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

ANNUAL CONJOINT MEETING HELD FEBRUARY 13, 1930 AT PHILADELPHIA

Dr. George P. Muller, President of the Philadelphia Academy of Surgery in the Chair

Calvin M. Smyth, Jr., M.D., Recorder

COAGULATION OF BLOOD

Dr. Isidor S. Ravdin, of Philadelphia, read a paper entitled

THE COMPARATIVE VALUES OF CALCIUM AND GLUCOSE AS AGENTS FOR DECREASING THE CLOTTING TIME OF BLOOD

for which see page 801

Dr. Frederick W. Bancroft, of New York City, remarked that at the Fifth Avenue Hospital in New York for the last three years they have been making studies of thrombosis and embolism with the idea of learning something about these conditions.

It was found that the bleeders could be divided into two groups: those definitely hæmophiliac with a low blood platelet count; and others with nutritional bleeding. It was found that the ordinary clotting time did not give a true index of the patient's bleeding reaction. Nutritional bleeders, on a high protein diet, regain their normal factors and become satisfactory operative risks. A number of tonsillectomies were referred for bleeding, and after placing them on a high protein diet, particularly liver, pancreas, brain, etc., it was possible to reduce the clotting time. Another type was the case of uterine bleeding without obvious pathological lesion—patients who had been curetted numerous times and in whom the bleeding still continued. When placed on a high protein diet the uterine bleeding ceased, but when the diet was not followed it started again. As it is extremely difficult to place post-operative patients on a suitable bleeding or clotting diet Doctor Bancroft has been experimenting to determine what drugs might influence this condition. In dogs he has found that the administration of glycocholate will definitely improve the clotting factors and shorten the bleeding time. In a study of patients suffering from thrombosis and embolism (the opposite pole of the bleeding problem) he finds that thrombosis and embolism are rare following operation in parts of the body where there is no active motion. For instance, in skull operations, even though the operation occurs in a vascular area, post-operative pulmonary complications are exceedingly rare. In operations on the abdomen, where post-operatively there is extreme motion due to vomiting and distention and where there is a great deal of subcutaneous fat, thrombosis and embolism are frequent. It occurred to the speaker that the fat might have something to do with the production of

embolism. By injecting an emulsion of fat into dogs, he found a tremendous increase in clotting factors. He has wondered whether emulsion of fat that occurs due to operative trauma may not be a factor in the causation of thrombosis and embolism.

Glucose in the concentrations given for post-operative shock have been the basis of study by Doctor Rosenthal, of Mt. Sinai Hospital. He has not found any change in the bleeding or clotting time following this procedure. In dogs they have carefully tested the clotting factors following intravenous glucose in concentrations of 5 and 10 per cent. without any noticeable change. Doctor Bancroft believes with Doctor Hunt, of the Otolaryngeal Service at the Fifth Avenue Hospital, that the bleeding and clotting time is not a true indication of a patient's bleeding susceptibility.

BONE METASTASIS IN CANCER OF THE BREAST

Dr. John Berton Carnett, of Philadelphia, read a paper with the above title for which we see page 811.

Dr. Burton J. Lee, of New York City, remarked that recently a survey was made, at the Memorial Hospital in New York, of 100 cases of carcinoma of the breast with metastasis to the osseous system. Fourteen of these patients had an involvement of the humerus, upper portion of the sternum or clavicle. Further study of these fourteen cases revealed that but three showed metastasis to one or more of these bones on the same side as the lesion of the breast, while in eleven of the patients the cancer of the breast was on the opposite side to the lesion or lesions in these bones. The lowermost axillary nodes connect with lymphatics down the arm to the vicinity of the nutrient foramen of the humerus so that any invasion of the humerus above this point might be accounted for by lymphatic extension.

Lymphatic permeation to bone from carcinoma of the breast would appear a probable method of extension if the most reasonable line of lymphatic permeation is found in the majority of cases, a finding not in accord with our study of these fourteen cases. Upon the other hand, he recalled a patient with a large mass of metastatic supraclavicular nodes who developed, at the end of two years, a definite extension to the clavicle immediately adjacent to the invaded nodes. In this case one had a clear demonstration of an extension by lymphatic permeation from the nodes directly into bone.

