

TRANSACTIONS OF THE PHILADELPHIA ACADEMY OF SURGERY  
AND THE NEW YORK SURGICAL SOCIETY

JOINT MEETING HELD FEBRUARY 14, 1934 AT MITCHELL HALL, COLLEGE  
OF PHYSICIANS, PHILADELPHIA, PA.

The President, DR. WALTER E. LEE, in the Chair,  
CALVIN M. SMYTH, JR., M.D., Recorder

SUBCLAVIAN ANEURYSM

DR. GEORGE P. MULLER (Philadelphia, Pa.) read a paper with the above title for which see ANNALS OF SURGERY, vol. 101, No. 1, p. 568, 1935.

DR. ELLSWORTH ELIOT, JR. (New York) remarked that subclavian aneurysm is a condition in which the experience of many observers is necessary to attain a satisfactory knowledge of its clinical features and treatment.

In the consideration of its pathology, distinction must be made between aneurysms the result of atheroma and those due to a complete or partial division of the vessel itself. In the former group the gradual establishment of an adequate collateral circulation permits the ligation of the main vessel either distal or proximal, or both, to the aneurysmal sac with but little risk of gangrene. On the other hand in the traumatic variety, in the absence of an adequate collateral circulation, gangrene occasionally follows the ligation of the main arterial trunk. Furthermore, the scar tissue, subsequent to the repair of divided contiguous soft parts, may, by its contraction, narrow the lumen of the main arterial channel, and, embracing the brachial plexus, an extensive adhesion between it and the wall of the aneurysm may follow; a condition which may make any operative separation of the plexus and the aneurysmal sac exceedingly difficult, if not impossible.

In all operations for traumatic subclavian aneurysm, hæmostasis should be insured by the preliminary exposure of the arterial trunk on either side of the aneurysmal sac followed by the precaution to pass a narrow piece of tape around either exposed vessel which, in case of uncontrollable hæmorrhage, can be readily and quickly temporarily tightened. After resection of the aneurysmal sac (in the ideal operation) the proximal tape may be tightened as the distal tape is relaxed. If bleeding then occurs from the distally divided artery, the presence of an adequate collateral circulation may be assumed and both proximal and distal artery may be permanently ligated. If such bleeding does not take place, an attempt to reestablish arterial continuity by end-to-end anastomosis or by the insertion of a segment of the internal jugular or other appropriate vein when the gap between the divided arteries is too great to permit anastomosis may be attempted.

In permanent ligation either of the divided arterial ends or of the artery in continuity, all kinds of materials have given good results. The fascial strip

is perhaps preferable to any kind of non-absorbable material. Doctor Eliot has been using heavy chromic gut.

Doctor Muller referred to the ligation of the first part of the right subclavian artery by the speaker, together with all its branches with the exception of the vertebral, for a pathologic aneurysm of the third part of the artery. A permanent cure followed this procedure, although a positive Wassermann test persisted for some years, the patient dying fifteen years later from an apoplectic seizure.

The results obtained by various operations for the relief of all varieties of subclavian aneurysm are unfortunately uncertain. While successful cases are usually reported, the failures to cure, as well as the operative mortality, do not find proper publicity. Unquestionably the operative mortality of this condition is very high. Some success has followed the packing of the aneurysmal cavity with iodoform or other gauze after a preliminary ligation of the artery on either side of the aneurysmal sac.

Doctor Muller is to be congratulated on the fact that he opened the pleural cavity rather than the aneurysmal sac. The pleura can usually be readily repaired. The opening of the sac, on the contrary, may be followed by uncontrollable hæmorrhage, especially if the precaution previously cited has not been taken. Such tearing or opening of the sac is undoubtedly the most frequent cause of death.

In aneurysms of the thoracic portion of the left subclavian a small uninvolved segment of the artery between its origin from the arch and the aneurysmal sac may be disclosed through an incision exposing the posterior mediastinum. A successful instance of the ligation of this uninvolved portion for an extensive aneurysm above it has been reported. While a preliminary X-ray examination may indicate the presence of such an uninvolved segment, it can be corroborated only by exploration through the posterior incision referred to.

In operations for subclavian aneurysm through the anterior approach excellent exposure may be obtained by either resection of the inner end of the clavicle with or without resection of the contiguous portion of the sternum. Neither resection of the inner portion of the clavicle or of its dislocation forward seems to interfere with the restoration of the abduction of the arm, even in the working man. In only one instance did a patient complain of frequent spontaneous painful recurrence of the dislocation when the arm was abducted beyond a right angle.

DR. HOWARD LILIENTHAL (New York) said that he had discussed the posterior approach to the subclavian artery, especially the left, in his book, *Thoracic Surgery* (Saunders, 1925) and there is a good picture drawn from an actual operation. The operation is not at all difficult. Posteriorly particularly, the pleura can be pushed away much easier than in any other location and the exposure is perfect. You will note the vertical direction of the artery.

DR. WALTER ESTELL LEE (Philadelphia) from his experience supports the statements of Doctor Eliot and Doctor Muller as to the value of digital

pressure upon the subclavian vessels as being perhaps the most vital part of any surgery of these vessels. He has been fortunate enough to assist with one case and operate upon another case of traumatic aneurysm of the subclavian artery, both of which followed stab wounds of the left subclavian artery. In the first case the clavicle was partially resected but the sternal end was left *in situ* and during the exposure of the sac the internal jugular vein was torn near its junction with the subclavian vein and there was a great deal of difficulty in controlling the resulting hæmorrhage. It was not until the sternal end of the clavicle had been resected that sufficient exposure was obtained to permit of the closure of the wound in the vessel. In the second case, however, remembering this first experience, not only was there a greater length of the clavicle removed, but the sternal end was disarticulated and part of the sternum resected, so that when the sac tore near its origin from the first portion of the subclavian artery it was possible to control the bleeding by digital pressure applied to the first portion of the subclavian against the underlying first rib, and this made it possible to close the opening of the subclavian artery with mattress-silk sutures. The first case did not survive more than six hours after operation, but the second case made a very satisfactory recovery, is still alive and will be reported subsequently.

#### TREATMENT OF COMPRESSION FRACTURES OF THE VERTEBRÆ

DR. DEFOREST P. WILLARD (Philadelphia) read a paper with the above title for which see p. 776.

DR. CLAY RAY MURRAY (New York) said that there are three basic principles in the treatment of these spine fractures: (1) Adequate reduction; (2) adequate maintenance of reduction; (3) adequate exercise of the back muscles during maintenance of reduction.

