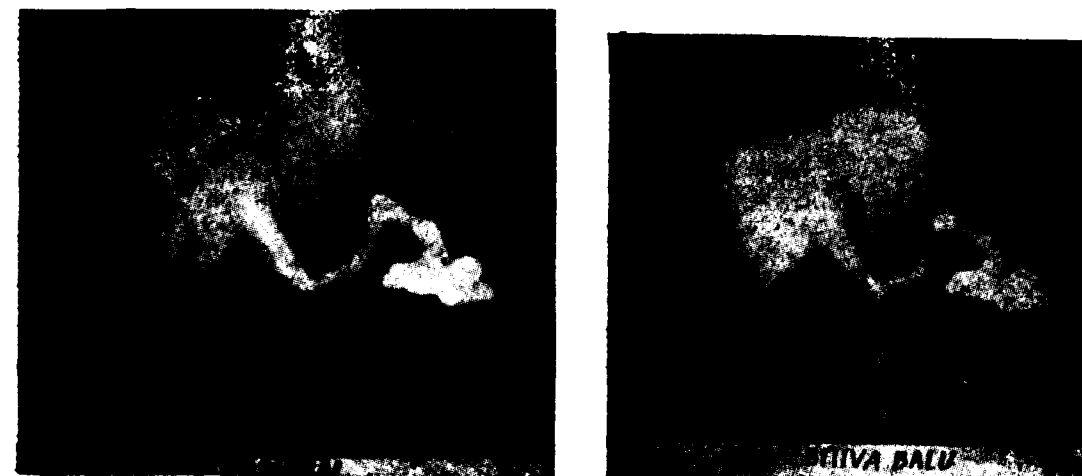


Fig. 3 & 4
Portograms in cases of cirrhosis, showing a large coronary collateral.

4. *Portal venography.* In normal portal venograms the portal vein and the splenic veins (with intra-hepatic branches) were outlined. The division of portal vein intra-hepatically showed no sudden diminution in size or disorganisation of patterns.

In cases of portal hypertension except for two (19 & 1) the collaterals were detected in varying size, position and extent. Short gastric and coronary veins collaterals were the most frequent to be demonstrated. They appear to arise either from splenic or portal vein. In three cases umbilical vein was seen filling from the left branch of portal vein and running downwards. Coronary azygos collateral was opacified in two cases (15 and 17) and inferior mesenteric vein in one case. Abnormality of intra-hepatic branches of portal vein such as irregularity of branching, pulling of contrast medium was demonstrated in less than 50 per cent of the cases.

In cases of C. C. F. the portograms were normal. No serious after effects were observed in any patient. Pain was felt in two subjects when contrast medium was injected

partly subscapular. Intra-abdominal haemorrhage or rupture of spleen was not experienced.

(5) *Wedged Hepatic Vein Pressure.* Patients without liver disease—Mean pressure W. H. V. P. was 7.7 mm. Hg. (Ranged 4.5 to 11 mm. Hg.) in five cases. Mean Pressure in free hepatic vein (ranged from 4 to 10 mm. Hg.) was 7.3 mm. Hg.

WHVP in portal cirrhosis—Mean WHVP Pressure was (range from 10 to 30 mm. Hg.) 17.3 mm. Hg.; Mean Free HV Pressure (ranged from 5 to 16 mm. Hg.) was 9 mm. Hg.

In five cirrhosis patients WHVP was between 10 and 11 mm. Hg., which is near the upper limit of normal pressure. Hence there was some over-lapping between these two groups (9, 12, 14, 15, 17).

There was a sharp drop in pressure as the catheter is withdrawn from wedge position to free position. This abrupt pressure drop is characteristic of intra-hepatic portal hypertension. This gradient was only slight in cases of suprahepatic portal hypertension

whose WHVP and free vein pressure were raised, and the pressure in inferior vena cava and right atrium was also raised.

Paroxysmal auricular tachycardia was produced in two cases. In one case the procedure was completed after administration of pronestyl. The other case was abandoned. In two cases mild cardiogenic shock was noted which promptly responded to Noradrenaline. One patient has developed thrombophlebitis of ante-cubital vein.

In two patients who were submitted to operation, direct portal vein pressure was taken. The pressure recorded directly was 25 per cent higher than WHVP (Case No. 9 and 13).

Discussions

The diagnosis and evaluation of cases of cirrhosis as well as other lesions producing portal hypertension were most of the time

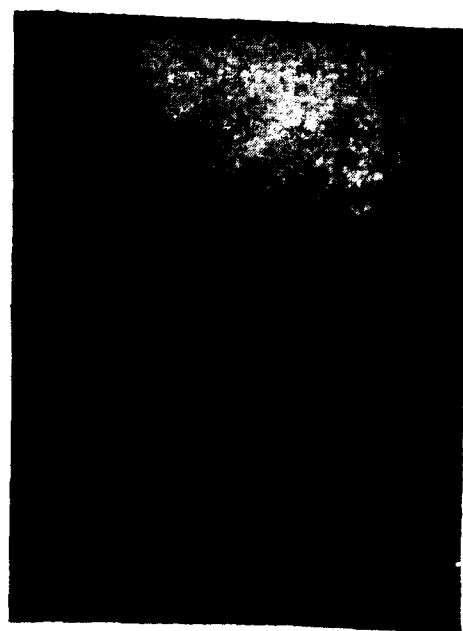


Fig. 5

Catheter shown in hepatic vein. Rt. in free and wedge positions.

incompletely investigated till the development of newer methods like spleno-portography by injection of radio-opaque contrast medium directly in spleen, and the estimation of intra-splenic pressure by direct puncture and WHV pressure tracings by electronic manometer. Some of the methods such as biochemical test, oesophagoscopy and clinical data of enlarged spleen, history of hematemesis, visible abdominal collateral etc. were not enough for the proper assessment of portal circulation and the hemodynamical changes occurring due to portal hypertension.

The methods of estimation of portal pressure directly in portal vein or its tributaries, indirectly by estimation of pressure from abdominal wall veins and direct intrasplenic as well as WHV tracings do not provide the information regarding the exact status of portal system. Besides, these methods involved risks of laparotomy, anaesthesia, operative shocks etc. After the advancement of splenoportography, the radiological field came into more active part in discussions of problems of portal hypertension. Some of the important information obtained by this method, are found of utmost value in cases of portal cirrhosis, unexplained hematemesis, extra hepatic lesions producing portal hypertension etc. and this study by radiological method has become inevitable to prove the patency or otherwise of portal vein and demonstration of size of splenic vein when surgeon is contemplating to undertake a case for porto-caval or leino-renal anastomosis to shunt the portal blood so as to avoid occurrence of bleeding due to collaterals. This fact made the Radiologist to take keen interest in the study of portal hypertension due to supra-hepatic, intra-hepatic or sub-hepatic lesions. (Causes of portal hypertension - Suprahapatic - C.C.F. - Constrictive pericarditis, diseases

of hepatic veins and I.V.C. - Budd chiari syndrome; Intrahepatic - Portal cirrhosis, biliary cirrhosis, Wilson's disease, haemochromatosis; Subhepatic - Portal and Splenic Vein thrombosis, anomaly of portal vein such as Cavernous malformation, Neoplasm or any mass in abdomen obstructing the portal venous flow. The state of radiology to-day foresees even more usefulness of X-ray methods likely to develop in future for more accurate diagnosis and prognosis as well as for the decision on operability on a case of portal hypertension

Methods of splenography developed since 1951: To-day this method is known for its simplicity of procedure, safety of patient before and after the investigation, and reliability of the imparted information as compared with any other method as portal circulation time study, barium meal examination, direct intrasplenic manometry and WHVP tracing undertaken.

It need not be stressed that what has been said about the spleno-portography is true when we can obtain very satisfactory radiograms in every occasion. A satisfactory spleno-porto-hepatogram should as a matter of fact demonstrate all possible existing collaterals, good intrahepatic patterns, and adequate concentration of contrast medium to delineate the portal and splenic veins with the collaterals.

We had initially great difficulties in obtaining good splenograms. Sometimes we failed, even repeated twice, thrice too. With increasing experience we succeeded in obtaining fairly satisfactory portograms. Following are some of the points regarding the technique which have drawn our attention.

1. *Contrast Medium.*—We used 50 to 70 per cent of ioduron (cilag) 70% fortom-brin and urograffin 76%. We found that more

concentrated dye of equivalent strength as 76 per cent urograffin, is satisfactory for splenography. We have been using 40 cc. of dye for all adult patients and 15 to 20 cc. for children. Some people have recommended only 20 cc. However, for the purpose of avoiding repetition we have used not less than 40 cc. in all the patients without any objectionable effects.

2. *Method of Injecting.* Most of our cases were injected by hand with glass-syringe. Three patients were injected with mechanical hand pump. Better density and contrast was obvious when using hand pump. In our opinion, use of mechanical hand pump should be encouraged since injection with the hand requires longer time as well as good amount of force. Most of our cases of II Series were carried out by using hand pump. About 10 to 12 seconds were required for injecting with the hand, while it took about 3/4 seconds when injecting with hand pump.

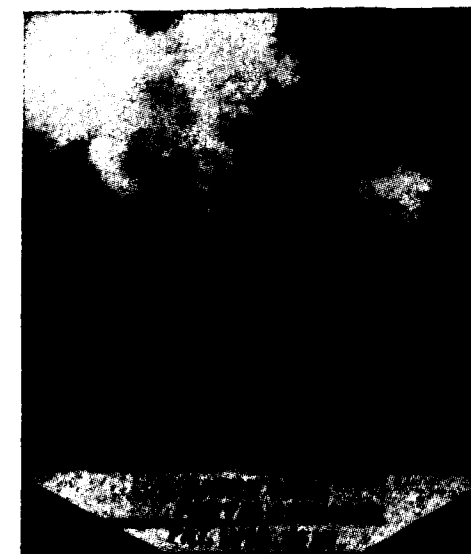


Fig. 6

Portogram showing a big umbilical vein collateral in a case of portal hypertension.

3. *Size of the needle.* The average size of the needle used varied between 16 to 18 gauge; we find that broader bore is more satisfactory for easy and rapid injection particularly with hand.

4. *Site of injection.*—We find that selection of ninth space intercostally in mid or posterior axillary line is suitable for adult patients. In children a preliminary scout film of abdomen is useful for selecting the site of injection.

5. *Size and Number of Films.*—Initially we were using single film of 12×15 " size to be exposed while the last few c.c.'s are being pushed. Later on we used 12×10 " size cassette - holder commonly used for carotid angiography. On account of the smaller size more care has to be taken while centering the film. Similar cassette holder of 12×15 " size in our opinion would be very satisfactory. The first exposure is made while the last few c.c.'s are being injected,

and the second exposure is made after the completion of the injection. The person who injects used to change frequently to avoid X-ray exposure constantly to one man while injecting. The usual protection with lead apron to the person who injects and proper coning of diaphragm is essential. The use of 70 mm. Odelca Camera was not done in our series with a view that it gives larger exposure to the patient and to the operator. Besides the conventional radiography was satisfactory for our purpose. However, we are starting using the 70 mm. Odelca Camera for serial roll film for next series of our cases. We feel it will be useful also for study of portal circulation time with the dye and help us in assessing the portal stasis as well as give more information regarding collaterals.

At this stage I may like to mention some of the useful data available from a splenogram.



Fig. 7

Record of intrasplenic, WHVP, free HVP and withdrawal pressure tracings in a case of cirrhosis. A sharp gradient seen is a characteristic in a case of cirrhosis. Pressure in Inferior vena cava and Rt. atrium are recorded.

1. The patency or otherwise of Portal Vein and anomaly of portal vein as mural thrombi, narrowing due to recanalisation following thrombosis or developmental anomaly as cavernous plexus veins etc. In other words it demonstrates any extra-hepatic lesion in portal hypertension.

2. Splenic vein thrombosis due to abdominal mass or secondary to portal vein thrombosis or rarely post traumatic.

3. Intra-hepatic patterns due to cirrhosis or delineating a mass of size enough to displace the portal ramifications.

4. To ascertain the efficacy of anastomosis after operation.

5. Demonstration of collaterals (Route and Extent).

6. Better method of visualisation of oesophageal collaterals in case of unexplained bleeding.

It is quite obvious that the data available from splenograms are numerous and useful and most of them are undetermined by other methods.

The portal circulation time made to study the portal blood flow did not help us at all since the findings are inconsistent and unreliable. This study is fairly difficult in sedated patients and not possible in children. We hope to get some information regarding the portal blood flow in our next series of patients on whom we are using 70 mm. serial roll film on Odelca Camera.

The barium meal study for gastric and oesophageal varices does not co-relate with the results of splenograms and we find that splenography is a superior method in visualisation of collaterals. Some time with gross hypertension it is negative. In our cases only 4 cases showed varices out of 11 cases

where collaterals were demonstrated. In children cases one showed varices out of the two undertaken and in whom intra-splenic pressure was high. Absence of visualisation of varices depends on the site of collaterals, history of recent hematamesis, the nature of barium suspension used and the quality of radiogram. Absence of varices in no way rules out portal hypertension. Pressure studies by intrasplenic Manometry and W. H. V. P. have fair correlation in cases of Portal hypertension. Meyer and Taylor demonstrated that since portal and hepatic veins are valveless and veins without anastomosis linked common sinusoids an end-hole catheter wedged into and blocking a division of hepatic vein would measure the pressure in sinusoids and indirectly in portal vein through a static column of blood. Even though the sinuses are supplied by hepatic arteries too besides the portal vein, the arterial component affecting the Intrasinusoidal pressure is very small. The results of WHVP and direct portal vein pressure in our series shows former pressure 25% lower than the direct portal vein pressure taken during the operation (cases 9 and 12) and it is reported to show constant difference.