Lymphatic extension to bone in cases of mammary cancer does occur but Doctor Lee does not feel that it will be found with as great regularity as Doctor Carnett's paper would lead one to believe.

Dr. George Semken, of New York City, said that it is highly improbable that the bony metastases that occur in cases of cancer of the breast can be ascribed to permeation via the lymphatic channels, mainly because of the absence of any demonstrable lymphatic connection of this type. It seems more logical to ascribe these metastases to emboli of cancer cells, carried to the bones in the blood-stream. This mechanism was conclusively demonstrated by M. B. Schmidt in his monograph upon the methods of dissemina-

tion of cancer ("Die Verbreitungswege der Karzinome," etc., Jena, 1903), the significant finding in which was the frequent and widespread occurrence of such cancer emboli in the small arteries of the lung parenchyma.

The apparent predilection of cancer metastases for sites within the substance of the bones may be explained by the relative quiescence of those regions. Cancer metastases are rarely found in the skeletal muscles, which are in active motion. It is possible, thus, that Doctor Carnett's observation of a low incidence of cancer metastases below the knees and below the elbows may be explained by the increased range and activity of motion in the legs and feet and in the forearms and hands as against those of the thighs and arms respectively.

Doctor Carnett's finding of an apparent tendency of the metastases from cancers of the breast to invade the neighboring bones—the clavicle, humerus and the ribs—before appearing in the os innominatum, femur and other distant bones, is not in agreement with the speaker's experience. The bone sites most frequently involved in metastasis, that have come under his observation, have been the vertebræ and, next in order, the os innominatum and the upper femur. The vertebræ, in some instances, seemed to be the only bones so attacked.

The subject of cancer emboli, transmitted via the blood-stream has received little consideration, but deserves the greatest emphasis, and should be ever present in the minds of all who palpate the cancerous breast to establish the diagnosis, and who handle the breast and its related tissues during the course of the radical operation. Breast cancer advances not alone along the lymph-spaces into the lymphatic vessels, but it regularly invades the veins also, filling their lumen to a greater or less extent with cancer thrombi. It does not require much force to dislodge these thrombi and to send the cancer emboli into the blood-stream. Many of these cells fail to survive, especially if enclosed in a blood clot, but others remain unenclosed or grow through the clot and the distant metastases are the result. The finding of such cancer thrombi in the cancerous breasts removed by operation is so frequent an occurrence that the pathologist's report of such findings no longer excites any comment—except the doubt that thus arises as to the ultimate prognosis. It has been fairly well understood that the cancerous breast should be examined gently; but too many still disregard this caution in a wholly unnecessary attempt to determine the consistency of the tumor by firm pressure especially between the thumb and fingers. Equally important and probably deserving of greater emphasis, is the need to handle the breast with the greatest gentleness during its removal, even at the expense of technical inconvenience. He was firmly convinced that many metastases have had their start in the injudicious pressure or traction exerted by the surgeon or his assistants during these operations, as well as during the course of the clinical examinations.

Dr. John B. Carnett, in closing the discussion on his paper, said that the last case came to autopsy and the bone showed cancer. It might be a combination of the two, but whether or not Paget's disease was present he

does not know, but he does know that one gets this picture uniformly in metastasis to bone. The speaker was not able in the short time at his disposal to go into the various reasons for believing that this is permeation rather than blood-stream metastasis. In the case of breast cancer one can predict with comparative certainty what it is likely to do. One is sure that it will not show up first below the knee or below the elbow in the great majority of cases. This one case with advanced disease below the knee is unique in Carnett's experience. If one sees destruction of the femur other evidences of permeation are seen in between. In osteomyelitis the blood-borne infection to the tibia is common; if that is true one would expect the same thing in blood-borne emboli. It happens almost never except in this case and one practically never finds disease below the elbow or below the knee, except that centrifugal spread from the shoulder down the length of the humerous and some of the femur before the disease passes over the joint. The reason that it appears in the tibia and radius before the extreme lower end of the femur or humerus is involved is because the cells go over the lymphatics in the soft tissues of the joint more rapidly than down through the bone.