In the absence of any of these three components the treatment fails. Following a meticulous application of these principles in the cases at the Presbyterian Hospital in New York, 85 per cent. of the cases which can be adequately reduced and maintained give satisfactory working backs within a period, the shortest about six months and the average nine to twelve months. The treatment includes reduction, plaster immobilization for two months and a brace-wearing period up to the time of resumption of duty. The two latter periods are characterized by progressive development of back musculature by exercise. The 15 per cent. which fail, fail for one of three reasons: First, no reduction can be accomplished, giving a back mechanically unfit for weight bearing; second, although reduction can be accomplished, it is not maintained, due to absorption in the vertebral body later; third, despite adequate reduction and despite adequate maintenance of reduction there persists pain at the site of fracture. The speaker feels these cases have lesions which cannot be shown of the articular facets or lamina, or traumatic arthritis, which again frequently cannot be shown. It is in these types of cases that conservative treatment fails and for the average surgeon these are the operative cases.

If there is not pain at the fracture site there may be in the low back; it is frequently due to a low back strain in the presence of kyphotic deformity above. These are cases for treatment by those measures suitable to low back strain. There is a great deal of difficulty in reducing high cases; the vast majority are in the twelfth dorsal and the first lumbar, but a certain percentage of cases occur at the fifth or sixth dorsal, particularly where patients land on the shoulders or base of the neck. These are particularly hard to reduce by the mechanism of hyperextension which is more apt to affect the dorsolumbar region, the most flexible portion of the spine. In these high cases he is inclined to use in place of a more gradual method of reduction the one first described by Davis, of Erie, Pa., who put the patient in a "swan dive" position and then applied direct pressure with the hands on either side of the spine. Doctor Davis' modified "jack" is capable of producing the same type of correction.

One other point in the pathology; a certain number show very little in the way of compression, and have subsequent pain at the site of injury. Some of these cases are found to have, on X-ray examination of the spine, a wide separation of the spinous processes in the region involved. In all injuries where the typical compression fracture does not show, but in which the rounding of the back is apparent, it is wise to make sure that the interspinous ligaments have not torn, allowing separation of the spines. The speaker recalled a case of a student in whom the spine X-ray showed no compression, but the distance between the twelfth dorsal and the first lumbar spinous processes was two and a half times as great as it was between those above and below and when the picture was taken with forward bending of the back, it was very clearly demonstrated. A back brace relieved him completely. A number of these cases are overlooked. A method of use in obviating the necessity for special frames for reduction is to turn the patient's bed around so that the knee gatch comes under the small of the back. You can then gatch up this bed one turn an hour. This obviates an anæsthetic and over a period of forty-two to seventy-two hours one can get complete correction without severe strain on the patient. Rapid correction is more apt to lead to distention than is slow correction. Even where slow correction is used, the head of the bed should be elevated on blocks; otherwise, the patient has distress and vomiting. As routine all patients receive pitressin three times daily; it works very well in controlling distention.

For the other method used, Doctor Murray is indebted to Doctor Stookey of the Neurological Institute and it is of particular value: Reverse the bed so that the low or foot piece of the bed is at the patient's head. Place two mattresses so that they come to the level of the foot piece of the bed. On top of that place an air mattress. Under that, at a level with the lesion (either under the shoulders or small of the back for upper dorsal or high lumbar, respectively) place a tightly rolled blanket; this angulates the air mattress in this region. After that a ten-inch-wide band of adhesive in the dorsal cases is attached to the central portion of the air mattress which lies

under the patient's head and shoulders and is pulled out tight and carried down with considerable pressure and fastened to the lowest foot bar of the reversed bed. This further depresses the head end of the air mattress. Underneath the thigh and calves of legs are placed pillow rolls; these can be shifted back and forth so that no pressure remains long on any one point. It impresses one as an easy and comfortable method of hyperextension, particularly when neurologic lesions are present, and has been very effective.

DR. ELLSWORTH ELIOT, JR. (New York) thought this a very interesting topic, especially from the medico-legal standpoint. Assuming that reduction has been satisfactory and that there is no demonstrable deformity, in the 15 per cent. of cases of persistent pain and discomfort, on what objective symptoms does Doctor Willard rely to exclude the possibility of malingering? In a number of these cases in which the anatomic result appears satisfactory, the patient continues to complain of a great deal of pain and of inability to return to work, *etc.*, and, on examination, no objective symptoms can be elicited. These patients, complaining of "terrible" pain, encouraged by unethical lawyers, bring suit and excessive verdicts are not infrequent. In the absence of objective symptoms, is there any way in which insurance companies and other defendants can be protected by determining the capacity of the plaintiff to resume work?

DR. GEORGE HEUER (New York) inquired as to the time at which the results reported were found. In a series of cases which he had in Cincinnati he followed twenty-two crushing injuries of the spine over a period of two or more years after the initiation of treatment. No case was considered under two years and it was in the two- to five-year period after the injury that the results were determined. The cases were all treated as has been indicated by hyperextension, by plaster case, two months application of a brace and then the treatment was confined to what he believed to be appropriate exercise. In the follow-up it seemed that the patients were doing very well and yet in this group of two to five years his results were not 80 per cent. cured. It is true that there was not a single case in which the man was incapacitated so that he could not work, but there was a fairly high proportion of the patients who complained of pain in the back and in some, even after a two- to five-year period, there was localized tenderness. In some there was demonstrable spasm of the muscles. He did not know where he failed in the treatment, but the results after five years were rather disappointing. The fractures dealt with were more serious than, for example, the X-rays shown here today. They were serious crushing injuries of one or more vertebral bodies and easily demonstrable in every lateral X-ray of the spine.

DR. ALLEN O. WHIPPLE (New York) remarked that he was interested in the treatment of the pain which takes place during the course of treatment in these cases. He did not believe the severity of the pain could be appre-

ciated unless one had a case of it in one's own family, but the speaker was aware that it is a very severe pain. The pain complained of in the cases of the extension treatment is not emphasized enough. Doctor Whipple had talked to a number of these patients and one has to be very stoical to endure it. The pain which follows after the case is off and exercise is given, the soreness and the residual back pain, are very real and none of the text-books which deal with this subject gives enough attention to it as a sequel or residual symptom.