Mean WHVP is reported to be 5 to 6 mm. Hg. in normal subjects and 18 mm. Hg. in portal cirrhosis. In our series the mean was 7.7 mm. Hg. in normal patients and 17.3 mm. Hg. in portal hypertension. A sharp gradient between WHVP and free HVP in cases of cirrhosis is considered a diagnostic sign to differentiate suprahepatic portal hypertension due to C. C. F. constrictive pericarditis and lesions affecting hepatic veins and Inferior vena cava from Intrahepatic hypertension. Obviously the value of WHVP need not be stressed in cases of splenectomised patients as seen in our case (No. 2). This method too has place only on certain occasions since it involves the risk of catheterisation.

Direct Splenic pulpmanometry is still safe and simple than WHVP tracings. Since pulp is in direct communication with the portal vein tributaries, and the pressure measured in splenic pulp gives the value of portal vein pressure; Splenic pressure shows constant higher values than WHVP and direct portal vein pressure. Our results (mean pressure 10.7 mm. Hg. for normal and 20 mm. Hg. for cirrhotic Pts.) are nearer to the reported normal pressures of 10 mm. Hg. in normal and 25.5 mm. in cirrhosis by Atkinson and Sherlock. In three cases of ours (12, 14 & 15) intra-splenic pressure was only moderately higher and overlapped the upper limit of that found in cases without liver diseases. In all these cases collaterals were demonstrated and had helped in diagnosis.

Development of collaterals depends on the portosystemic gradient and its duration of existence; the obvious reason for which no collaterals were revealed in spite of considerably raised portal pressure as noted in our cases of supra-hepatic portal hypertension (6, 7 & 8) and absence of a collateral in one early case of cirrhosis of our case (19, 22) pressure studies have added value in these cases. The splenography, spleen acts as a buffer and hence the presence of collaterals is a definite evidence of portal hypertension as noted in all our 11/12 + 23 cases. However absence of collaterals in no way rule out portal hypertension. Presence of a collateral in absence of extra-hepatic lesion

indicate cirrhosis. The size and extent of collaterals do not correlate with the height of portal pressure as seen in three cases with moderate hypertension whose splenograms show huge umbilical collaterals. The site of collaterals is some times of prognostic value—Sherlock—just as in a case of coronary collateral, where potential chances of bleeding are more and obviously the prognosis is poor. Secondly an absence of coronary collateral rules out oesophageal varices in a case of unexplained haematemesis. Demonstration of extensive collaterals draining into the Inferior Vena Cava may indicate portosystemic origin of encephalopathy.

The intra-hepatic patterns were normal in many cirrhotic cases and hence its value is limited in diagnosis of portal cirrhosis. However the presence of collateral with normal intra-hepatic patterns in the absence of evidence of extra-hepatic lesion indicate cirrhosis and the pattern of which is not recognized on radiogram on account of minute liver radicals being affected and not recognized partly on account of lack of contrast medium.

Although splenography is more safe, simple and reliable as compared to any one individual method mentioned in our study its value as a single method in cases of portal hypertension is limited and for the reasons mentioned above the pressure studies have important place in conjunction with splenography.

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Abnormal Contractions of the Oesophagus and their Significance

A Preliminary Report

BY

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Radiology, endoscopy, pressure studies, chemical analysis, anatomical and histopathological studies and cine-radiography have made the study of the oesophagus extremely interesting. This paper attempts to analyse the abnormal contractions of the oesophagus met with during the course of fluoroscopy and assess their significance.

Technique

Tests were carried out with Micropaque standard mixture 100 w/w creamy suspension. The transit time in erect and 10° Trendelenburg position, the action of deep inspiration, the nature of the peristaltic waves and in a few cases, the effect of drugs were noted. Special studies were done with the patient in prone, oblique position with a pillow under the abdomen, sucking four ounces of barium through a rubber tube.

Material

The material was gathered from 2,629 routine Barium meals performed at the Christian Medical College Hospital, Vellore, South India, over a period of 19 months. This excludes studies done for Carcinoma, Varices and Achalasia of the oesophagus.

The Normal Oesophagus - Histology

(a) *Mucosa*.—The lumen of the oesophagus is lined by squamous epithelium upto the lower one inch or less—where transition to gastric columnar epithelium takes place.

(b) *Muscularis Mucosa*.—Between the phrenic ampulla and the vestibule, the muscularis mucosa may be hypertrophied producing a sphincteric action. This is not universally accepted yet as an anatomical entity.

(c) *Muscle Coat*.—The muscle of the upper one third of the oesophagus is composed of striated muscle—but not under voluntary control.

The middle one-third has striated and smooth muscles. The lower one-third has smooth muscles only. No sphincter is present.

(d) *Innervation*.—The centre for swallowing is in the medulla. The propulsion of the bolus is controlled by the higher centres—the vagus being the main nerve. A harmonious balance of the sympathetic with the parasympathetic system ensures normal functioning. It is of interest to note that sectioning of the oesophagus or ligating it across does not prevent a peristaltic wave from going past (Starling 1956). On the other hand, if the vagus is sectioned, the oesophagus relaxes and becomes atonic—except for the lower end which is tonically contracted. This simulates an achalasia cardia. This tonic contraction is relieved by regional sympathectomy (G. C. Knight 1934).

Physiology

(a) The oesophago-gastric mucosal junction has been shown to glide up and down independently of the muscular and serosal layers (Johnstone 1951).

(b) *Peristalsis*.— These waves are of two types :—

(i) The primary wave is initiated by deglutition and begins from the post cricoid region and carries the bolus to the stomach.

(ii) The secondary wave, initiated by mechanical stretching, locally— begins at the level of the aortic arch and carries remnants of the bolus to the stomach (Starting 1955).

The Functionally Abnormal Oesophagus

(a) *Muscularis Mucosa*.— In some cases, the muscularis mucosa, at the junction of the vestibule, and the stomach either goes into a ring contraction or hypertrophies. (Mac-Mohan et al 1958). There may be hyperplasia of the connective tissue as well. This is called the vestibulo-gastric ring or the lower oesophageal ring (Schatzky 1956). This is seen only in cases of hiatus hernia (Johnson et al 1960, (Fig. 2-c).



Fig. 1

- (a) Ripple contractions.
 (b) Tertiary contractions. Associated hiatus hernia seen.
 (c) Cork screw oesophagus. Associated Hiatus Hernia seen.
 (d) Beaded oesophagus - Barony-Teschendorf Oesophagus. Associated Hernia seen.

Physiology

A neuro-muscular imbalance reveals itself in the following ways— singly or in varying combinations :

1. The transit time is prolonged in both erect and supine postures.

2. The secondary peristalsis is often absent. The patient has to initiate another primary wave to empty the oesophagus, by attempting another swallow. In the absence of the secondary wave, a to and fro, undulating movement is present in its stead.

3. Spasm of sphincter and reflux from ampulla may be seen.

4. Ripple contractions are seen as fine waves or crenations on the oesophageal border.

5. Tertiary contractions are of a coarser nature and are irregular in distribution.

6. Cork-screw-like contractions are produced.

7. A beaded appearance of the oesophagus may be present. This may be a permanent change (Terracol & Sweat 1958).



Fig. 2

- (a) Local neuro-muscular imbalance producing diverticula. Tortuous oesophagus.
 (b) Ring contraction in upper oesophagus seen. Associated para oesophageal hernia seen.
 (c) Vestibulo gastric ring or lower oesophageal ring seen, with associated hiatus hernia. Oesophagus shows tortuosity.
 (d) Vestibulo gastric ring seen. This is between the vestibule and stomach, seen only in cases of hiatus hernia.

8. Pulsion diverticulacae may be produced by a highly localized neuro-muscular imbalance.

9. Ring contractions, as narrow bands, may be present in the upper or middle one third of the oesophagus. These may persist for a longer duration.

10. A post-cricoid web may be seen in some cases. There may be an associated Plummer-Vinson Syndrome.

11. A vestibulo-gastric ring may be seen as a ring or notch at the junction of the oesophagus and stomach. These may be transient or develop into an organic ring. (Fig. 2).

12. Diffuse spasms extending for a few centimeters are occasionally seen in the lower two-thirds of the oesophagus. These may present in the long run, with hypertrophy or thickening of muscular layer (Johnstone 1960). (Fig. 3).

13. Tortuosity of the lower one-third of the oesophagus may be present. This also may be of a transient nature.

14. Achalasia cardia may be present. Degeneration of the Auerbach's plexus is probably secondary to the neuro-muscular imbalance. (Fig. 4).

Clinical Symptoms

Acid eructations, belching, dysphagia, anginal type of pains, epigastric and postural discomforts were the usual complaints. The patients sometimes gave a history of periodicity. The patients may emotionally be highly strung.

Discussion

The accepted theory behind these manifestations is one of neuro-muscular disorder. Though some authors have commented that some of these contractions are normal for an older age group (Terracol & Sweat 1956) it is our belief that these waves are not normal.



Fig. 3

a & b Diffuse spasm in the upper part of oesophagus simulating a structure.
c & d Diffuse spasm lower end of oesophagus simulating sacus-aria

We have observed that a number of cases which showed a tortuous lower end of the oesophagus during one of the serial films, reverted, in a few minutes, to a normal, straight oesophagus. Of all the possible theories put forward to explain this, the one that seems most plausible is that the lower one third of the oesophagus possesses the power to elongate or shorten independently.

In our experience we have not seen a post-cricoid web, although we did see five cases which showed a severe post-cricoid spasm. Co-incidentally, these were also associated with other abnormal oesophageal contractions and hiatus hernia.

In our series of 2629 oesophagograms, only twelve diverticulae were demonstrated. Of these none were situated in the cervical oesophagus. The middle one-third had the largest incidence. More than half of these appeared to be of the pulsion type, though all were associated with abnormal contractions of the oesophagus.



Fig. 4

Achalasia Cardia.

The ripple contractions, tertiary waves, cork screw oesophagus were seen as transitory phenomena. The beaded oesophagus, the ring contractions in the upper two-thirds of oesophagus and the diffuse spasm of the oesophagus without muscle thickening were more stable and were visualized again in a few subsequent examinations. The vestibulo-gastric ring was seen only in certain definite cases of hiatus hernias. These rings were seen to appear and disappear in the earlier stages, but became more permanent and organic in cases of longer standing. The diffuse spasm with muscle thickening was seen in four cases, but not proved by surgery—only surmised. Achalasia cardia was seen in 19 cases. Of these twelve were operated.

A study was made of the associated lesions. Hiatus hernias were seen in 342 cases. Hiatal disorder in 508 cases. It was noticed by Von Bergmann 1932 that the longitudinal muscles of the oesophagus were in continuity with those of the stomach, and when the vagus was stimulated either directly, or indirectly at the vagal distributory regions, a hiatus hernia could be induced. In our series we have noticed that abnormal contractions of the oesophagus were associated with a surprisingly large number of hiatus hernias. Many of these cases presented in combination with peptic ulcer, small intestinal disorder or gallbladder disease. This suggests the gago-vagal reflex as the possible underlying common factor, which manifests as an imbalance between the sympathetic and parasympathetic systems—best shown in the motor function of the oesophagus.

In our series we found that a certain group presented with symptoms of ischaemic heart pains but they showed no changes in the E. C. G. and we were able to demonstrate abnormal oesophageal contractions.

There were another group who came with peptic disorders. These were all young active adults who were non-smokers, but they showed definite S. T. segment depressions in the E.C.G. and also showed hiatus hernia with abnormal oesophageal contractions.

The third group had a history suggestive of ischaemic heart disease, showing ST depressions in the ECG, in whom we demonstrated abnormal oesophageal contractions and hiatus hernia.

In view of these observations, it becomes difficult to attribute the ECG changes either to a cardiac disease or to an oesophageal abnormality. These questions have not yet been satisfactorily settled.

If an oesophageal abnormality could cause an ECG change, a link might be postulated between the vago-vagal and the vaso-gagal reflexes (Van Dellen).

Table-I

Total number of oesophagograms done	...	2629
1. Ripple oesophagus	...	202
2. Tertiary waves	...	102
3. Corkscrew oesophagus	...	80
4. Beaded oesophagus	...	8
5. Ring contractions in upper two-thirds	...	11
6. Vestibulo-gastric ring	...	164
7. Diffuse spasm in upper two-thirds	...	11
8. Diffuse spasm in lower two-thirds	...	34
9. Tortuosity of the lower end	...	201
10. Diverticula oesophagus :		
—Upper one-thirds	...	0
—Mid one-thirds	...	11
—Lower one-thirds	...	1
11. Post cricoid web : or spasm	...	5
12. Muscle thickening	...	18
13. Achalasia cardia	...	7

Fig. 5

Table-II.
Associated Lesions

1. Hiatus Hernia	...	342
2. Hiatal Disorder	...	508
3. Duodenal ulcer Proximal	...	177
Distal	...	202
4. Gastric ulcer	...	35
5. Small Intestinal Disorder Duodenal	...	64
Jejunal	...	272
Ileal	...	211
6. Cholelithiasis	...	39
7. Diverticula elsewhere	...	40
8. Intestinal hurry	...	55

Fig. 6

Comments

From the statistics it is shown that motor disorder of the oesophagus, viz. the alteration of the normal transit time, absence of secondary peristalsis, and the presence of abnormal contractions of the oesophagus are by no means unusual. But they do indicate an abnormal state. A number of

them are secondary to hiatus hernia & peptic disorders. A certain number of them are either associated with ischaemic heart diseases or imitate cardiac symptoms.