OSTEITIS FIBROSA

Dr. Elridge L. Eliason, of Philadelphia, read a paper with the above title for which see page 833.

Dr. John Douglas, of New York City, remarked that this subject is of particular interest because there is so much confusion as to the various ideas of etiology and pathology. It is known that osteitis fibrosa occurs most frequently in children who are most apt to meet with trauma of various kinds and the lesions are most apt to occur where trauma is most frequent. It is sometimes difficult to link up the history of the trauma with the presence and size of the lesion. A history of severe trauma is sometimes so far back that it has no relation apparently to the lesion present. In other cases, trauma a short time before the appearance of the lesion may not have been the cause of the lesion but simply may have called attention of the patient to the lesion.

Of the three theories as to etiology and pathology which have been enumerated by Doctor Eliason, *viz.*, traumatism, infection, a type of new growth (some form of pathological lesion due to the formation of new tissue), there are evidences which make it difficult to controvert any of these theories, but the weakest is the etiologic factor of infection. It does not act like an infection. Cultures have been made and no organisms found and the curious way in which the lesion spreads after removal or heals after a fracture when nothing else is done does not resemble what one would expect in an infectious process or a neoplastic lesion.

Whether these various lesions are all progressive stages of one condition or whether the lesion starts as a definite pathological entity is hard to explain. In some cases a large number of giant cells are found and in others very few. The essential pathology according to Ewing is replacement of bone marrow

and the inner portion of the cortex by fibrous tissue. It may continue to grow as fibrous tissue; it may develop into a cyst. In some cases the fibrous tissue develops into some type of sarcoma and then a cyst develops in the sarcoma. The lesion spreads rapidly sometimes, and sometimes slowly. The differential diagnosis between benign and malignant conditions, between osteitis fibrosa and other forms of lesion in the bone is difficult. But the peculiar trabeculation of the bone as shown by the X-ray in these cases is characteristic.

DOCTOR DOUGLAS then showed lantern slides illustrating the progress in nine cases of this disease which he has had under his care.

DR. FENWICK BEEKMAN, of New York City, said that he had seen but five cases which he could positively say were osteitis fibrosa cystica. Two of these were seen with Doctor Bancroft, on his service, at the Lincoln Hospital. Only two of the patients were operated upon. In four of the five cases, which came under his observation, the patients did not know they had this condition until they sustained a pathological fracture. The diagnosis is difficult. In July, 1914, Barrie, in *Surgery, Gynecology and Obstetrics,* discussed a condition which he called chronic hæmorrhagic osteomyelitis. His description of this condition was similar to that of the so-called giant-cell sarcoma of bone, the microscopic pictures showing the typical histology of a giant-cell tumor. Doctor Eliason's third case impressed the speaker as one of a hæmorrhagic tumor of the bone. Again, he observed a patient some years ago who had a mass in the lower end of the radius, the röntgenogram showing a picture similar to that of one of the cases presented by Doctor Douglas; this later was proved to be syphilis. Bloodgood believes that most of these lesions of osteitis fibrosa cystica are only discovered following a pathological fracture. He also states that the condition will heal by itself, the child growing out of it. In the first case mentioned by Doctor Beekman, he curetted the bony cavity to remove the membrane and followed this with cauterization by carbolic acid. This patient was followed for one and a half years and the condition of the child showed improvement. The second individual had an involvement of the upper end of the femur; the cavity was curetted and a flap of muscle turned into it. During the period in which this patient was observed, one and a half to two years following operation, the condition improved materially, new bone being formed within the cavity. In the three other patients, no operative procedure was undertaken—one of them was lost track of and the other two showed decided improvement over a period of two and a half years.