DR. CLAY RAY MURRAY, in reply to Doctor Heuer, said that his longest follow-up was five years, the shortest one year. He specifically stated that 85 per cent. of the cases as qualified returned with workable backs, not perfect backs, at the end of treatment. He is citing cases which show no neurologic lesion, cases in which the compression has been reduced and reduction maintained and in which the muscular development is made as good as before injury. It must be a number of years before one can state results, but at the end of a one-year period 85 per cent. of such cases can be returned with workable backs, though not entirely symptom-free. That means he can do relatively hard physical work and do it well enough to earn his normal wage, although he may have some complaints about his back. He did not know how many were entirely symptom-free and it would be inaccurate to attempt to state cases. The speaker did not believe there are many surgeons in New York who have treated many wedge-shaped fractures, if the cases are seen early, who could not show accomplished reductions. The cases in which some improvement and after very striking reduction cannot be accomplished are few and far between.

DR. DEFOREST P. WILLARD said that he knew of no sign that one can demonstrate on the witness stand that will make a great deal of impression on a jury. Patients complain of subjective pain and often this is greatly exaggerated for legal purposes, but as far as the medical mind can be made up, the cases that show good anatomic reduction, that are free from muscular spasm, especially of the lumbar muscles, in which the flexion and the lateral mobility is free, can be considered as exaggerating their pain for legal purposes. A great many of these malingerers may be caught off guard by getting their attention centered on some other part of the body and one finds the pain in the back disappears. That type is hard to demonstrate to a jury. Doctor Willard believed that we can make up our own minds, but did not know any positive method of presenting that possibility to the layman.

The speaker thought that these older cases had often had distinctly inadequate treatment and there was definite wedging and poor position of the back. Many of those cases that do complain of pain do not complain of it around the fractured area, but of back strain. The injury started that strain, but it is continued by the drawing of the muscles. It is a part of the fractured back, but so many of these cases complain of pain in the low back due to the hurt to the soft parts that accompany the fracture. That extends over

a long period of time and requires considerable treatment. A great many of these cases, especially in older people, constantly complain of pain. If there is no legal side to it that pain will subside; it is not of disabling character. Taking the cases as a group there are very few absolutely pain-free. Many look well under the X-ray but upon weight bearing they complain of these various types of intermittent pain. There is no way of entirely accomplishing our purpose of getting them pain-free and that is due to the muscle injury rather than due to the actual spinal injury itself.

CYSTINE NEPHROLITHIASIS

DR. LEON HERMAN and DR. WALTER E. LEE (Philadelphia) read a paper with the above title for which see p. 746.

DR. EDWIN BEER (New York), said that some people claim that cystinuria is much more common than cystine calculi. If so, it is surprising that the crystals of cystine are not found more often in routine urinary examinations. This may be due to inaccuracy on the part of the examiner. If one considers the thousands of urines that are reported in the course of a great many years of practice and the rarity with which cystine in the absence of stone of the same composition has been reported, one does get the impression that it is a relatively infrequent occurrence. With more regular sulphur determinations and subsequent search for crystals, a greater incidence may be noted.

Underlying the production of cystine stones, there seems to be no doubt that there is a protein metabolic fault and that it runs in families. Thin recently collected in two generations in a Scotch family, fourteen instances of cystinuria and cystine calculi. It is of interest to note that although the stones probably always originate in the kidney, the first observation of cystine stones was made on a bladder stone, which gave the name to this type of waxy stone. Chemically they are not regularly pure stones. They contain approximately 25 per cent. of sulphur.

In the speaker's experience he has encountered six of these stones, usually in young adults. In the literature, cases in children have been reported, but personally he has never seen one in a child. According to German authorities these stones are not opaque to X-ray, but in Doctor Beer's series they have usually been discovered by the X-ray unless they were very small. In one particular patient, the stones on one side were of good size and gave a very sharp shadow. On the other side, there was no evidence of stone, but while the patient was convalescing from a pyelolithotomy on his left kidney, he passed several cystine stones with right kidney colic, and these stones could not be seen in the X-ray films. In this particular patient, a cystine stone recurred rapidly and was again removed. After some years, another recurrence developed in the same kidney and this time the stone was a phosphatic calculus. The treatment is particularly difficult. Low protein, alkaline diet and alkalis have been reported as helpful, but some observers have noted continuous excretion of cystine crystals under this diet. Crowell and others

have reported disappearance or reduction in size of such calculi by lavage of the kidney pelvis with alkaline solutions.

Turning to the two cases presented, Case I illustrates very well the problems met in these cases with their tendency to produce stones with final destruction of a kidney and impairment of the second kidney. Case II also illustrates the malignancy of stone disease in general and how it may lead to renal failure and require nephrectomy.

#### PANCREATIC CYST

DR. HUBLEY R. OWEN presented a patient forty years of age, admitted to the Philadelphia General Hospital, Sept. 14, 1932, with the chief complaint of a mass in the abdomen of six years' duration. She stated that she herself felt a freely movable mass in the upper left quadrant of the abdomen, giving sensation of pressure. For the past ten months it had grown and pressure sensations had increased. There was no actual pain but a sensation of heaviness in her abdomen. After each meal there was discomfort and she had been constipated. She becomes dyspneic on slight exertion. She gave a history of having had an appendectomy with drainage at fourteen years of age and an incisional hernia, operated upon in November, 1931.

*Physical Examination.*—Well-nourished woman, forty years of age. Not in acute pain. There was a large, firm, oval, freely movable mass in the left upper quadrant about the size of a grapefruit. On deep inspiration this mass descended and could be held below the costal margin. The mass appeared to be attached by a pedicle to the left side of the abdomen. Laboratory examinations were essentially negative. *Preoperative Diagnosis.*—Cyst originating from pancreas or mesentery.

At operation a large cystic mass was exposed from which were aspirated 40 oz. of turbid, brownish, odorless, gelatinous fluid. Chemical examination of the fluid showed calcium carbonate and cholesterol crystals. The interior of the cyst was found to be irregularly multilocular in character. The cyst apparently arose within the pancreatic tissue. About one-half of the cystic wall was removed and the remainder sutured to the peritoneum and the cavity cauterized and packed. The patient was discharged from the hospital fifteen days after operation with a small amount of packing in the cystic cavity. The wound was healed solidly four weeks from the time of operation.

The patient was readmitted to the hospital one year later in the service of Dr. P. A. McCarthy with recurrence of the mass in the epigastrium which she stated she had noticed for about two months. Symptoms present on first admission were present but not as severe. A secondary anæmia was present. Physical examination showed a mass about the size of a small grapefruit to the left in the mid-line of the epigastrium. It was movable and somewhat tender. At operation a cyst about the size of a large orange was found attached to the tail of the pancreas. The pancreatic tissue was firmly adherent to the cyst-wall from which it could not be freed. The tail of the pancreas was ligated and removed with the cyst.