Drugs used on oesophagus show no standard findings, for the baseline used—that of irregular contractions, their amplitudes and frequency and transit times—are not stable or reliable. Pressure studies with drugs may give more accurate information.

As to the validity of ECG changes, one should not commit a patient with chest pain to cardiac crippledom on changes found on ECG findings alone—especially when a hiatus hernia or motor disorder of the oesophagus is present. Till the question is fully settled, ECG findings should make for reserved judgement only.

Acknowledgements

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Cancer Breast—Radiotherapy

Treatment Policy at the Barnard Institute of Radiology, Government General Hospital, Madras

BY

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Very largely, the treatment policy adopted by us follows closely the British practice and the line of treatment for any given patient is decided entirely on the clinical stage of the disease when the patient is first seen during the weekly combined Conference of the Surgeons, the Radiotherapist and the Pathologist. I may mention here that ours is not a purely cancer Institute where only malignant diseases are treated, but has a very large Radiotherapy department attached to the General Hospital. But we have under our control over 100 beds for effectively practising radiotherapy, with our own radium ward with attached Radium Theatre and General wards for patients undergoing x-ray therapy etc. The General and Specialist Surgeons and the Pathologist collaborate with us in the work. This kind of set of up has its advantages as well as disadvantages. Anyway, during the last decade or more, we have been able to practice Radiotherapy rather effectively on the same lines as obtained in Great Britain. A sizeable number of our staff had the benefits of further training in Radiotherapy in British Institutes and therefore it is natural—as I mentioned earlier—that the methods followed by us is largely on British lines. I have laid stress on this point since some workers in the United States of America have begun to doubt the efficacy of Radiotherapy in the Treatment of Breast Cancers whether pre-operative, post operative or the technique

advised by Prof. McWhirter and they have begun to advocate more and more extensive surgery. Well—it is not my desire here to enter into a controversy over this matter. I am one of those who are thoroughly convinced that Radiotherapy has a very definite and highly useful place in the scheme of things here. Used with wise judgement and meticulous care it plays a great role in the fight against breast cancer.

Our Policy of treatment therefore is as follows:—

Stage I

Radical Mastectomy—If axillary glands are microscopically involved—the patient is categorised into Stage II and advised a full course of x-ray therapy. If the tumour is histologically reported to be very anaplastic, and even if it is in the outer half of the breast—a full course of x-ray therapy with an additional parasternal field is given. If axillary lymph nodes are not involved, leave the patient alone and advise regular follow up. If the tumour is situated in the medial half of the breast—then it is quite necessary to irradiate the internal mammary chain—(ipsilateral).

If the tumour is situated in the medial half and very near the internal mammary, we prefer a full course of radiotherapy to Radical mastectomy.

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Stage II

Here the policy varies. If the tumour is not large and there is no extensive skin involvement a radical mastectomy is done—followed by x-ray therapy to the whole field plus the parasternal glands. If the size of the tumour is large or there is considerable involvement of the skin, necessitating a skin graft, we prefer to have a local mastectomy followed by radiation therapy or advise radical radiotherapy and operate in about 3 months' time when the reaction has completely subsided.

Stage III

A large number of our cases report at this stage. These are treated with radiotherapy with an attempt at radical therapy.

Stage IV

If the disease is confined to the breast and regional lymph nodes—treat as in Stage III. But if there are distant metastasis, treatment is directed at relieving the distress of the patient, e.g. a secondary in the skeleton or a small dose to a fungating tumour.

Technique of Treatment

The aim of Radiotherapy should be the same as followed in Surgery—monoblock treatment of the affected area and the possible paths of extension of the growth. Therefore the whole breast area, the axilla, the supra-clavicular region and the parasternal nodes of the same side are included in the field of irradiation. For this purpose a five field technique is followed:

- (1) Two 15×10 tangential fields—medial and lateral for the chest.
- (2) Two 15×10 —A. P. and P. A. and sometimes 15×10 A. P. and 10×10 P. A. are used for the supraclavicular and axillary lymph nodes.
- (3) One 15×6 direct A. P. field for the parasternal nodes.

A uniform distribution of dose of 4000r in 4 weeks or 4500r in 5 weeks is attempted to the whole area taking care that the fields do not overlap or no gap is left in between the fields as shown below:



Fig. 1



Fig. 2

For this purpose we make use of the following set up:



Fig. 3



Fig. 4

We took measurements of the chest across from the mid-axillary line to the lateral border of the sternum in a large number of our patients. The average distance between these two points is about 15 to 16 cms. On the basis of this measurement, we made a jig out of light wood (Fig. 3) and use it for adjusting the tangential fields. When the applicator and the patient is fixed in position, the jig is removed and its place filled up with bolus bags (Fig. 4).

Factors

220 k.V., 2 Cu., H.V.L., 50 cm. F.S.D. As mentioned earlier we aim to deliver a uniform dose of 4000r in 4 weeks or 4500r in 5 weeks, the individual daily dose being 200r for each field, the limiting factor being the skin.

Post Operative Therapy

Post operative treatment is begun any time between 2 to 3 weeks after the operation, so that a well healed scar may be available. If there is ulceration of the skin or collection of fluid under the flaps, treatment is commenced with the axilla and supraclavicular region—i.e. the peripheral region is taken up first. If the skin flap is very thin or there has been wide ulceration and scarring of the chest wall—we prefer not to treat the chest wall at all and content

with irradiating the peripheral fields only. If any recurrences occur on the chest wall, these are treated as and when they occur either with suitable radium surface applicators or Chaoul or medium voltage x-ray therapy 130 to 140 k.V.

The post operative dose aimed at is either 4000r in 4 weeks or 4500r in 5 weeks over the entire operated area bearing in mind of course the skin reaction. The usual plan of administration of radiation is daily 200r to each tangential field and 300r to the anterior supra-clavicular-cum-axillary field during the first three weeks—which brings a total of $3000r \times 2$ to the breast field and 4500r to the anterior axillary field. Thereafter the breast fields and the posterior axillary field are treated on alternate days. By this way, we have been able to administer to most of our patients a uniform dose of 4000r throughout the treated area in a period of 33 to 35 days, over all time. If the daily adjustment of the tangential fields over the chest is done with care, the underlying lungs get very little radiation and such complications as pneumonitis, late fibrosis of the lungs, bronchiectasis etc. are spared.

Reaction

The reaction obtained is generally a dry desquamation and if moist desquamation

should occur, these are treated with application of aqueous solution of Gentian Violet 1% and if necessary exposure to infra red rays, and the skin reaction generally clears up in a week or 10 days. From the commencement of the treatment, soap, water, or any oily applications or irritation of the part is strictly avoided. We prefer to use a bland dusting powder to keep the parts dry.

Treatment of Recurrences

The common sites of recurrences are the skin, regional glands, bones, lung and pleura.

Skin Nodules

If the patient had no previous post operative irradiation, a full course is given; if indicated and feasible additional dose to any specified nodule with low voltage x-ray. If this is not feasible radium plaques can be used.

Lymph Nodes

If they have not been treated previously a radical dose is given. Otherwise they may

be treated again—the dose depending upon the skin condition and the reaction that may follow.

A few case records are reproduced below to illustrate the methods of treatment adopted in our Institute.

Case I (Radiation Therapy only)

Disease: Cancer Breast: (left), No. 210/60, Name: Annammal, F. 40 years, (Madras). Admitted on: 18-2-1961.

Complaint and Duration.—Lump on left side of breast; no pain; no discharge through nipple; duration 3 months. In 1947—14 years ago patient had a mass in the left breast which was excised in Kasturba Memorial Hospital, Madras for histological examination and reported as Adeno-Carcinoma. Patient was advised radical mastectomy but refused. Hence she had a course of Deep X-ray Therapy at the Barnard Institute of Radiology, after which she had no trouble for the past 14 years.



This patients was free from recurrence for 14 years after radical radiation therapy following an excision biopsy.

Habits.—Married 27 years back. Has borne no children. Attained menopause 2 years ago.

Present Condition.—Firm mass of 6 cm. × 6 cm. felt in the upper and outer quadrant of left breast attached to the skin to an area of about 2 cm. in diameter. Mobility of the tumour is restricted when pectoral muscles on that side are contracted. Left axillary glands are slightly enlarged and mobile.

X-ray Chest.—No secondaries in the lungs.

Treatment.—Surgery advised.

Case II (Post operative X-ray Therapy)

Disease: Cancer Breast (Left), No. 649/51, Radical Mastectomy done, Admitted on: 7-2-1951. Name: Sundarambal, F. 45, of Tanjore Dt., Hospital: Government Stanley Hospital, Madras.

Family History.—Married, 36 years; no children; attained menopause 2 years ago. No history of Cancer in the family.

Personal History.—Previous Illness: Had some operation on the left thigh when patient was 14 years of age? Osteomyelitis femur?

Present Illness.—History of a lump in the left breast.

Duration.—4 months. Radical Mastectomy was done at the Stanley Hospital on 17-1-1951 for a large lump in the left breast occupying mostly the upper half. Patient also had palpable glands in the left axilla.

Local Condition.—A well healed operation scar over the left mammary area and left axilla. There is a tender spot with slight swelling on the left clavicle—junction of middle third and medial third. ? bone secondary. ? Inflammatory.

Regional and Distant Metastases.—No regional glands palpable.

Histological Examination.—Adenocarcinoma.

Roentgenologic Examination.—Lung fields: No evidence of secondaries seen. General Condition of patient—Fair.

Treatment.—Post operative Deep X-ray Therapy. Left breast—Two tangential fields—medial and lateral—220 kV., 15 mA. 1.5 mm. cu. + 1 al.

8—2—51 to 3—4—51: An effective dose of 4500r was given to the chest and from 4-4-51 to 17-4-51, 2500r was given to the axilla and supraclavicular region.

During the course of follow up on 16-3-56, patient complained of pain over the upper part of back, with a small swelling on the left leg. X-ray did not reveal any secondary. X-ray chest—no secondaries.

6—7—59: No recurrence. Patient complained of weakness and pain in the chest. X-ray lungs—nil abnormal.

No further follow up. A case where there was no recurrence for 8 years after post-operative radiation therapy.

Case III

Disease: Carcinoma Breast: Stage III, Cancer Unit No. 176, Admitted on: 17-2-1958. Name: Adilakshmi, Bangalore, Age 40 years; Sex F., Occupation: Cooly, Rs. 30 - Govt. General Hospital, Madras.

Family History.—Has three children. Two children were breast fed. No history of malignancy in the family.

Personal History.—Nil relevant.

Previous Illness.—No history of previous illness available.

Mgm. hrs. for 1000r ... 855 Mgm. hrs.
 Mgm. hrs. for 6000r ... 5130 Mgm. hrs.
 Corrected Mgm. hrs. for 1.5 cm.
 Separation 5130×1.25 ... 6413 mgm. hrs.

N. S.	T. L.	A. L.	C. mgm.
8 N $\times$ 3 mgm.	(58 mm. 45 mm.)		23.28 mgm.
10 N $\times$ 1.5 mgm.	(58 mm. 45 mm.)		14.6 mgm.
12 N $\times$ 1 mgm.	(42 mm. 30 mm.)		11.76 mgm.
2 N $\times$.5 mgm.	(25 mm. 15 mm.)		.98 mgm.
32 Needles (Thirty two needles)			50.62 mgm.

Treatment Time: 127 hours.

Date and Time of Implantation:
 11-30 a.m. 27-8-56.

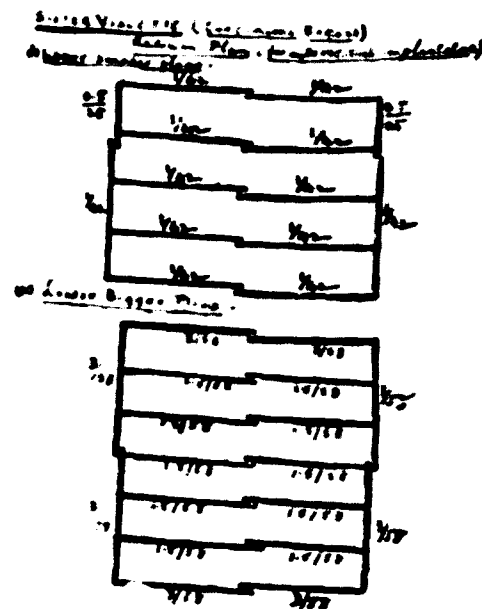
Date and Time of Removal:
 6-30 p.m. 1-9-56.

Implantation done by Dr. K. M. Rai.

12-9-56: Deep X-ray to the axilla and supra clavicular glands advised by Dr. K. M. Rai and started on the same day.

17-9-56: O. E. Reaction very satisfactory. There is very good regression of the tumour.

5-10-56: There is complete regression of the tumour. No macroscopical evidence. The gland in the axilla also is greatly reduced in size (Requested to send a report every 3 months).



After Radium Treatment.

Note the uniform reactions and the almost complete disappearance of the tumour.