TRAUMATIC RUPTURE OF THE DIAPHRAGM

DR. HENRY P. BROWN, JR., of Philadelphia, presented a colored boy of nineteen years who was admitted to the Presbyterian Hospital after having been injured a short time previously in a motor accident in which he was thrown violently against the steering wheel of his truck. On admission he showed localized tenderness and some rigidity over the upper left quadrant of his abdomen and lower aspect of the left side of his chest. Examination revealed localized tenderness in the above area within

twenty-four hours. Physical signs of a left pneumothorax developed and an X-ray picture apparently confirmed the diagnosis. He progressed satisfactorily until about to be discharged two weeks later when another X-ray suggested herniation of the diaphragm, which was confirmed by gastro-intestinal X-ray.

On operation, the approach to the hernia being through the abdomen, it was found that there was a tear on the left side approximately eight centimetres in diameter extending laterally from the œsophagus. The fundus of the stomach, most of the transverse colon with the omentum, and some of the small intestine were found to be within the chest. Adhesions were present around the edges of the opening in the diaphragm, showing that the condition was of recent origin and not congenital in character. By grasping the edges of the opening with hæmostats, the negative pressure in the chest was overcome and the herniated viscera were reduced within the abdomen. The opening in the diaphragm was closed with interrupted sutures of chromic catgut, reinforced by a continuous layer of the same material. The abdomen was closed without difficulty.

The patient made a normal convalescence and gastro-intestinal studies made two months later revealed that there was no evidence of hernia. An X-ray picture taken eighteen hours after operation showed that the heart, which had been displaced to the right, had resumed its normal position, and there was no evidence of pneumothorax.

Dr. Howard Lilienthal, of New York City, remarked that there are different kinds of so-called hernia of the diaphragm: 1, a congenital absence of the diaphragm (not a hernia in the strict sense); 2, true hernia with peritoneal covering, whether traumatic or not; and 3, traumatic hernia with rupture of the diaphragm and no peritoneal sac. This last is the type which Doctor Brown presented and in which he got such a splendid result.

The speaker feels very humble and can forgive anyone who mistakes a thoracic stomach for a pneumothorax. He has even gone further and has put a needle into such a stomach, thinking it was a pneumothorax. Fortunately, he did not aspirate anything but air. It was a traumatic case. The patient had "indigestion." He was given a test meal and found the same condition as shown here. At operation it was found that he had broken several ribs, one of which had perforated the diaphragm and produced the hernia. Doctor Lilienthal went in between the ribs and was able in spite of the adhesions present to reduce the hernia and even to sew up the hole in the diaphragm except for an area about the size of half a dollar. The assistant at the operation, Doctor Neuhof, suggested that he take a piece of fascia lata and transplant it, which was done with a perfect result. After several cases of hernia of the diaphragm, the speaker is a firm believer in the transthoracic approach rather than the transperitoneal, for a number of reasons. First, the exposure of the parts is perfect and if any adhesions are present one can find them and do away with them. If the hernia is drawn upon from below and there are adhesions in the chest, one must stop the operation or go in from above anyway. One can deal much better with the hole in the diaphragm when it is in plain sight. Another reason is that there is easy access to the phrenic nerve where it passes across the pericardium; by giving it a pinch, the diaphragm will remain still while you are working on it. Even if permanent paralysis of the diaphragm occurs, the

patient is better off than with a diaphragmatic hernia. Lastly, it is necessary to know that one is not dealing with congenital absence of the diaphragm. He saw one case in which Doctor Lewald, the röntgenologist, was able to diagnose the absence of the diaphragm. The patient, by the way, was a runner.

As to age for operation, Ralph Boerne Bettman, of Chicago, reported a case operated upon by him at the age of three and one-half months for strangulation. He approached through the thorax and did a fine operation, reducing the hernia before he found that he was not able to close the hole in the diaphragm. He cut two ribs and then did not have the slightest trouble in sewing up the diaphragm. This shows how a resourceful surgeon can get around what looks like an insuperable condition.

The speaker thinks that diaphragmatic hernia is much more common than is usually thought to be the case. When a child's digestive system is decidedly disturbed, we owe it to the patient to give it the same chance we would an adult, and to make an X-ray study of the chest, with contrast meal if necessary.