DR. JOHN DOUGLAS (New York) said that pancreatic pathology depends on one factor which is peculiar to this gland, namely, its self-destruction by digestion by its own ferments. While the fat-splitting ferment requires no activation, the protein-splitting ferment does. It is activated normally in the intestine by enterokinase, but may be activated by injured pancreatic

tissue, calcium salts, certain bacteria or neutralization by hydrochloric acid. The various pathologic changes in the pancreas, hæmorrhage, necrosis, sloughing or cyst formation then follow, whether the primary etiologic factor be due to altered bile or duodenal contents entering the duct, or to infection of the pancreas from the gall-bladder or some other inflammatory lesion in the gastro-intestinal tract by the lymphatics, or is due to trauma.

Cysts of the pancreas are divided into true cysts and pseudocysts. The true cysts may be (1) Congenital; (2) retention cysts due to blocking of the duct by chronic pancreatitis or calculi; (3) neoplastic in origin. These are all rare. Ecchinococcus cysts are very uncommon in the pancreas. Most of the cysts of the pancreas, while these are not common pathologic lesions, are pseudocysts.

Korte, some twenty-odd years ago, divided cysts of the pancreas, of which he had collected 121 cases, into (1) Those of traumatic origin; (2) those due to inflammation; (3) those of unknown etiology. Of these cases there were thirty-three in the first group; thirty-three in the second group; fifty-one in the third group.

With our present knowledge of pancreatic pathology, we are justified in assuming that, whatever may be the primary etiologic factor, traumatism or primary pancreatic necrosis, the secondary factor is the same in all of them, namely, a breaking down of the tissue with the activation of trypsinogen and either a more or less extensive destruction of pancreatic tissue. This results in the lesions of acute pancreatic necrosis or, if limited in extent, may eventuate in recovery as must frequently happen in the mild cases, which may accompany or be diagnosed as acute cholecystitis, or, if the lesion is localized in a portion of the pancreas, proceeds to a liquefaction of pancreatic tissue and a pseudocyst forms.

The recurrence of a cyst formation in Doctor Owen's case probably was caused by recurrence of an attack of pancreatic necrosis. In reviewing a series of thirty-two cases of pancreatic necrosis from the records of St. Luke's Hospital, there were four cases of proven cyst of the pancreas, together with a few cases which were diagnosed as pancreatic cyst on the medical side but were not operated on and therefore were not included in this series. One of these cases, which had been under the care of Dr. Frank S. Mathews, six years after an operation for acute pancreatic necrosis, had three attacks of pancreatic cyst. The patient was operated on for the first and third attacks of cyst formation and the cyst drained. At the time of the second attack, the cyst subsided spontaneously. It is now several years since the last recurrence and he has had no further symptoms. The rapidity with which these cysts may form is illustrated by another case which was operated on for an acute pancreatic necrosis and in whom no lesion was found except a moderate amount of swelling and thickening of the pancreas and some fat necrosis. This patient was closed without any operative procedure on the pancreas or biliary system and three weeks later developed a cyst containing almost a quart of fluid. This is contrary to what is usually stated, that cysts

in the pancreas do not form until several months or even longer after traumatism or injury to the pancreas. One patient was readmitted four years after an operation for acute pancreatic necrosis and the X-ray showed what was apparently a calcified cyst of the pancreas about 2.5 cm. in diameter. Another developed a cyst two years subsequent to a cholecystectomy for acute cholecystitis.

We know that more or less severe attacks of pancreatic necrosis result in recovery without operation. This is proven by finding a new, severe



FIG. 1.—(Case I.) Showing distention of veins of neck and chest.

pancreatic lesion where the result of an old lesion, from which the patient has recovered, is present in the pancreas. Therefore, it is at least fair to assume that this probably was the cause of recurrence in Doctor Owen's case, especially as the two cysts involved quite different areas in the pancreas.

#### MEDIASTINAL TUMORS

DR. HUBLEY R. OWEN presented the following patients:

CASE I.—H. B., fireman, first reported April 10, 1922. Chief complaint.—Enlargement of veins in neck (Fig. 1) and nervousness. The patient stated that he first noted fullness in neck one year ago. He showed a moderate degree of exophthalmos. He was admitted to Jefferson Hospital in the serv-

ice of Dr. Hobart A. Hare, May 3, 1922, complaining of palpitation, nervousness and insomnia, pleurodynia and cough. Stellwag's sign was positive. X-ray showed slight widening of the upper mediastinal shadows suggestive of an enlargement of the thyroid downward. There was a mass of considerable size in the hilus on the right side which was believed to be enlarged glands although the possibility of new growth was mentioned. The laboratory examinations were all essentially negative. He was transferred to the Philadelphia General Hospital under the care of Dr. Morris Piersol with a tenta-

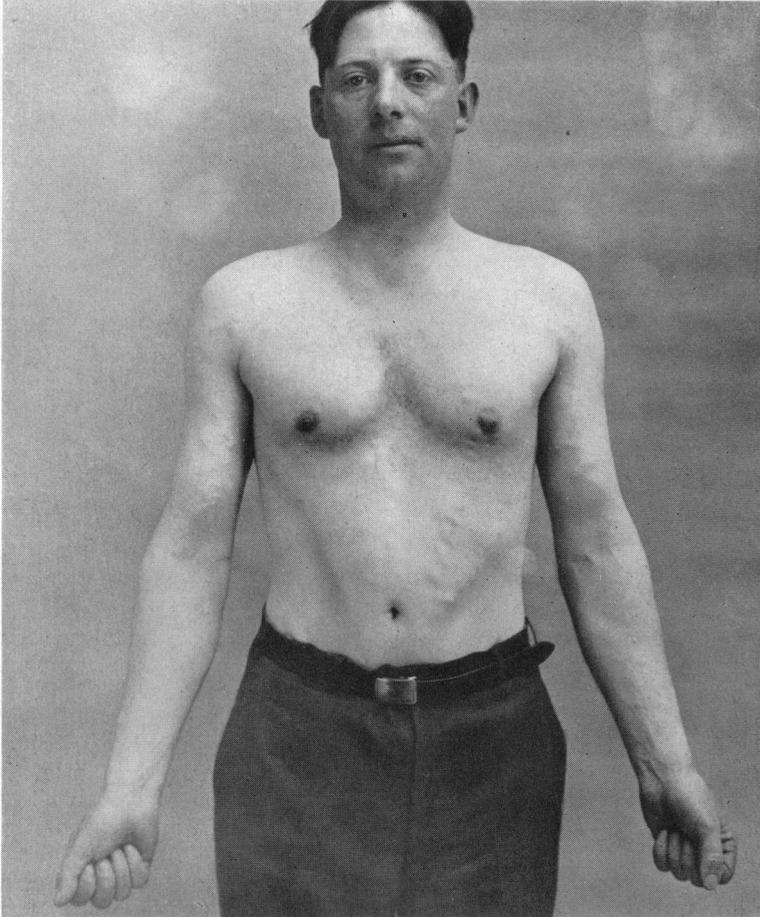


FIG. 2.—(Case II.) Showing distention of veins of chest, arms and abdomen.