Case Report V—(Surface Application of Radium for Local Recurrence)

Disease: Cancer Breast: Left—No. 1787/58, Admitted on: 1-3-1960, (Old Case) with secondary nodule, Name: Pappathi Ammal, F. 53, Clerk, Rs. 60, Hospital: Government General Hospital, Madras, Address: No. 39, Malaiappan St., Madras-1.

Past History.—Patient was admitted for a hard lump $1\frac{1}{2}$ " in diameter in the left breast situated just above and lateral to the nipple, irregular in outline, skin adherent to the lump. The lump is not fixed to the Pectoral fascia. The lump was painless, of six months' duration and had also two glandular swellings in the left axilla which was however noticed 3 months ago. She was operated in the Stanley Hospital in the month of October, 1958 for this.

Histological Examination.—Spheroidal Cell Carcinoma with infiltration of lymph nodes. From 19-11-58 to 18-12-58, patient had a course of Deep X-ray therapy to the chest as well as to the axilla, supra-clavicular glands, and internal mammary chain—an

effective dose of 3000r—Patient stopped away—"ineffective dose".

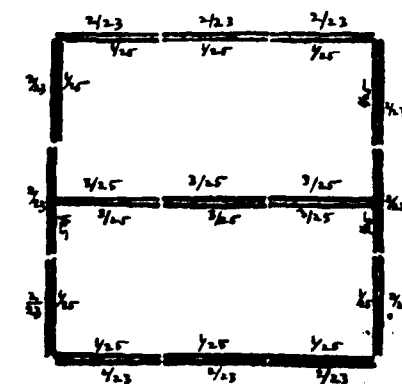
Patient reported again on 1-3-60 with a hard nodule fixed to the skin and deeper structure over the left lateral and lower border of the sternum; skin breaking down, tender on palpation. Size of the lesion 3 cm. $\times$ 2 cm. Opposite breast normal. A soft mobile gland palpable on the right axilla in the medial group. Radiograph of the chest—No secondaries.

Admitted for treatment by Radium surface application. R.B.C.: 2.8 mil.; W.B.C. 9,400; Hb—55%; Differential Count: P-51; L-40; E-9.

Treatment.—Surface application of Radium, Area to be treated: 7×8 cms.: 56 sq. cms., Treatment Distance: 2 cms., Mg. Hrs. to get 1,000 r: 2,092 mg. hrs., Mg. Hrs. to get 6,000 r: 12,552 mg. hrs., Mg. used 54 mgs., Treatment time: 232 hrs., Date of application: 9 a.m. on 12-3-60, Date of Removal: 1 a.m. on 22-3-60, 4-8-60: Ulcer has healed well; no evidence of disease, X-ray lungs: Free.

Plan of Treatment

PAPPATHI AMMAL (Carcinoma Breast)
 Radium Plan for Surface application



Clinical Photo after treatment, 21-4-61
 seen again—doing well.

Case Report VI—(Cancer Breast with Secondaries in the Second Cervical Vertebrae)

Disease: Cancer Breast (Left), Regd. No. 2340 (804/4-6-51), Name: Jayalaxmi, F. 34, Madras, Hospital: Government General Hospital, Madras, Admitted on: 4-6-1951.

Family History.—Married, 2 children, last child 15 years old, periods regular, both children nursed by herself. No history of cancer in the family.

Personal History.—Nil particular.

Previous Illness.—Had an abscess of the left breast while nursing her first baby 17 years ago.

Present Illness.—Tumour left breast. Duration—one year. She first noticed a small swelling in her left axilla. A few days later she felt a small round nodule in the upper and outer quadrant of the left breast. These growths were gradually increasing in size and she was admitted in General Hospital and a radical mastectomy was done.

Condition.—Before operation: A firm roundish growth 5 cm. in diameter not adherent to Deep structures, skin mobile and healthy, no retraction of the nipple. Left axilla—There is a gland firm and painless and freely moving. Right axilla—and breast free. Operation Notes—Radical mastectomy performed with complete block dissection of the axilla—The operation wound has healed completely except for a small area in the apex of the axilla. No evidence of any infiltration at present. No supra-clavicular glands.

Histological examination.—Biopsy - Carcinoma breast. Axillary lymph node shows infiltration.

Röntgenologic Examination.—X-ray Chest—No secondaries. General Condition of patient—good.

Treatment.—Post operative x-ray therapy to the Chest and axilla was given from 4-6-51 to 17-7-51. The supraclavicular region was not included in the area of irradiation. The chest received 4000r effective in a period of 4 weeks and 3000r to the axilla in a period of 2 weeks from 4-7-51 to 17-7-51. From 19-7-51 to 2-8-51—Castration was done—630r effective in the region of the ovaries. The periods completely stopped.

8—8—52: When the patient reported for follow-up, she was doing well; complained of occasional pain on the back. X-ray of the whole spine—No bony lesion.

6—3—53: Report - recurrence of menses but no recurrence of growth either in the chest or in the glands.

21—8—53: No recurrence; but the ovaries appeared to be still active. A further course of x-ray therapy for ovaries was advised and 640r effective was given in a fortnight.

25—3—54: No evidence of recurrence.

25—9—54: Patient complained of pain in the neck. X-ray did not show any lesion in the cervical spine. ? Muscular pain and a course of short wave therapy was given. Patient advised to report immediately if the pain was worse.

22—11—54: Lateral view of the cervical spine showed destruction of the body of the second cervical vertebra. Immediate immobilisation was done followed by Deep X-ray Therapy. A dose of 3000r effective in the body was given between 7-12-54 and 24-12-54. Pain was relieved and hormonal



Fig. 1

Skiagram shows destruction of body 2nd cervical vertebra and the neck in a collar—immobilised.

treatment (Testoviron) was commenced. 150 mgm. twice a week for 4 weeks and thereafter once a week for 6 months.

18—3—55: Skiagram showed good calcification of the affected vertebra. Patient was advised to continue testoviron 250 mgm. fortnightly for 2 months.

7—5—55: Reported with occasional pain on the back of the neck, especially on the left side; x-ray spine and lungs did not warrant any treatment for the spine.

12—10—55: Recurrence of pain in the neck. A further course of 2000r effective in the vertebra was given with relief of pain.

6—2—56: No evidence of recurrence of the primary. X-ray of the cervical spine revealed very satisfactory calcification.

9—3—56: No recurrence in the chest. No pain in the neck but a small gland less than a pea size, hard freely mobile—seen in the left supraclavicular region—secondary? This was treated with small field between 9-3-56 and 28-3-56—4500r—dry disquamation.



Fig. 2

Good recalcification of the part with the collar removed.

7—7—56: Patient doing well. Able to move about without the collar. No obvious secondaries. X-ray cervical spine showed good calcification of the second cervical vertebra.

21—11—56: Pea sized freely mobile but hard supra-clavicular gland on the contralateral side. Treated with a small field with 6000r between 22-11-56 and 18-12-56. Dry disquamation.

11—3—57: Complained of severe pain in the neck. X-ray examination of the cervical spine showed evidence of reactivation of malignant process in the 2nd cervical vertebra previously treated. Spine was immobilised and another 3000r given in 3 weeks effective in the vertebrae with no further appreciable benefit. Patient was reported to have died about 6 months later—towards the end of 1957.

Note.—This patient was alive and fairly well with a secondary in a very dangerous part of the cervical spine for 3 years and a total period of over 6 years after radical mastectomy.

124039

Treatment of Carcinoma Epiglottis by Radiotherapy

BY

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This report is presented with apologies. The first apology is that although seventy and odd cases were treated in the Chittaranjan Cancer Hospital in the four years from 1951 to 1954, only twentyeight cases could be followed up. When our patients are well, they do not bother to report, when they are worse, they do not believe us any more and go to the charlatan. The second apology is that radiotherapy to be successful need certain prerequisites viz. that the patient should have a fair nutrition and that there should be no infection. For reasons which we need not discuss here, it is only rarely that these conditions were fulfilled and result of radiotherapy cannot really be assessed from these figures. We are conscious of these short comings but publish it all the same for what it is worth.

Technique.—In all cases we used deep x-ray therapy viz. 250 K. V. with 0.5 Cu. and 1 mm. Al. filter giving a H. V. L. of 1.5 mm. Cu. 50 cm. F. S. D. was used. Output was 40 to 50r per minute. Field size varied and depended on several factors. If the glands were involved, we increased the field size to include the glands. A lateral skiagram of the neck (Fig. 1) was taken in all cases to note whether the tip of the epiglottis was close to the mandible or not. This was important, for if we can

avoid radiating the mandible we can not only administer a good dose at the tumour in relation to the skin (i.e. increase the therapeutic ratio) but also avoid the possibility of late necrosis of the mandible. Field size varied between 6 cm. × 8 cm. and 8 cm. × 10 cm. except in one case (serial No. 20 where it was 10 cm. × 15 cm. Two opposing lateral fields were used. The interfield distance varied between 8 cm. and 13 cm. The average tumour dose was between 5500r and 6000r between five to six weeks. Normal skin tolerance as



Fig. 1—Normal

recorded in text books was exceeded in most cases by about 10 percent. There was moist disquamation and sometimes ulceration but they all eventually healed up. The result of treatment is tabulated below. All cases except where mentioned were squamous cell carcinomas.

Remarks

Case No. 3 was a chondrosarcoma, case No. 5 a papilliferous transitional cell carcinoma and case No. 20 a lymphoepithelioma possibly arising from the vallecula. Immediate assessment of result was made not only by clinical examination but also by soft tissue radiography. Lateral skiagrams of the neck of case No. 52/632 before and after deep xray treatment are presented here as examples. Skiagram taken on 22-4-52 (Fig. 2) shows a huge mass involving

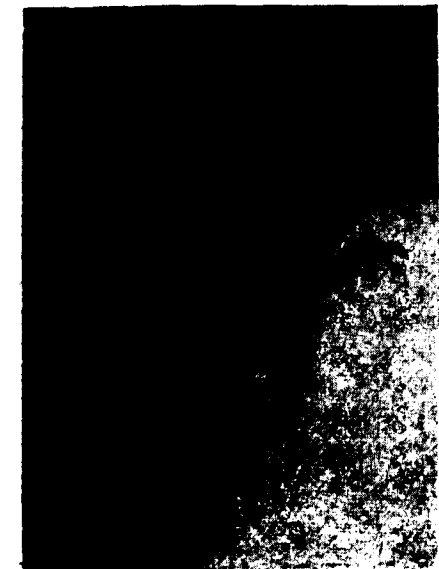


Fig. 2

Serial No.	Regd. No.	Limited growth		Extensive growth		Immediate response	Recurrence or residual	Retreated	Total life
		Without glands	With glands	Without glands	With glands				
1	51/129	—	—	—	Yes	No	—	—	1 year
2	51/194	—	—	—	Yes	Yes	—	—	8—12 year
3	51/222	—	—	—	Yes	Yes	Yes	Yes	1 & 1/2 year
4	51/753	—	—	—	Yes	Yes	—	—	Alive
5	51/779	—	—	—	Yes	Yes	—	—	—
6	51/854	—	Yes	—	—	Yes	Yes	Yes	3 years
7	51/981	—	—	Yes	—	No	—	—	—
8	51/1005	—	—	—	Yes	No	—	—	—
9	51/1776	—	—	—	Yes	No	—	—	—
10	52/33	Yes	—	—	—	Yes	—	—	Alive
11	52/44	—	—	—	Yes	Yes	Yes	No	1 year
12	52/105	—	—	—	Yes	No	—	—	—
13	52/565	—	—	—	Yes	Yes	Yes	Yes	1 year
14	52/632	—	—	—	Yes	Yes	Yes	Yes	1 year
15	52/1008	—	—	—	Yes	Yes	Yes	Yes	2 & 1/2 year
16	52/1426	—	—	—	Yes	No	—	—	—
17	52/1630	—	—	—	Yes	No	—	—	—
18	53/654	—	—	—	Yes	Yes	—	—	Alive
19	53/1693	—	—	—	Yes	Yes	Yes	Yes	1 & 1/2 year
20	53/1784	—	—	—	Yes	Yes	Yes	Yes	4 years
21	53/1824	—	—	Yes	—	Yes	—	—	No trace
22	53/1974	—	—	—	Yes	Yes	Yes	Yes	2 years
23	53/2530	—	—	Yes	—	Yes	Yes	Yes	5 years
24	53/3657	—	—	—	Yes	No	—	—	—
25	53/3787	—	—	—	Yes	No	—	—	—
26	54/1939	Yes	—	—	—	Yes	—	—	Alive
27	54/3110	—	—	—	Yes	Yes	—	—	Alive
28	54/3253	—	—	—	Yes	Yes	Yes	No	1 year

Investigations

Clinically suspected to be a case of Carcinoma Caecum; the following investigations were done.

1. *Barium Enema*.—Was done considering the site and extent of tumour but it showed no abnormality of the caecal area, but a Gall Bladder like shadow was visualised extending from the right transverse process of the 2nd Lumbar Vertebra up to the iliac crest with a dense Radio-opaque area within the shadow of the Gall Bladder (Fig. 1).

2. *Urine*.—No abnormality detected.

3. *Stool*.—Occult blood in traces.

In view of this dense Radio-opaque shadow and the fact that nothing abnormal could be detected in Barium enema, the patient was further investigated from the point of view of cholelithiasis.



Fig. 1

Showing Barium enema and shadow of the Gall Bladder, with a dense Radio-opaque area within it.

Plain skiagram of Gall Bladder area

Showed exactly the same gall bladder like shadow with a dense Radio-opaque shadow within it (Fig. 2).