As to the age for operation, what he would prefer to do and what the attending physician would let him do are two different matters. The operative procedure is looked upon by most physicians as a very dangerous one; although it is not nearly so dangerous as to wait until strangulation complicates the case. In the *British Medical Journal* there appeared an article by a Russian surgeon who believes that prolapse of the intestine through the hiatus œsophagis is much more common than we believe, and thinks some of the herniæ in children begin in that way. If there are no symptoms, it might alter his opinion as to when to operate, but usually there are symptoms, and the X-ray examination discovers the presence of the hernia, in which case he thinks it is better to operate early and avoid the dangers of acute strangulation.

FRACTURES OF THE MANDIBLE

Drs. Robert H. Ivy and (by invitation) Lawrence Curtis, of Philadelphia, presented cases of fracture of the lower jaw undergoing treatment. Doctor Ivy remarked that in the average textbook on surgery, under fractures of the mandible, considerable space is given to obsolete methods and little to practical modern treatment. Various types of more or less complicated splints are shown, without specific instructions as to their use, except that they can be made by a dentist. But definite practical information as to how to reduce and fix the fragments quickly and efficiently is usually lacking. Surgeons are being confronted with an increasing number of these injuries owing to a combination of rapid transportation and prohibition, and those skilled in making special appliances are seldom immediately available. Hence, it has been their endeavor to foster the employment of simple methods which can be applied readily in the majority of cases by any surgeon willing to give a little thought to the subject. These methods are not original with them, but are adaptations and modifications of those first introduced by Gilmer. He

did not deny that many cases without displacement will do well with a bandage alone, but these would do just as well without a bandage at all. But no head bandage can be put on sufficiently tightly to fix fragments which show a tendency to displacement, without strangling the patient. Instead of a

FIG. 1.

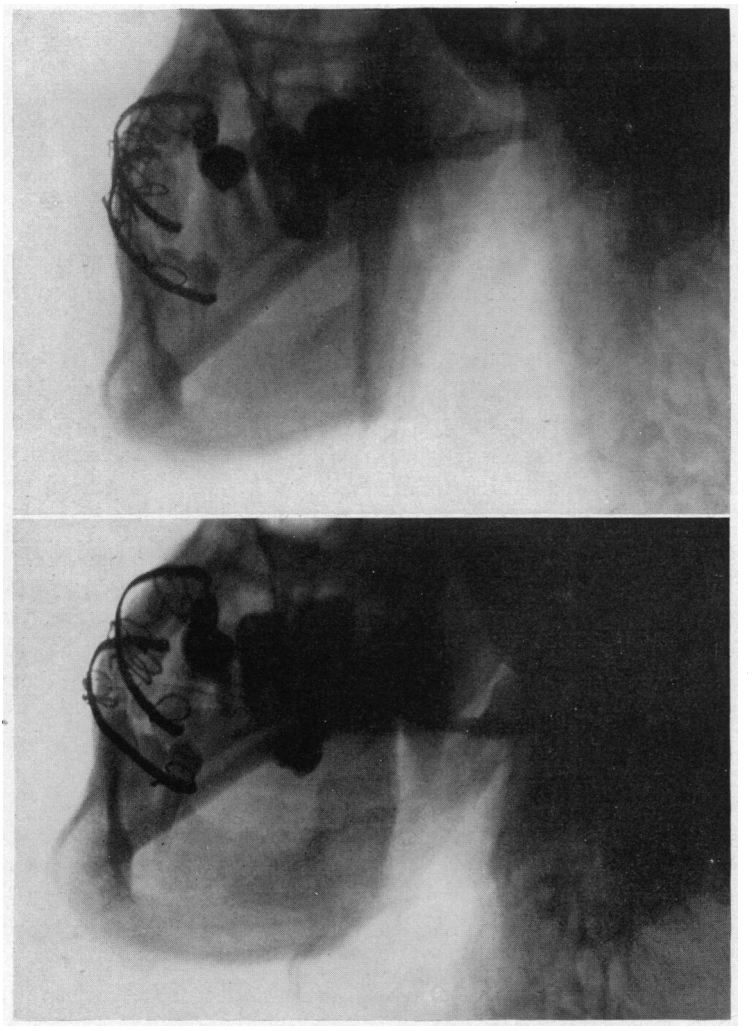

FIG. 2.