tive diagnosis of lymphosarcoma of a mediastinal gland or glands about the hilus. Coley's fluid was employed but the reaction was so severe that it was discontinued. X-ray at the Philadelphia General Hospital Aug. 23 showed no evidence of substernal goiter. On the left side the hilum glands were enlarged. On the right side there was a rectangular shadow measuring 7 by 2.5 cm. Sept. 12, an enlarged gland was visualized in the left hilum. The entire right upper lobe showed an increase in density but the mottling did not resemble tuberculosis. It was thought to be a malignancy springing from one of the main bronchi.

X-ray treatment was given by Dr. Willis Manges once a month for one year. Bronchoscopic examination by Dr. Louis Clerf at Jefferson Hospital Nov. 30, 1925, showed fixation on the right side of the trachea at the orifice of the right main bronchus. Bleeding was present apparently coming from an erosion on the carina and in the trachea. March 27, 1930, Dr. Willis Manges reported that there had been no increase in the size of the growth. It was believed that there remained only fibrous tissue and no treatment advised.

CASE II.—T. F., patrolman, first appeared for treatment April 13, 1932. Chief complaint, "hoarseness, swelling of the neck." The tentative diagnosis was substernal goiter. He refused hospital treatment. The basal metabolic rate was plus 13. There was marked enlargement of the veins of chest and arms and swelling in the suprasternal and supraclavicular spaces. The blood Wassermann was negative. Hæmoglobin, 85 per cent.; erythrocytes, 4,859,000; leucocytes, 6,000. Patient continued on duty and remained under the care of his family physician until Oct. 16, when he was admitted to the Philadelphia General Hospital. The symptoms at that time were hoarseness, blood-tinged sputum and swelling of the neck. Prominence in the tissues of his neck was said to be of one year's duration. Hoarseness had been noticed for four or five months, during which time he also complained of throbbing headache aggravated by lying down and relieved when sitting up. He had lost twelve pounds in the past eight months. Previous medical history and family history, negative.

*Examination.*—Color is more florid than normal, particularly the ears with more cyanosis on lowering head. Seems to have a facial atony with weakness on left side. Neck.—Definitely full, particularly on left side. Arms.—Marked dilatation of superficial veins of both arms. Hands.—Cold, sweaty, cyanotic, with rapid paling of upper extremities upon elevation of hands. Marked telangiectasia of whole lower chest. No tracheal tug.

On standing has marked collateral communication with inferior vena cava. (Fig. 2.) Sweat pouring down both arms and axillæ. Posteriorly, cyanosis of neck, shoulders and both arms; beginning telangiectasia in back; very little if any collateral circulation; retraction of eleventh and twelfth intercostal spaces. Beginning cyanosis of lower extremities on standing and in course of five minutes shows definite venous collaterals in both legs, more in left than right. No varicoceles present.

The most striking phenomenon in physical findings posteriorly is the retraction in region of 11th and 12th intercostal spaces. Mass in left lumbar region suggests spleen. Very slight systolic retraction of chest-wall.

*Prone Position.*—Collateral circulation is more striking; cyanosis of face and ears; no marked dyspnoea in prone position; suggestion of dilatation of the pupils and increased hoarseness on lying down suggesting pressure on veins; no œdema is present. A definite hard mass can be felt in left neck deep down in sternocleidomastoid region.

*Comments.*—There is no question of superior vena cava obstruction. Whatever is causing the obstruction is involving the azygros and intercostal veins and is probably beginning to interfere with the inferior vena cava. *Blood-pressure.*—Prone position, left arm 122/72, Right arm 134/78; standing position, left arm 120/88, right arm 126/86. *Diagnosis.*—Sarcoma, lipoma, tuberculous glands and adhesive pericarditis are to be considered. An X-ray showed over upper mediastinum an irregular density which in the sagittal view is shown to be situated anteriorly. It is evidently an inflammatory process but its interpretation is indefinite. A second X-ray made two weeks later showed density still present but possibly less.

After several series of X-ray treatments Doctor Manges on May 23, 1933, reported a practically normal-looking radiograph of his chest. The enlargement in the mediastinum had almost entirely disappeared. There was also considerably less fullness in the neck than there was formerly.

CASE III.—C. M., roofer, admitted to the Woman's College Hospital in the service of Dr. J. Stewart Rodman with the chief complaint of growth on chest, severe pain in region of left arm radiating to left side of chest, pain left arm for past five months, pain in chest and arm intense, continuous and radiating to the left elbow, pain accentuated at night. Marked pain in chest over precordial area. In July, 1933, three months before admission, he had noticed "lump" just below the left sternoclavicular joint. This has increased in size. The appearance of this tumor was preceded by severe pain in that particular region. There was no shortness of breath on exertion nor oedema, no palpitation, cough, or hemoptysis. Has insomnia because of pain in arm and chest.

*Physical Examination.*—Pupils unequal. Right more dilated than left. Both react to light and accommodation. Ocular movements normal. Chest.—Well developed. On left side of sternum below sternoclavicular junction is a non-fluctuating, fixed and tender mass about 6 cm. in diameter. The heart and lungs were essentially negative. The blood Wassermann was negative and the blood count normal. X-ray showed a soft tissue mass the size of a lemon beneath the sternum and the left first and second ribs. This was not related to the bone and not connected with the aorta. Operation advised but refused. He was discharged but readmitted Nov. 22, 1933, with pain over the entire left chest, shoulder and left arm. The tumor had not grown but the patient stated localized pain was over a greater area than before.