Oral Cholecystography

Density of the gall bladder area was not much changed with a Radio-opaque area in the centre. Oral Cholecystography was repeated with double dose method and still it was not possible to visualise the Gall Bladder.

Intravenous Cholangiography

No concentration of Radio-opaque material was seen in the Gall Bladder like shadow.

Exploratory laprotomy

Was done on 5-8-60 Abdomen was opened through right upper paramedian incision. The mass felt on clinical examination was found to be enlarged right lobe of the liver



Fig. 2

Showing plain Skiagram of G. B. area.

studded with snow flakes metastasis. The Gall Bladder contained a single stone which occupied the whole of the Gall bladder and moulded itself to the shape of the Gall bladder, the wall of which was in close contact with the stone inside. The stone was removed but the gall Bladder could not be removed because of dense adhesions but a piece from it and a piece from the liver was taken for histological examination. No primary lesion was felt on exploration elsewhere in the abdomen. The Abdomen was closed with a rubber drain in the Gall Bladder.

Post operative period

The wound healed but bile continued to drain through the drainage tube track.

Patient died seven weeks after the operation. Post mortem could not be obtained.

Skiagram of the Gall stone

Taken after its removal from the gall bladder is as shown in the previous skiagrams (Plain and Barium enema) and is exactly of the shape and size of the Gall Bladder with a very dense area of opacity with in the shadow of the Gall Stone (Fig. 3).

Microscopic Examination

Of the piece from liver showed a adenocarcinoma cells separated by fibrous tissue stroma. Liver Tissue is destroyed at some places.

Section of the Gall Bladder

Shows moderate chronic inflammatory cell infiltration and marked haemorrhages in the wall. There is no evidence of malignancy seen.

- I. Adenocarcinoma of Liver.
- II. Chronic Cholecystitis.

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Fig. 3
Skiagram of stones.

Chemical Analysis of Gall Stone

1. Cholesterol	...	Plus.
2. Calcium	...	Plus.
3. Bilirubin	...	In traces.
4. Carbonate	...	Nil.
5. Phosphorus	...	Plus.
6. Ammonium	...	Nil.

Comments

It is not the rarity of Gall Bladder stones that attracted the authors but the peculiar shape and the size of the Gall stone and more over it was diagnosed in the Barium Enema pictures.

Though all different shapes have described in the books, Tetrahedral, Cuboidal etc., but this was a solitary Gall Bladder—shaped stone completely filling the Gall bladder which is rather uncommon.

Choledochoduodenal Fistula with Duodenal Ulcer

(A Radiological study of nine cases)

BY

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AND

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A biliary enteric fistula may form between any part of extrahepatic biliary system and any adjacent portion of the gastrointestinal tract. The critical study of spontaneous biliary fistulae done by Borman and Rigler¹ in 1937 and many reports²⁻⁴ after that, have shown a few interesting features.

(1) Most frequent site (about 90%) of fistula is between gall bladder and duodenum. Internal biliary fistulae are most frequently caused by gall stones.

(2) Uncommon type is choledochoduodenal fistula (4 to 5%) which is mostly the result of penetration of duodenal ulcer into biliary duct.

(3) Rare variety of cholecystocolonic fistula is usually secondary to neoplasm.

Our experience at the K. E. M. Hospital, Bombay, shows that choledochoduodenal fistula is comparatively far more common. We have come across nine cases of this condition with interesting radiological findings. These are in addition to the 31 cases of choledochoduodenal fistula reported in the available literature. In 1956, Hutchings et al⁵ did extensive review of the literature dating from the first report of barium visualisation of the biliary tree by Hunt and Herbert in 1915, and 23 case

reports of choledochoduodenal fistula. To this they added five cases of their own. Glenn and Mannix⁶ in 1957 reported 40 cases of internal biliary fistula out of which 2 cases were of choledochoduodenal fistula.

Clinical Material

Over a period of six years, 9 cases of internal biliary fistulae were detected in the Department of Radiology, K. E. M. Hospital, Bombay. All these 9 cases were of choledochoduodenal fistulas.

Out of these 9 cases, only one was female. Average age incidence was 38 years, minimum being 24 years and maximum 57 years. Obesity was not the feature of any patient.

The presenting symptom in all cases, was pain in abdomen. Clinical signs and symptoms were suggestive of peptic ulcer disease. All the patients denied history of jaundice. There was no history of passing gall stones either in vomiting or per rectum.

All these patients were referred to the Department of Radiology for barium meal study of alimentary tract, because of the complain of pain in abdomen. In some cases, preliminary plain x-ray of abdomen was taken. In the remaining cases, this was considered retrospectively for the

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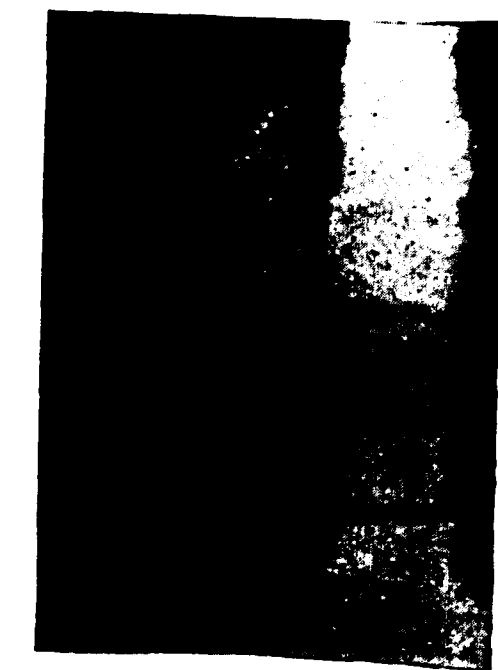
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demonstration of air in the biliary system. Out of nine, seven cases showed presence of air in the biliary system. (Plates 1 & 2).

Table—I

Particulars	No. of Cases
Total	9
Air in the Biliary Tract	7
Barium in the Biliary Tract	9
Radiological Evidence of Duodenal Ulcer	9
Operated Cases	6
Noncalculus Cholecystitis	2

In four cases air was visualised in gall bladder apart from biliary ductal system. The presence of air is commonly detected in vertical position and is likely to be absent in plain skiagrams which are usually



Figs. 1 & 2

Plain Skiagrams with air in biliary system

taken in horizontal position. The presence of air in biliary tract may be missed entirely and patient may thus be deprived of the simplest and surest method of diagnosis of this condition.

Gall stones were not found in any case.

During barium meal examination, regurgitation of barium into the biliary system was observed. In many cases the regurgitation was early and easily recognized, while in two cases it was noticed after a prolonged study of the duodenal cap which was deformed. These two cases never showed air in the biliary system. The fistulae were between the first part of duodenum and common bile duct. (Plates 3 to 9).

Three cases were studied with intravenous cholangiography, one of which

showed poor concentration of the dye. This patient showed changes of noncalculus cholecystitis at laparotomy.

Out of nine, six cases were operated upon. All these showed fistulous tract between first part of duodenum and common bile duct. They showed evidence of chronic duodenal ulcer. Two cases also showed macroscopic changes of noncalculus cholecystitis which were confirmed histologically. In the remaining four cases gall bladder was normal. Gall stones were not found in any case at operation.

Discussion

Between Western countries and a Bombay region, there appears to be a great difference in types and causative factors of internal biliary fistulae.

In Western countries, commonest site of the fistula is between gall bladder and



Fig. 3

Ba. Meal study in the biliary ducts.



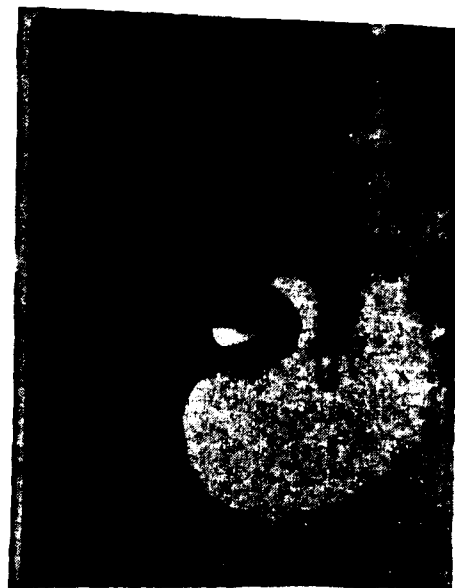
Fig. 4

Ba. Meal study in the biliary ducts.



Figs. 5 & 6

Ba. Meal study in the biliary ducts.



Figs. 7 & 8

Barium in the gall bladder.

duodenum as mentioned before. Choledochoduodenal fistula constitutes only a small percentage of internal biliary fistulae. Epperson and Walters⁴ had 3 cases of choledochoduodenal fistula out of 83 cases of internal biliary fistulae; Glenn and Mannix³ had 2 cases of this type out of total of 40 cases. Thus choledochoduodenal fistula constitutes only 4 to 5% of internal biliary fistulae. As against this, all the nine cases of the present series, were of choledochoduodenal variety. No other type of internal biliary fistula was detected during this period.

It is shown that 90 per cent of internal biliary fistulae reported in the literature were due to gall stones^{3, 4, 5}. In the present series of nine cases, six, which were operated upon, showed duodenal ulcer as causative factor. In the remaining cases clinical and radiological findings were indicative of duodenal ulcer.

These differences can be explained by the fact that biliary calculus disease is not as common as peptic ulcer in our region.

Predominance of cholecystoduodenal fistula in gall bladder disease and choledochoduodenal fistula in duodenal ulcer is explained on anatomical basis. The intimate relationship between distended gall

bladder and second part of duodenum is the cause of greater frequency of fistulae between these two organs. Similarly close relationship between common bile duct and first part of duodenum explains the choledochoduodenal fistula which is caused by penetration of duodenal ulcer into common bile duct. This fact is observed in study of our cases, where second part of duodenum was normal while duodenal cap was found to be deformed.

Changes of chronic cholecystitis found in two cases can be explained on the basis of infection due to regurgitation of duodenal contents. Despite the reflux of duodenal contents into the biliary system, clinical cholangitis is not a frequent finding, which according to Borman and Rigler is explained by the wide open stoma and the free drainage of biliary system. Incidentally cholangiography and cholecystography are of no particular use in demonstration of choledochoduodenal fistula.

The purpose of this report is to emphasise the frequency of choledochoduodenal fistula and also to stress the importance of a vertical scout film of the abdomen which is diagnostic in majority of cases because of visualisation of the air-filled biliary tract.

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Abstracts of Radiological Literature

N. Joffe, Cavitating primary pulmonary tuberculosis in infants, *Br. Jour. Radiology*, July 1960, Vol. 33, 430-439.

This study is concerned with some of the radiological aspects of cavitating primary pulmonary tuberculosis detected during the first 2 years of life. A series of 27 cases is presented.

The present-day occurrence of primary tuberculous cavitation is uncommon. The commonest presenting symptom was cough, fever, vomiting and diarrhoea. The presence of cavitation was not usually suspected prior to radiographic examination. A widespread distribution of primary cavitation with regard to site of occurrence is seen. In the present series, it occurred most frequently in the right upper lobe, followed by the right middle lobe, and the left upper lobe. The lower lobes were each involved three times, and the lingula once only.

The cavity was usually observed as an area of translucency, irregular in outline, and lying within a region of homogenous consolidation. No clearly defined wall could be detected beyond the irregular, often ragged outline of the translucent area. In a minority of cases, the cavity appeared as more well defined spherical or oval translucency surrounded by a limited area of caseous pneumonia. A not uncommon finding was the presence of a bulging of an interlobar fissure, away from an adjacent area of consolidation. The presence of air-fluid level within cavity was very rare and was in fact seen in only one case. If a tuberculous cavity communicates with a bronchus which is partly occluded so that a check-valve mechanism is set up, the tuberculous cavity

may become a tension cavity. In addition to this type of tuberculous cavity, one may rarely observe thin walled "cysts" in association with primary tuberculosis in the infant. These thin walled cavities usually seen in acute lung infections, resemble pneumatoceles.

There are six associated radiological features. They are:

- (1) An area of homogenous consolidation surrounding the cavity, lobar or sublobar, or even involving an entire lung.
- (2) Small areas of consolidation involving part or all of one or both lung fields, representing bronchogenic tuberculosis.
- (3) Miliary tuberculosis, was observed in 3 cases in present series.
- (4) Hilar and/or mediastinal lymphadenopathy was observed in 11 cases.
- (5) Spontaneous pneumothorax was uncommon complication.
- (6) Mediastinal emphysema as a result of a cavity must be of rare occurrence.
- (7) Pleural effusion, associated with a cavity was uncommon.

S. N. Deboo, Bombay.

Lewis S. Carey, F. Henry Ellis, C. Allen Good and Lewis B. Woolner, Neurogenic tumours of the Mediastinum, A Clinico pathologic study, *Am. Jour. Roentgenol*, August 1960, Vol. 84, 189-205.

The present paper deals with 140 cases of extrapleural mediastinal tumours of neurogenic origin treated surgically. Benign

neuropathic neoplasms, the schwannomas, arise from differentiated adult schwan cells. The nerve cell tumours from undifferentiated elements form malignant neuroblastomas at one end, and the benign ganglioneuroma at the other end. The neurofibromas contain all the nerve elements. The cases examined included 62 schwannomas, 23 ganglioneuromas, 4 Neuroblastomas and 5 neurofibromas.