At operation, Nov. 27, a large soft mass presented itself between the first and second rib. This mass was apparently situated in the mediastinum and had penetrated through the intercostal space. The second and third ribs were detached from the sternum and the flap turned outward. The tumor was then seen to extend into the mediastinum apparently not penetrating the left pleural cavity. A small piece of tumor was removed for biopsy and the wound closed with drainage. The pathologic diagnosis was carcinoma evidently arising in the thymus.

X-ray treatment was instituted.

The three above reported cases show three different pathologic entities with involvement of the mediastinum:—First, bronchogenic carcinoma; second, probable Hodgkin's disease involving glands of the mediastinum; third, carcinoma of the thymus.

DR. W. F. MANGES (by invitation) said that this patient came at a time when he was deeply interested in primary carcinoma of the bronchus, and although he had no definite confirmation, he assumed that this was the diagnosis and that he had a rather slowly growing tumor, for the symptoms had existed for a considerable length of time, but were definitely increasing. The degree of dyspnoea when he first saw the patient was alarming.

X-ray treatment was begun over both sides of the chest anteriorly with rays generated at 140 kilovolts and approximately erythema doses over each side of the chest were given at monthly intervals for about five months. At the end of this time he showed quite definite clinical improvement but relatively little change in the appearance of the mass. Being satisfied with the

clinical improvement, treatment was discontinued. He believed that the character of the growth had changed to some extent and that it was perhaps largely converted into fibrous tissue as the result of the radiation.

A few years later there was hemoptysis and some slight recurrence of the dyspnoea. A bronchoscopic examination failed to reveal any evidence of growth in the lumen of any of the accessible bronchi. A series of treatments was then given front and back with high voltage therapy which controlled the bleeding and also the symptoms. The mass still remains in the chest, only slightly smaller than it was originally.

DR. GEORGE J. HEUER (New York) thought that the first case with the mass in the mediastinum extending into the thorax, more on the right than the left, is questionable so far as the diagnosis is concerned. It may be a carcinoma arising in the thymic region. It may be a primary carcinoma of the mediastinum. Autopsy and pathologic studies would indicate the likelihood of these two varieties of carcinoma but it is difficult to say which it is. The second case, in its reaction to X-ray therapy, would certainly suggest that it is one of the conditions of the mediastinum which react favorably and these are principally lymphosarcoma and Hodgkin's disease. The third case is identified by pathologic examination.

Some years ago the speaker had occasion to look up the tumors of the thymus reported. The pathologists divided them into thymoma (lymphosarcoma), carcinoma and sarcoma. This case is among the rare tumors of the thymus. So far as surgery is concerned it has as yet offered nothing very remarkable in the treatment of any of the tumors presented. In going over the literature he failed to find a case of malignant tumor of the thymus which has been successfully removed by surgery; nor had he found any cases of primary carcinoma of the mediastinum or of Hodgkin's disease which have been successfully operated upon. The treatment we must use is that which has been carried out in these cases, namely X-ray therapy, in the hope that one may either keep the growth from increasing in size or actually cause it to disappear as it undoubtedly does in some of these tumors.

The particular group of tumors demonstrated today forms the less favorable group from the standpoint of surgery. The mediastinum harbors many benign tumors and he had seen more benign tumors than malignant ones. He now had a fairly large series of these tumors and they lend themselves to surgical removal. There is a great distinction in the X-ray aspects of mediastinal tumors, so distinct that he can almost predict the malignant or the benign by the shadow cast by the lesion. Whenever one finds a perfectly circumscribed shadow in the mediastinum without any processes going out from it, one can say it is cast by a benign tumor which is amenable to surgery. If the shadows are not circumscribed, but diffuse, in the large proportion of cases they are cast by tumors not amenable to surgery and should be treated by X-ray therapy.

DR. HOWARD LILIENTHAL (New York) said that all cases of mediastinal growth are of interest to the thoracic surgeon whether for diagnostic opera-

tion or for removal. Of course the cases which Doctor Owen presented are apparently not suitable for radical procedures. He has found that in any case for diagnostic purposes an incision either posteriorly or anteriorly according to location of the tumor down to the ribs will permit the removal of a specimen with the aid of a cylindrical punch (Mixer's is his favorite one). If this is not feasible he would recommend a small exploratory operation with the removal of a specimen under visual guidance.

The disappearance of a large mass in a case of Hodgkin's disease under röntgenologic treatment is gratifying but of course this does not promise permanent relief. In these cases as well as in softer variety of sarcoma, no matter how malignant they may be according to the pathologist, Coley's mixed toxins should be tried. This is not the place nor is there time to discuss the matter as it deserves, but the method should be tried. I may say, however, that the action of the streptococcus and prodigious toxins is not merely that of a non-specific protein and he also called attention to the important fact that the toxins act upon the entire organism including possible undiscoverable metastases while röntgenologic therapy or radium have local effects only.

Some day he hoped to present a report of a series of cases which he had treated, many with complete success. One of his most striking ones was reported in the ANNALS OF SURGERY for January, 1925, vol. 81. The patient is well after ten years.

#### ARTHROPLASTY OF ELBOW

DR. HENRY P. BROWN, JR. (Philadelphia), presented a patient who illustrated the fact that fortunately the extent of restoration of function of a damaged elbow-joint is not always dependent upon the degree of accuracy of anatomic restoration.

CASE REPORT.—Jan. 13, 1931, the patient, sixteen years of age, was admitted to Doctor Packard's service at the Pennsylvania Hospital with a diagnosis of left mastoiditis from which, at operation three days later, was obtained a pure culture of *Streptococcus hemolyticus*. Two days after draining her mastoid, she showed symptoms of meningitis and lumbar puncture revealed cloudy spinal fluid under increased pressure. A blood culture at this time showed *Streptococcus hemolyticus*.

Feb. 7 her left elbow became swollen and tender and on Feb. 9 the joint was drained, a culture revealing the same organism. On Feb. 16 from an abscess over the left ankle-joint the streptococcus was again obtained. She had quite a stormy convalescence, it being necessary to make multiple incisions about the elbow and upper forearm and ankle for drainage. She was discharged on April 21 with her elbow ankylosed in about 150 degrees of extension and three-fourths supination.

Jan. 4, 1932, she was admitted to Doctor Mitchell's service for arthroplasty of the ankylosed elbow. At this time examination revealed complete ankylosis between the humerus and ulna and the radius and ulna (Fig. 3).

The region of the joint was exposed through a posterior longitudinal incision and the joint found to be as shown in the X-ray, there being no evidence of joint outline. After displacing the ulnar nerve from behind

the condyle, the olecranon was drilled at approximately its junction with the shaft of the ulna and divided with a Gigli saw. By means of a gouge and chisel, the ulna was then freed from the humerus and sufficient bone removed from the lower end of the humerus (about 2 cm.) to allow of free motion at the elbow.