In the posteroanterior view of the thorax, the schwannomas and the ganglioneuromas appeared as a dense round mass blending with the mediastinum. In the lateral view, the mass extended to the posterior limits of the intervertebral foramen. The roentgenographic appearance of the neuroblastomas varied. In one case it appeared as a paramediastinal mass associated with an expanding destructive lesion involving the rib contiguous to the mass, the remaining tumours appeared as ovoid masses indistinguishable from schwannomas. Microscopic deposits of calcium were common in the ganglioneuromas, but were visible only in one case, appearing as small punctate densities. Calcium was seen roentgenographically in 7 cases of schwannomas, and in one case of neuroblastoma, where it was scattered.

Changes in the bones were relatively common. The bony changes consisted of erosion and scalloping of the inferior portion of the vertebral end of the rib, erosion of the vertebral pedicles, and in some cases erosion of the lateral part of the vertebral bodies. In several cases, the pedicle of a tumour extended into the intervertebral foramen or there was a frank dumbbell tumour. In such cases there was erosion of the intervertebral foramen. There is frequent association of scoliosis with the tumour, the scoliosis in most cases was directed away from the tumour, but in few

cases it was directed towards the tumour. Displacement of mediastinal structures, particularly of oesophagus and trachea was noted in 15 schwannomas and in 5 ganglioneuromas.

These tumours may be removed by an extrapleural or intrapleural approach. In the case of dumbbell tumours, the operation, they believed, should be done in 2 stages, the spinal phase taking precedence. The thoracic portion of the tumour should be removed at a later date.

S. V. Deboo, Bombay.

David Sutton, Thoracic aortography, in adults, Clinical aspects, Br. Jour. Radiology, September 1960, Vol. 33, 545-558.

In the past 7 years 75 thoracic aortograms have been performed on 67 patients. The technique used is the percutaneous method of trans-femoral catheterisation, carried out under local anaesthesia with basal narcosis. The medium used was 70 per cent diaginol, but the author now recommends use of Urografin 76 per cent, in some cases 60 per cent. 20 to 30 ml. of contrast medium are adequate for most purposes. The catheter used is small, as the main danger is with larger catheters and in very hypertensive patients.

The cases are described and illustrated. The aneurysms form the largest group in their material. Aortography here demonstrates whether the aortic lumen above and below the aneurysm is normal for operation and grafting to be feasible. In some cases there is diffuse involvement of too much of the aorta for surgery to be practicable.

Diagnostic problems have been raised by tumours and cysts simulating aneurysms and *vice versa*. The syndrome of the kinked

carotid artery is well known as occurring in hypertensives and simulating aneurysms of the root of the neck. It decides in occasional differential diagnosis between aneurysm and tumour or cyst. Pseudo-aneurysms due to kinked vessels and post-stenotic aneurysms in cases of coarctation of aorta are discussed.

Coarctation of aorta has proved the commonest indication in their material for thoracic aortography in the investigation of congenital anomalies. He has also investigated cases of anomalous great vessels causing dysphagia lusoria and cases of patent ductus, and has demonstrated cases of thrombosis of the great vessels, as well as cases of arteriovenous fistula and angioma. He has not encountered any case of traumatic arteriovenous fistula within the thorax in his material, but has encountered 3 cases of arteriovenous fistula involving vessels at the root of the neck and requiring investigation by thoracic aortography.

Angiomata or congenital arteriovenous fistula are usually diagnosed by plain x-ray films and tomography. Contrast vascular studies when undertaken are usually by angiocardiology or selective pulmonary arteriography. He has encountered however one case where the diagnosis was only possible by thoracic aortography because the lesion was an angioma of the systemic circulation.

S. V. Deboo, Bombay.

Sidney W. Nelson, William Molnar, Anthimos Christoforidis and Clarence Britt. Coronary arteriography. Development of a method in animals with particular attention to physiologic effects. Radiology, July 1960, Vol. 75, 31-49.

The development of a transcarotid method of coronary arteriography in dogs affording

excellent visualisation of both coronary arteries in most instances is described. This is now being used clinically in man in an attempt to solve vexing problems in the diagnosis and treatment of coronary artery occlusive diseases.

The catheter is introduced through a tiny incision in the right common carotid artery and the tip is easily positioned in the aortic valve region without fluoroscopic control by recognition of the characteristic to-and-fro movement of the catheter as it approaches the valve region. If the catheter was passed into the descending aorta, this movement was minimal and did not increase in amplitude. 20 to 30 c.c. of 90 per cent hypaque is injected in approximately one second through a closed-end, multiple hole side-opening nylon catheter with an outside diameter of 3.5 mm. and an inside diameter of 2.5 mm. Injection pressure of 6 to 10 kg/cm² are used. Serial filming is started after 10 to 15 c.c. of the contrast material has been injected by means of an electric relay circuit. With the Gidland device used by them, serial simultaneous biplane filming can be started approximately midway in course of a one-second injection of 20 to 30 c.c. of 90 per cent hapaque. Serial biplane exposures are made at the rate of 3 per second during a period of 2 to 4 seconds. The majority of electrocardiographic changes coincident to the injection of 90 per cent hypaque and 70 per cent cardiograpfin into the supravulvar region of the aorta of dogs are non-specific and quickly reversible. The extrasystoles, tachycardia, depressed ST segments, flattening or inversion of T-waves and ventricular tachycardia were almost always transitory with complete reversion to the preinjection electrocardiogram within 2 to 3 minutes, after the first 2 injections. It is their opinion that the mere possibility of their occurrence in man should not preclude the attempt to

save the life or improve the life-expectancy of persons with serious coronary artery disease. They are now using this method of arteriography in man in suspected and known cases of occlusive disease of the coronary arteries.

S. N. Deboo, Bombay.

William Martell, Walter M. Whitehouse and Fred Jenner Hodges, Small Bowel tumours, Radiology, September 1960, Vol. 75, 368-379.

In 17 patients with primary small-bowel tumour encountered during a 6 year period, radiological findings have been reviewed and correlated with observations at operation and with pathologic reports. The small-bowel examination was informative in 8 of the 17 patients. There were 3 benign tumours in the series.

The long duration of symptoms prior to laparotomy was noteworthy, and exceeded ten months in 11 cases and 8 months in 6 others. In most patients the symptoms were caused by chronic anaemia due to blood loss, and in some by intermittent or incomplete obstruction.

A radiologist can do much to improve the accuracy of his investigation if he is apprised beforehand that a small-bowel lesion is suspected. The timing of radiograms should be such as to demonstrate continuous progression of barium when the roentgenograms are viewed in sequence. Fluoroscopy and spot-filming of suspicious areas and the terminal ileum should be employed when indicated. The use of 16 ounces of barium in routine small-bowel examinations offers several advantages. The demonstration of multiple contiguous loops of small bowel on a single film facilitates detection of minimal dilatation by comparison with adjacent

loops of normal calibre. It is then feeling that partial or complete small-bowel obstruction is not a contraindication to the judicious use of barium suspension, because the fluid content of this part of the gut makes inspiration unlikely.

Non-invasive submucosal tumours characteristically produce a smooth arcuate defect with distinct borders, the overlying mucosa is stretched with the resultant effacement of its markings. In the case of leiomyomas, a sharply outlined central crater may be seen. Primary carcinomas usually involve short segments and cause irregular luminal narrowing with proximal dilatation and mucosal ulceration. An overhanging edge is characteristic, but when the tumour is diffuse, or schirrous in type, overhanging edges will not be observed. Sarcomas are not apt to cause luminal constriction. The appendix is the most common site of carcinoids with the lower ileum next in frequency. The primary tumour appears as a firm submucosal nodule or a plaque with intact or slightly ulcerated overlying mucosa, tending to spread through the serosa, mesentery and lymph nodes.

S. N. Deboo, Bombay.

Roger Pyle and Eric Samuel, An evaluation of the hazards of Barium enema examination, Fac. Jour. Roentgenologists, July 1960, Vol. XI, 192-196.

The widespread use of barium enema as a diagnostic method has resulted in a lack of proper assessment of the risks in patients. The complications are divided into first those attending the use of any type of enemas, and secondly those arising from radiological technique. General hazards:—

Injury to the bowel wall from an incorrectly inserted enema tube. Advice is

given against the insertion of enema tube more than 2 inches, as perforation is reported in some cases. The only tube to be inserted blindly into the rectum is a soft rubber tube. Where there is a colostomy present, special care should be taken as the damage to the colon and perforation are more frequent than in normal rectum. The safeguards against perforation are the use of a rubber catheter, the tube to be kept centrally in the stoma, avoidance of force with the removal and insertion of the tube. The enema should be given with the can at 3 feet, and it is advisable to avoid the temptation to raise the fluid reservoir higher to obtain a more rapid flow. Another complication is "water intoxication", and it is particularly liable to occur where there is poor excretion of water as in anuria. The symptoms are sweating, weakness and drowsiness, alternating with excitement and delirium, terminating in convulsion and coma, nausea and polyuria. Treatment is to withhold all fluids and hypertonic salines to be given intravenously. In megacolon, barium enema should be allowed to proceed only until the dilated segment is reached, at which stage, the enema should be stopped. The enema fluid should be at or below 40° C, as burns are reported due to the enema being too warm.

Specific complications of barium enema.—The perforation of bowel occurred more frequently under 3 conditions (1) performed via a colostomy stoma (2) using an inflatable balloon (3) following recent endoscopy. By avoiding these 3 conditions, danger of perforation could be minimised, if not eliminated. Following barium leak into the peritoneal cavity, the authors found adhesions after 18 months in 30 per cent of 23 such cases studied. Even barium granulations have been reported as complications of leakage of barium enema. Intestinal obstruction due to the combination

of barium enema and faeces into hard masses occasionally occurs, Fatal barium sulphate embolus has been reported. Ulcerative colitis carries a greater risk of perforation of the bowel, and it must be slowly and carefully given in such cases. Concentration of one percent Tannic acid to give a good mucosal study has been followed by vasomotor collapse and shock, and its use has been abandoned.

A case report of an unusual complication of a double contrast enema is recorded, where the enema film showed no or little air in the bowel lumen, most of it having accumulated in the retroperitoneum.

S. N. Deboo, Bombay.

R. N. Cooley, C. H. Agnew and G. Rios, Diagnostic accuracy of the Barium enema study in carcinoma of the colon and rectum, Am. Jour. Roentgenol, August 1960, Vol. 84, 316-331.

The accuracy of the barium enema examination in the diagnosis of 228 consecutive cases of carcinoma of the colon is assessed.

There are 2 reasons for delay in the diagnosis of carcinoma of colon (1) is the unquestioned acceptance of negative x-ray findings (2) is the diagnostic lassitude engendered by a series of negative colon x-rays.

The carcinoma was proximal to the rectum in 130 cases, and in 109 of these barium enema studies were performed. In this group a tumour was overlooked 11 times, giving a false negative error of about 10 per cent. Rectum was involved in 43 per cent, sigmoid and iliac colon in 29 per cent, descending colon 4 per cent, splenic flexure in 2 per cent, transverse colon in

2 per cent, ascending colon in 8 per cent, and caecum in 12 per cent. The most unsatisfactory performance was in the caecal area, where 6 of the 22 cases were overlooked or misdiagnosed, giving a false negative error of 27 per cent. Errors in the caecal area were due to failure to fill the caecum, failure to obtain adequate mucosal detail, failure to appreciate the varied manifestations of carcinoma in this area.

In the sigmoid, 4 of 52 cases were overlooked or misdiagnosed. Here the errors were due to incomplete demonstration of redundant loops, inability to recognise carcinoma engrafted on a diverticulosis.

In carcinoma of the colon, besides typical appearances, atypical cases are quite common. The typical appearances in carcinoma of the caecum is described as fungating and polypoid, where as the sigmoid lesion is annular and obstructive. In the caecum, 9 of the 22 cases revealed a lesion having an annular appearance; in the sigmoid colon only 22 of the 48 cases reviewed were definitely annular in appearance. The only reliable roentgen sign is aberration or distortion of the segment or direct visualization of the tumour mass. So there is no single certain roentgenic approach to diagnosis of carcinoma of the colon. The procedure which may prove successful one day may be inadequate the next day. So that any rigidity of approach or absolute reliance upon any one type of barium enema examination, either routine method or barium contrast examination will be conducive to either waste of expenditure or to errors in diagnosis. The authors rely on single contrast or routine enema study using tannic acid with high voltage exposures, careful fluoroscopy with high quality roentgenograms.

S. N. Deboo, Bombay.

Harold F. Ibach and Lawrence L. Larsen, Roentgen manifestations of multiple cysts of the renal medulla. *Radiology*, September 1960, Vol. 75, 363-367.

Two cases of medullary cysts of the kidneys have been presented. The appearances of the medullary cysts and demonstrated by either excretory urography or pyelography is diagnostic. The condition may be unilateral or bilateral as illustrated by the 2 cases presented.

The outstanding feature is the presence of multiple cyst-like cavities in the renal pyramids, adjacent to, or surrounding the terminal portions of the minor calyces. The cavities vary in size and shape resulting in distortion or compression of the calyces, varying from a few cavities in a single pyramid to multiple cavities in all of the pyramids bilaterally. The kidneys are either of normal size, or slightly larger. Unless complications are present, the kidneys ordinarily function well.

The most common complication is the occurrence of calculi through out the medullary portion of the kidney. In their first case, no calculi were demonstrable on the conventional scout film of the abdomen. In their second case, calculi could not be visualised on the radiographs or in the surgical specimen.

There was no clinical or radiological evidence of systemic or renal tuberculosis in either of their cases, and one would anticipate tuberculous lesions of the kidney to show calcification and impairment of renal function. The 2nd case illustrates a complicating pyelonephritis with a fulminating course leading to nephrectomy within four weeks after the onset of symptoms.

McKenna and Kempmeier suggested that medullary cysts may be the result of abnormal persistence of the vestigial structures, as after examining numerous sections of foetal kidneys, they demonstrated that the first 3 or 4 generations of convoluted tubules become vestigial. But the authors feel that until more cases are reported with histopathological data, it is doubtful that a single fundamental concept will be accepted.

Conservative medical treatment is indicated. When complication occurs, with involvement of a single kidney, surgical resection may effect a cure.

S. N. Deboo, Bombay.

E. J. Pick, R. Davis and A. J. Stacey, Radiation dose in cinecystourethrography of female, *Br. Jour. Radiol.*, July 1960, Vol. 33, 451-454.

In recent years, the development of image intensification and cineradiography has provided a means of studying the act of micturition under near physiological conditions, being the most satisfactory type of radiological investigation in this field. It is taken as a routine investigation in disorders of micturition, chiefly those connected with incontinence and bladder neck obstructions. Many of the patients are females, in whom the x-ray beam during examination of the bladder necessarily includes ovaries. In the male, the testicles, lie outside the main beam and therefore exposed to a smaller dose.

In a recent study, by the authors, the methods of estimating the skin and gonad dose are given and the results tabulated. The bladder was first filled by a sterile 35 per cent solution of Diodone or 50 per cent solution of micropaque. The contrast medium was injected by gravity through a

funnel and the tube connected to the catheter with the patient recumbent. The patient was then put in erect position and requested to micturate. The bladder and urethra were observed and filmed through a 35 mm. Arriflex cinecamera, mounted on a 5 in. Philips image intensifier. Both filling and emptying of the bladder were observed fluoroscopically, and cinefilm was taken to record the most relevant observations. The kV range varied from 80 to 100 kV. For fluoroscopy, the 0.5 mA tube current was sufficient.

An approximate value of the doses delivered to the ovaries during the examinations was obtained by direct measurement within a phantom under similar radiation conditions. The estimated skin doses are probably within 10 per cent of those actually observed. The gonad doses can not be accurately estimated, as the exact position of the ovaries with respect to the beam is not known, but it is unlikely that they will be ever far out of the beam.

The measurements show that the radiation doses to the skin of the patients are high, and the gonads receive a considerable dose. The gonad doses vary from 0.2 per cent to 4.9 roentgens (total during fluoroscopy and cineradiography). These are unlikely to cause somatic injury, but their possible genetic effects must be kept in mind. It is essential to limit the time of filming as much as possible, relying mainly on fluoroscopy and make a cinerecording of only truly relevant features. A high kV technique with a lower tube current is entirely satisfactory.

S. N. Deboo, Bombay.

Robert Bennett, Unequivocal radiological evidence of intra-uterine foetal death, including demonstration of gas formation within the foetal circulation, Jour. Fac. Radiologists, July 1960, Vol. XI, 200-204.

The author reviews the radiological signs contributing to the diagnosis of foetal death namely Spalding's sign, Hartley's sign, disproportion between foetal maturation and the estimated period of gestation, absence of continued foetal growth, absence in change of position of the foetus and its limbs, an angular kyphosis in lumbar or dorsal spine, collapse of the thoracic cage. In more recent years 2 additional signs have been recognised namely (1) evidence of foetal intravascular gas (2) Deuel's Halo sign. These may provide an early and irrefutable evidence of foetal death.

Deuel's Halo sign may be seen relatively early and before marked deformity of the foetal head has occurred. Definite demonstration of gas in the foetal circulation appears early in comparison with other radiological signs and may be seen within 3 days of the estimated time of death. It is not seen in the smallest foetuses, even when a high degree of maceration is present. A review of the literature shows that at least seventy cases of gas in the foetal circulation have been reported to-date.

A review of the films of 36 patients who underwent prepartum radiographic examination has shown evidence of foetal intravascular gas, in five (13 per cent).

The characteristic appearance of foetal intravascular gas is its bizarre appearance, reminiscent of gas in the biliary tree. Such an appearance is produced by gas in the portal vessels. Gas in umbilical vessels will also produce an equally characteristic

appearance if present in sufficient quantity. Gas in the foetal heart can be identified by its position in the foetal thorax and its roughly triangular shape with the base caudad. If a lateral film is taken in the erect position, a gas fluid level may be shown in the heart. The main dorsal vascular trunks produce characteristic parallel walled streaks following the curve of foetal spine, and branching streaks may be seen in the region of the iliac vessels. Finer worm-like streaks may be shown in the upper abdomen, representing the vessels in the liver. Spalding's sign and evidence of lack of foetal tone were the most consistently helpful signs in arriving at the a diagnosis of foetal death.

S. N. Deboo, Bombay.

Joseph Dineen, Thane Asch and John M. Pearce, Retroperitoneal fibrosis, Radiology, September 1960, Vol. 75, 380-390.

Four cases of benign idiopathic retroperitoneal fibrosis are presented in this paper, bringing the total number of reported cases to 43. The lesion is identical histologically with sclerosing lipogranuloma, and in its early phase bears a close resemblance to Weber-Christian's disease or non-suppurative panniculitis. The lesion presents as a fibrous plaque enveloping one or both ureters and the great vessels of the abdomen.

Clinically loss of weight and pain in the flanks are almost universal symptoms, often with a testicular component. Occasionally sudden complete anuria impels the patient to seek medical advice. The disease usually progresses to bilateral involvement. Months of ill-health with anorexia, vomiting follow. A palpable mass was noted in only 2 cases.

Laboratory studies show anaemia in 30 per cent of cases. Red and white blood cells are frequently seen in urine.

Surgical, traumatic and infection etiologies have been suggested, but the specific etiology is yet unknown.

The characteristic radiological features are demonstrated by retrograde pyelography. The proximal ureter is dilated and tortuous and then swings medially by sharp angulation. Hydronephrosis is evident. The ureter tapers gradually to a fixed stenotic segment, varying from 3 to 6 cms. in length, normal ureteral calibre is then resumed. A unique finding in one of their cases was the presence of numerous small sacculations in the region of involvement.

It must be emphasised that this is a benign disease and that surgery should not be delayed. The reported deaths have been due to late diagnosis, permitting the production of intractable uremia or advanced renal destruction secondary to obstruction and infection. The treatment of choice is surgery, including ureteral lysis and ureteral transplantation with or without nephrostomy and splinting of the ureter.

The prognosis is excellent if renal function has not been too severely compromised, and no recurrences have been reported. Radiation therapy was utilised in 3 cases with favourable results in 2 cases. In one case radiation therapy was the only therapy offered and complete remission followed. However the small number of cases so treated does not warrant a definite conclusion, regarding efficacy of non-surgical treatment.

S. N. Deboo, Bombay.

Lars Andren, Instability of the pubic symphysis and congenital dislocation of the hip in new-borns. The possible aetiologic role of maternal hormones, Acta Radiologica, August 1960, Vol. 54, 123-128.

It is widely believed that the primary cause of dislocation of the hip in new-borns is congenital dysplasia of the joint. Relaxation of the capsule with dislocation of the joint can be demonstrated at birth by the 'snapping' phenomenon. Every case of congenital dislocation of the hip can be diagnosed at birth by clinical as well as by roentgenologic methods. On roentgen examination in 1959 of a series of new borns with congenital dislocation of the hip, co-existent instability of the symphysis pubis was noticed. When the femoral head was pressed against the acetabulum and then dislocated postero-laterally, the manipulation was accompanied by a widening of the symphysis by 3 mms. A distinct relaxation of the capsule was observed, which stretched as the femoral head slipped out of the acetabulum.

During 6 months, 3 cases of congenital dislocation were seen, all 3 being girls. When examined on the first day of life, the symphysis was found to widen from 3 to 9 mms. When compared with the controls, it appears that the instability observed in the 3 girls has something to do with the dislocation, since the widening was unequivocal and so much greater than in the controls.

Instability of the symphysis is known to occur in pregnancy, and is ascribed to an increased elaboration of oestrogens and of the pregnancy hormone relaxin. It is therefore tempting to assume that the symphyseal instability and relaxation of the hip joint are due to the influence of maternal hormones. After the first week of life, the

influence of maternal hormones has practically disappeared. When the pelvis is examined at birth and 8 days later, the instability of the pelvis is less than 1 mm. and the hips can no longer be dislocated. The only treatment the child received was immobilisation of the legs in a flexed outward position. But if the legs are held adducted and stretched, the femoral head can lie outside the acetabulum and present regression of the elongation with permanent partial or complete dislocation as a result.

S. N. Deboo, Bombay.

Herbert Muss-bichler, Fractures at the tuberosity of the 5th metatarsal in children, Acta Radiologica, August 1960, Vol. 54, 90-96.

Sixty-six fractures at the tuberosity of the 5th metatarsal bone out of a total of 1668 cases of injuries of the feet and ankles in children were studied according to frequency, type and healing.

The tuberosity of the 5th metatarsal bone is a part of the diaphysis. As a rare anomaly, the base may be formed as an accessory bone centre, separated from the diaphysis by epiphyseal cartilage, and usually appears between the 2nd and 5th years of life. The epiphyseal line should not be mistaken for a fracture.

The fractures studied were classified into following types.

1. Transverse fractures.
2. Oblique and longitudinal fractures (regarded as atypical).
3. Avulsions.
4. Epiphyseal separation.

In all cases a more or less marked swelling of the soft tissue around the tuberosity was present. This was often helpful in the correct diagnosis, esp. in avulsions or fissures.

Transverse fractures.—In 5 cases, a diastasis of 2 to 5 mm. was present on the day of the accident. During the process of healing, the diastasis between the fragments increased and took the shape of a wedge-formed defect. The callus formation which usually appeared 3 to 4 weeks after the accident was restricted to the endosteum, as a result of which the fracture surfaces appear sclerotic. The absence of periosteal reaction is due to the fact that the fractures involve that part of the bone where no periosteum is present. In some cases, the diastasis and the sclerosis were so marked as to give the impression of developing non-union (pseudarthrosis). 4 to 9 weeks after the accident, when these cases were re-examined, none of them showed complete union of the fragments, but when they were performed 4 months to 4 years afterwards, the union had occurred in all cases.

Oblique and longitudinal fractures.—When re-examined after 2 and 4 weeks were found to have healed. No diastasis or sclerosis occurred.

Avulsions.—When re-examined, showed that the time of complete union was not different from that observed in transverse fractures. No displacement of the fragments occurred.

Epiphyseal separation.—Only one case showed separation of epiphysis. The reason for the delayed union of transverse fractures is due to the effect of traction of the peroneus brevis muscle inserted at the tuberosity resulting in increase of diastasis between fragments.

S. N. Deboo, Bombay.

G. E. Massoud and H. K. Awwad, Nasopharyngeal Fibroma. Its malignant potentialities and radiation therapy, Jour. Fac. Radiologists, July 1960, Vol. XI, 156-161.

The present paper deals with the data presented by seven new cases of nasopharyngeal fibroma seen among forty nine nasopharyngeal tumours (14.3 per cent). None of the patients showed signs of sexual under-development. Direct forward extension of the tumour into one or both nasal fossae was noted in all patients. The nasal cavity was expanded by the tumour with atrophy of the lateral nasal boundaries and deviation, thinning or destruction of nasal septum, causing an exceptional radiological visibility of the odontoid process in the posteroanterior projection. The maxillary antrum is involved through the medial wall, or its posterior wall. In one patient the sella turcica was involved with destruction of its floor suggesting an upward extension into the pituitary fossa. The orbit can also be involved.

The seven cases were treated by deep x-rays, H. V. L. = 1.5 mm. of copper. The first case was given a dose of 1500r in 3 weeks, and after watching the response to this dose, subsequent cases were given 3500r to 4000r in four to five weeks. The results of treatment showed that 3 cases remained symptom free with no detectable tumour for periods of six, three and one and a half years respectively. One patient showed regression after a dose of 3500r in four weeks. 2 years later a local recurrence occurred, which was treated by a dose of 3000r in four weeks with regression. One year later a huge mass of glands developed in the cervical area and was treated with 3500r in four weeks with almost complete regression. 8 months later, the mass began to grow again and was

given a further course of 1500r in 5 days. 2 years later lymph nodes began to appear in the lower deep cervical area and were treated with a dose of 1500r in 5 days. 2 months later, severe pain in the first lumbar vertebra appeared and this vertebra was given a dose of 2000r in ten days with amelioration of pain. 2 cases showed partial regression after radiation therapy. The 7th case was lost sight of after apparent regression 3 months after x-ray therapy.

The nature of the fibroma is a debatable question. Most workers consider the lesion to be a true neoplasm of benign or locally malignant nature. In their cases, malignant tendency was suggested by the high incidence of bone destruction, and by occurrence of extensive metastatic deposits in cervical lymph nodes and in one patient by occurrence of metastases in lumbar spine.

S. N. Deboo, Bombay.

Professor Sir Charles Dodds, Some reflections on Cancer research, Jour. Fac. Radiologists, July 1960, Vol. XI, 137-143.