The head of the radius was then chiseled free from its fusion with the ulna and removed. A drill hole was made in the upper end of the ulna and the olecranon, and these two segments united with No. 3 chromic catgut. A pedicle flap of adjacent fat and fascia was sutured between the humerus and ulna and the wound closed. Primary union was obtained and a smear

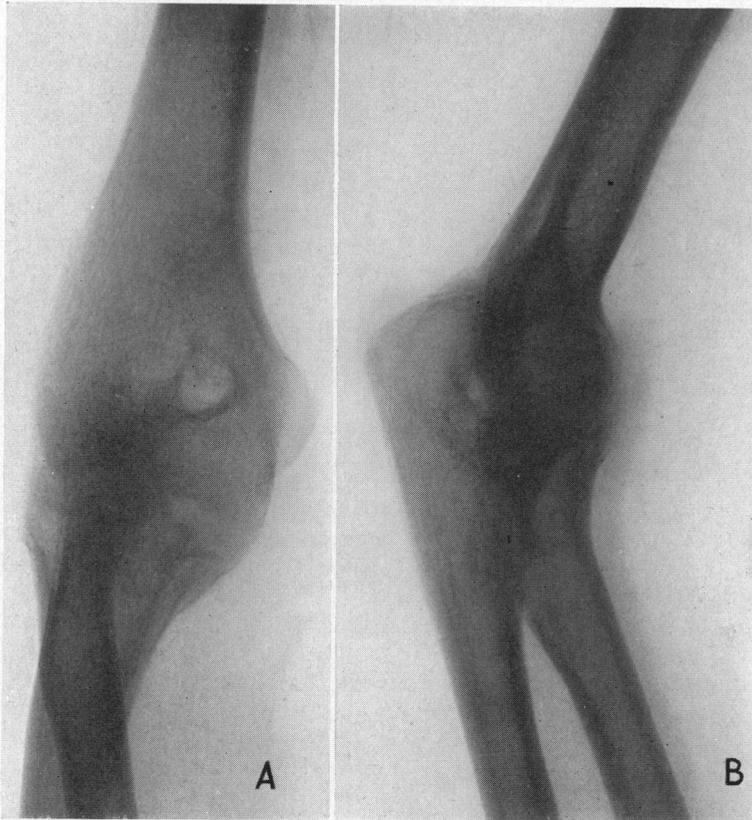


FIG. 3.—Showing the complete ankylosis between the humerus, ulna and radius.

taken from the operative field was sterile. She was discharged on Jan. 27, two weeks after operation, her arm being in a plaster case. The progress of the joint was followed by numerous X-rays and Figs. 4 and 5 show her condition at the present time.

As you may observe, she has complete flexion and extension of the elbow and there is no limitation of pro- and supination. In relaxation there are about 50 degrees of lateral motion at the elbow (Fig. 4A), which entirely disappears upon muscular contraction. Examination of film 5B reveals the cause of limitation of extension of the forearm against gravity.

The divided olecranon has fused with the lower end of the humerus and a new joint has been formed between the olecranon and the upper end of the

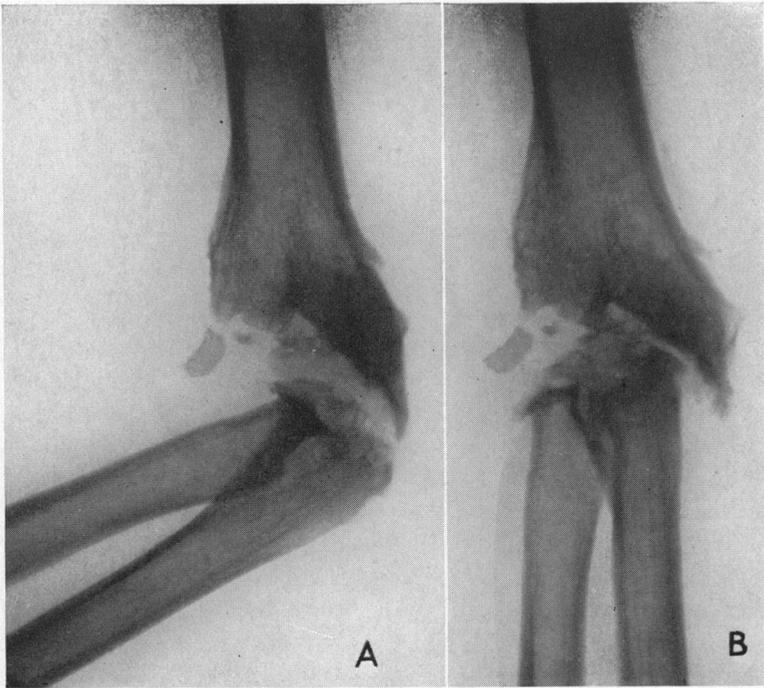


FIG. 4.—(A) Showing amount of lateral motion. (B) Alignment on extension.

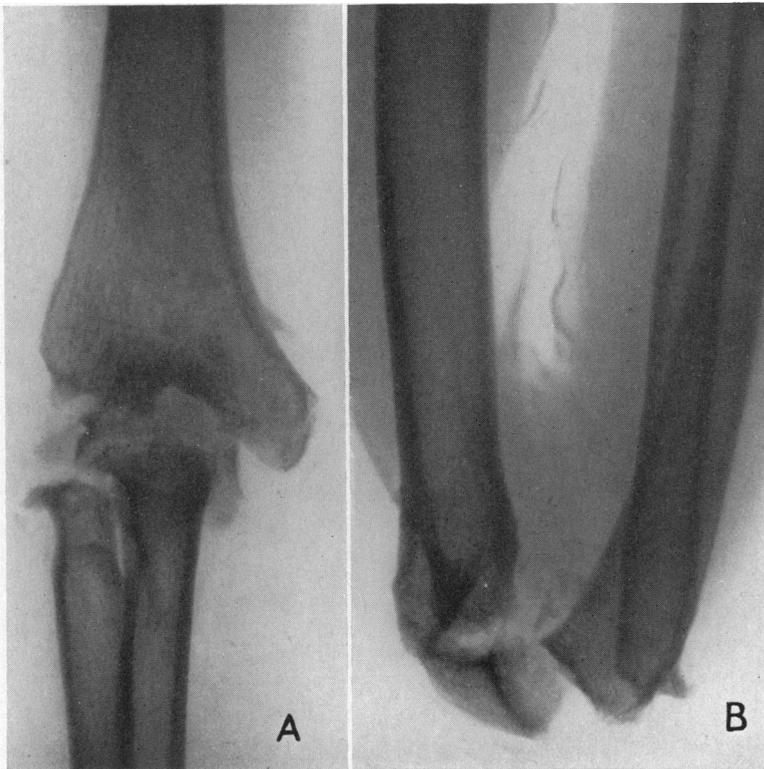


FIG. 5.—(A) Later result of joint restoration, in extension. (B) Showing fusion of the divided olecranon with humerus, therefore allowing no fulcrum to permit of extension.