Chronic irritation theory first came in Vogue. Then came the bacterial theory. Then came the transplantations of rabbit tumours, mice tumours etc. Then came Dr. Peyton's Rous sarcoma, but at present time, there is no proof that a human tumour is due to a virus. The Japanese workers succeeded in producing tumours by application of tar. Attempts however to link this with spontaneous cancer have not been very successful despite the fact that many of the compounds show carcinogenic activity. Dr. Dobriner attempted to correlate disorders of steroid metabolism with the cancer problem, but there is no specificity of the claim.

In early 1920, Warburg postulated that in malignant tissue, the respiration was damaged, and that the cell metabolised its glucose to lactic acid and was able to do this aerobically. This had not specific claim. Then Chemotherapy came in vogue. Many workers however consider that there is not sufficient difference between the malignant cell and the normal cell to allow chemotherapeutic principles to operate. The application of chemotherapy has not been very encouraging upto the present time.

The author suggests that we should greatly extend our clinical experiments on human inoperable malignant disease, and thus obtain valuable information on the biology of cancer by experimenting with these patients. This is justifiable, provided that one adheres to the first proviso, namely that the subject must not suffer.

Professor Maran and others were able to show that in the animal body, there were a number of oestrogenic substances, at that period five, with slightly differing constitution, but with the same biological activity. This led finally to the discovery and synthesis of the highly active synthetic oestrogens, namely, stilboestrol, hexoestrol, dienoestrol, and others of the same series. By administration of a few milligrams of stilboestrol a day, it was possible to

produce an intense oestrogenic background in human or animal. Subsequently they were used in the treatment of malignant disease. This dependence of the tumour on the back ground controlled by hormones led Huggins to put forward his now widely accepted concept of the hormone dependent tumour. This is in complete accord with Beatson who advocated castration of ovaries in carcinoma of the breast, and the surgeons who advocated castration in carcinoma of the prostate. But oestrogen treatment is only of use in the cases of carcinoma of the prostate and to a limited extent in inoperable carcinoma of the breast. If a patient comes out of control, then no increase of oestrogens will have any effect.

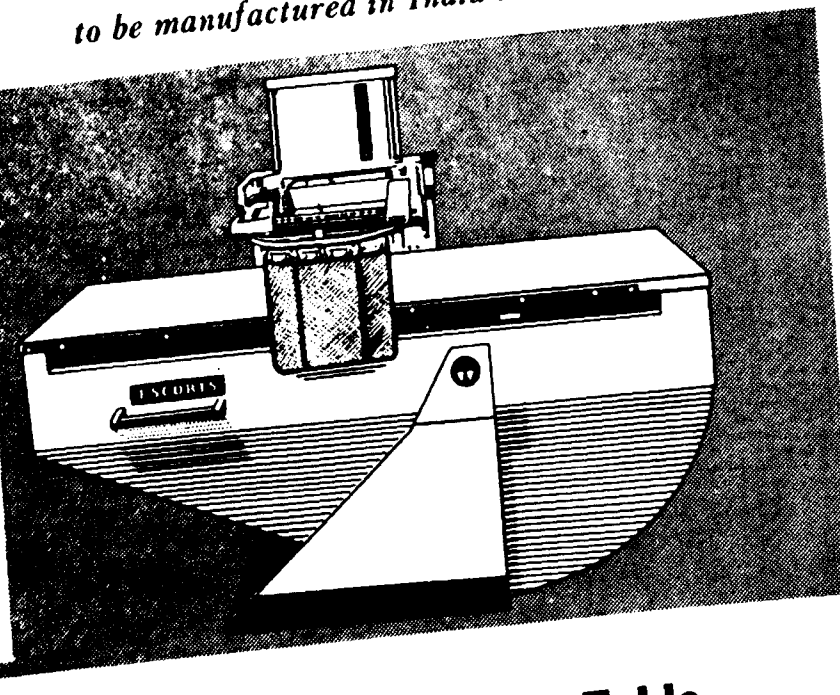
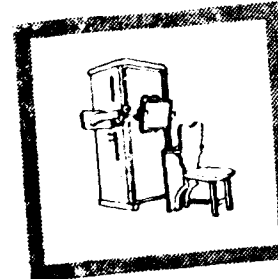
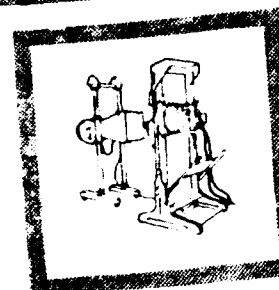
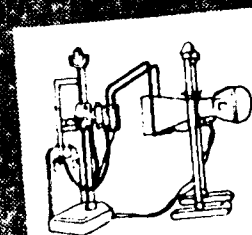
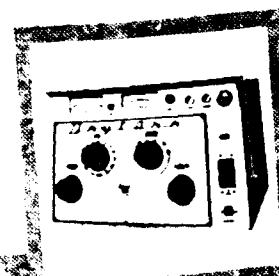
Gray and others have shown that an increase in the tension of oxygen will lead to an increase in radiosensitivity of malignant cells. This is confirmed and a direct application is being made to its use in radiotherapy of tumours. Together with Prof. Windeyer, the author has commenced the study of the effect of 4-6 dinitro ortho-cresol on patients with malignant disease (inoperables), with a view to see whether radiosensitivity is affected. But it is too early to express an opinion.

S. N. Deboo, Bombay.



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North Carolina M. J. 18:513, Dec., 1957

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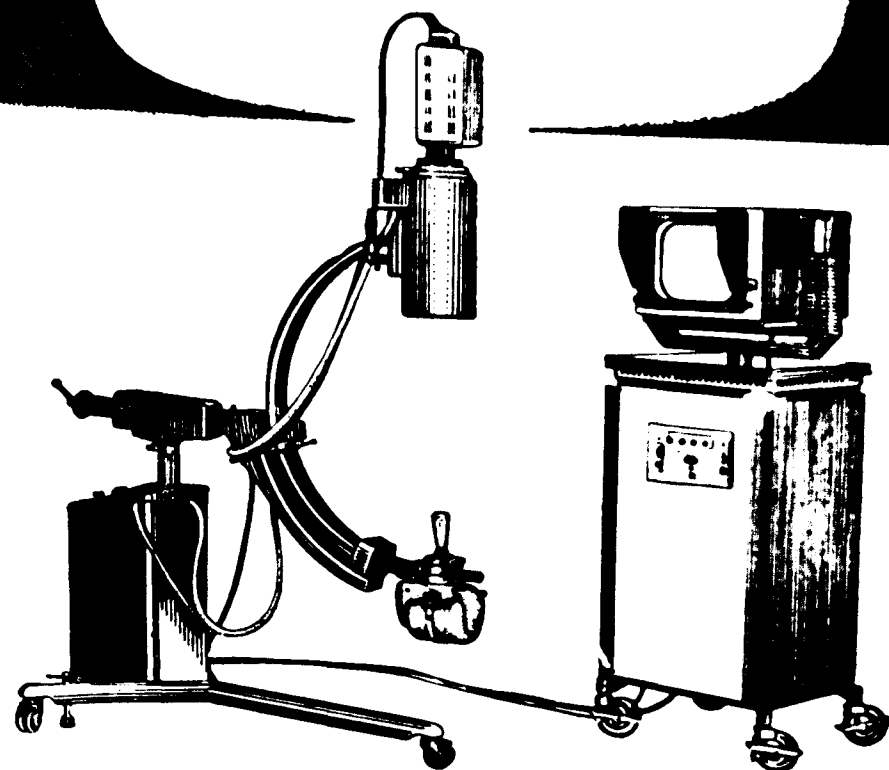
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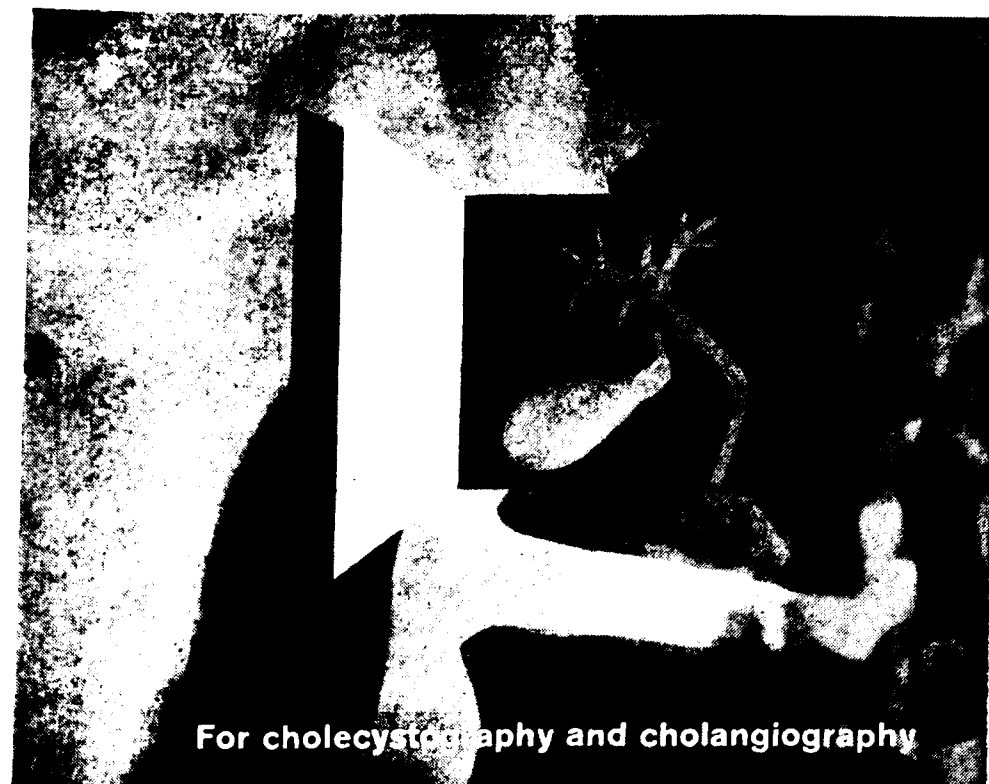


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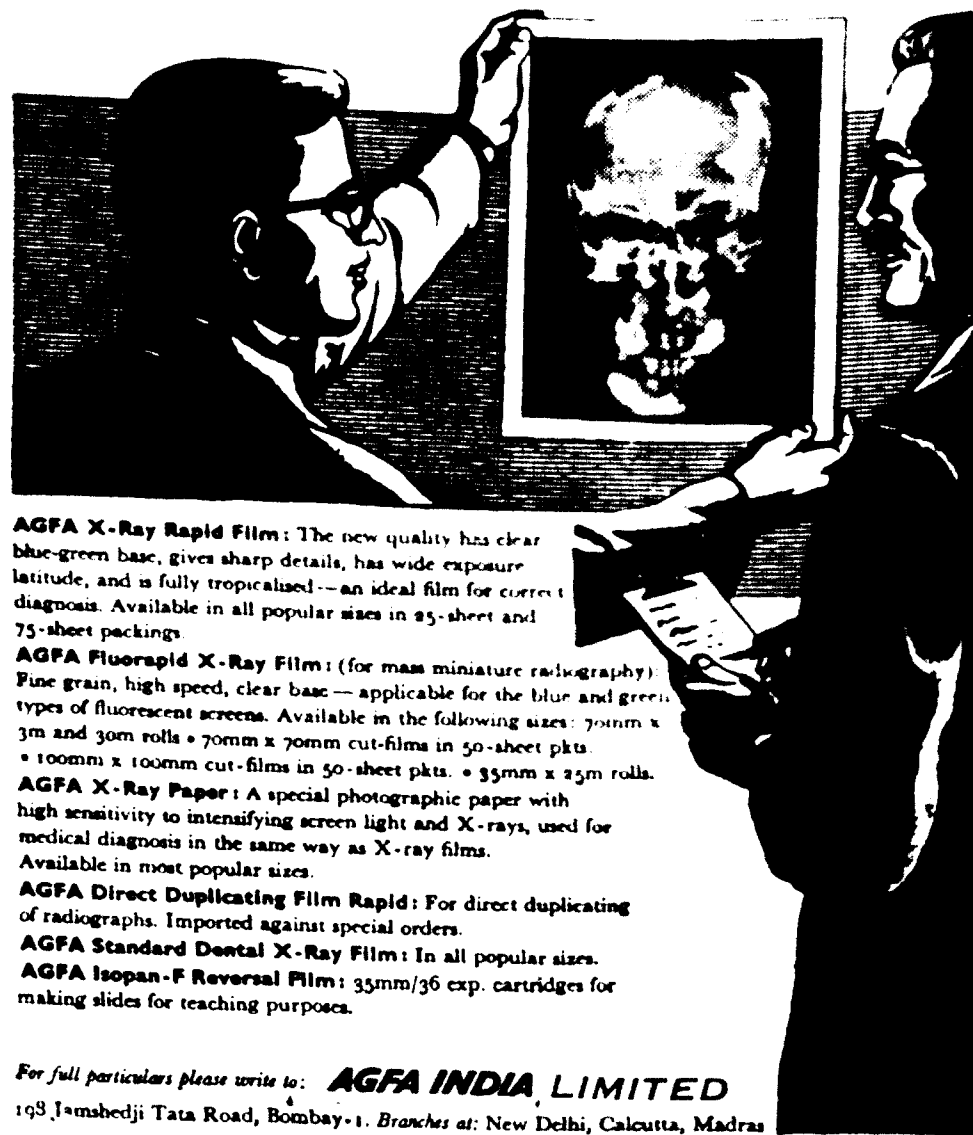
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