ulna, at the point at which the olecranon was divided. There is obviously no fulcrum to permit of extension, and hence the triceps action has practically disappeared. The patient states that she suffers but slight inconvenience from her inability to extend the forearm against gravity, and while the muscular movements at the elbow are somewhat weaker than normal, she feels that she has a useful elbow-joint, uses it accordingly and expresses herself as being quite pleased with the result.

#### CHRONIC SUBDURAL HEMATOMA

DR. CHARLES H. FRAZIER (Philadelphia) read a paper with the above title for which see p. 671.

DR. BYRON STOOKEY (New York) remarked that Doctor Frazier had presented a subject very important to the general as well as the neurologic surgeon. He has presented a group of cases which are difficult to diagnose, difficult to localize and difficult to operate upon. The clinical history is most often confused with that of brain tumor or an abscess and the preoperative diagnosis is not often made even by the neurologist. The reason lies in the pathology. In the first place the hemorrhage over the surface is part clot and part fluid and the pressure upon the brain is, therefore, a soft pressure on the side of the lesion and a counter pressure of the brain from the opposite side against the inner table and a resistant area. Therefore the appearance of signs indicating the lesion of the opposite hemisphere. Doctor Frazier has referred to the latent interval. This is difficult to explain. Gardener has pointed out that possibly there is a difference in osmotic pressure. Subdural hemorrhage is entirely outside of the arachnoid. The brain is depressed and the arachnoid is not destroyed and histologically the arachnoid puts out a tissue reaction and this forms a definite membrane which Gardener thought allowed for the difference in osmotic pressure. He believed that fluid was soaked into this membrane and sac lying upon the arachnoid and accounted for the latent period and the appearance of rather sudden symptoms. While it is not certain that Gardener's view will hold, nevertheless in these cases the latent period is an outstanding clinical characteristic. It is very seldom one gets a history of trauma except after painstaking inquiry. The patient might not remember, but when a lesion is found at operation the patient will say, "Yes, I do remember a slight blow." It is a blow on the occipit or frontal area which is likely to produce the hemorrhage. Trotter in 1914 called attention to this lesion and explained that the rupture was due to the back and forth movement of the brain. It was his idea that the fall was back and forth, with a rupture of the veins as they enter the longitudinal sinus.

Regarding operative procedures the speaker agreed with Doctor Frazier that the operation of choice was the bilateral or unilateral trephine openings rather than a large osteoplastic flap. Even with very large flaps it is often impossible to remove the clot as completely as it can be done by washing out between trephine openings. Another point in favor of the trephine is that it is applicable to bilateral lesions whereas it is practically impossible for

the patient to survive after making bilateral osteoplastic flaps. The great majority of these patients are received in serious condition. The speaker had no explanation to offer for the sudden change from a relatively fair condition to an extremely bad condition which so often is encountered.

DOCTOR FRAZIER advocated bilateral perforation as the ideal surgical method. Only by this method may a latent hematoma on the contralateral side be discovered. There is, of course, one fundamental objection to this program in that we cannot remove the adventitious membrane which lines the dural membrane. This may be said to be a theoretical rather than a practical objection, since we have as yet seen neither any recurrence nor any sequelæ by the plan which we have advocated. Theoretically, with regard to the pathogenesis, if we follow the teachings of Virchow, there are two types, the inflammatory and traumatic. Speaking only from his own experience in the four cases, in which unquestionably trauma was a factor, the pathologic process was alike in each.

#### PERFORATION IN ACUTE CHOLECYSTITIS

DR. ELDRIDGE L. ELIASON read a paper with the above title for which see *ANNALS OF SURGERY*, vol. 99, No. 6, pp. 914-921, 1934.

DR. CHARLES GORDON HEYD (New York), said that in 489 cases of gallbladder disease that demanded surgery, perforation of the gallbladder was found on six occasions. The pathologic changes were widespread. The diagnosis of gallbladder disease was made in all and there was a history of gallbladder disease in all of them. Three of the patients were male and three female and in the group of six there was one death. In regard to the technical procedures in cases of perforation of the gallbladder it has been his policy to bisect the gallbladder from the fundus to the cystic duct and to do an enucleation or evisceration of the mucous membrane. Usually this procedure is very readily performed and after the mucous membrane of the gallbladder has been entirely removed a rubber tube is inserted well down toward the cystic duct and the gallbladder closed by a continuous suture of No. 2 chromic catgut, the final appearance being that of a simple cholecystostomy. One of the six cases had to be re-operated within three months for an abscess which contained a calculus.

Perforation of the gallbladder in acute cholecystitis occurs much more frequently than has probably been recorded. This is apparent for in looking over his cases he found not infrequently a note that "upon separating the omentum from the gallbladder there was a small defect with the extravasation of bile or purulent material." The speaker was in accord with the general principles of Doctor Eliason's paper; however, he had never done cholecystectomy in these cases. He believed that the dissection necessary for cholecystectomy in an acutely inflamed zone of tissue is a dangerous procedure. Drainage of the gallbladder alone in these cases would require secondary operations, and the retention of an infected mucous membrane or

occasionally a gangrenous mucous membrane is an additional factor making for mortality. This mortality factor brings up a very important consideration which was illustrated by the presentation of three slides. These slides represented a portion of the liver removed in a case of acute gangrenous cholecystitis. They indicated that the infection of the liver was progressive and ascending as evidenced by the dense coagula in the intrahepatic bile radicles and furthermore in the most minute bile canaliculi polymorphonuclear leucocytes can be readily determined. It is fair to assume that in every serious infection of the gallbladder, perforated or otherwise, there is very apt to be a concomitant liver infection.

#### LEIOMYOMA OF THE SMALL INTESTINE

DR. EDWARD KLOPP (Philadelphia) read a paper with the above title for which see p. 726.