FIG. 1.—Radiograph showing ascending ramus and condyle dislocated forward and rotated at right angles. (Case I.)

FIG. 2.—Radiograph showing replacement of condyle and ascending ramus in normal position. (Case I.)

detailed description of the technic, which is to be found in previous publications, they presented three cases, now actually undergoing treatment:

CASE I.—A man, aged twenty-eight, in an automobile accident November 15, 1929, was struck on the left side of the head by the fender of a car. At the Lankenau

Hospital a deep wound was found beginning behind the left ear, and passing downward over the ascending ramus of the mandible to the neck. The parotid gland and facial nerve branches were severed, and there was a fracture of the mandible at the angle, the ascending ramus and the condyle being dislocated forward and turned at right angles so that the posterior border faced toward the left (Fig. 1). First-aid treatment by Dr. Montgomery Deaver consisted in arrest of hæmorrhage, suture of the ear, and fixation of the lower teeth to the upper by means of brass wires to control the main fragment of the lower jaw. By November 30 the patient had recovered sufficiently to be transferred to the clinic for further treatment. The exposed bone of the ascending ramus had become almost entirely covered by granulation tissue, and practically no suppuration was present. There was almost complete left-sided facial paralysis. The main fragment of the mandible was in fairly good position. The wires on the teeth having worked somewhat loose, it was thought advisable to obtain firmer fixation by applying heavy half-round German silver arches to upper and lower teeth, and in

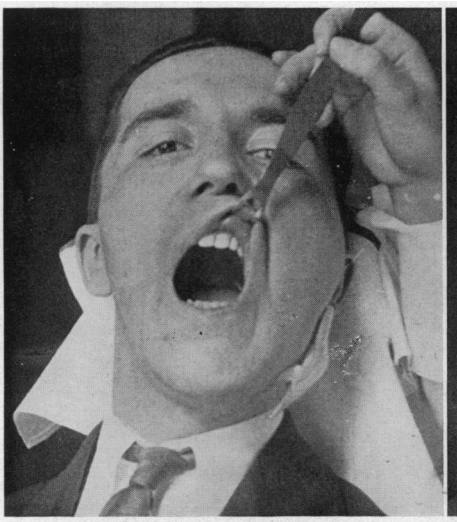

FIG. 3.—Normal opening of mouth after treatment. (Case I.)

FIG. 4.—Satisfactory occlusion of teeth after treatment. (Case I.)

turn connecting these with finer brass tie-wires. On December 12, at the Graduate Hospital, under ether, the external wound was enlarged, exposing the outer aspect of the displaced ramus and condyle fragment, care being taken not to completely sever the bone from all soft tissue connections. This fragment was then manipulated into correct position, the condyle being brought back to the glenoid fossa. The lower end was brought in contact with the main part of the mandible at the angle, but no attempt at direct fixation was made (Fig. 2). The attachment of the bone fragment to the soft tissues was so precarious that there was little hope of saving it. Healing over the exposed portion of the bone gradually took place with the exception of a small sequestrum near the angle, and on January 29, 1930, the external wound was almost closed. On this date, the connecting wires between the upper and lower teeth were cut and almost complete union between the fragments had taken place. There was good motion at the joint, the mouth opening being at least two-thirds normal (Fig. 3), and the occlusion of upper and lower teeth was satisfactory (Fig. 4). They believe there has been some improvement in the facial paralysis. They expect later to smooth out the depression left in the healing of the wound, and possibly raise the left side of the face by fascia lata strips.

CASE II.—A man, aged forty years, was referred by the University Hospital January 25, 1930, with history of being struck with a blackjack on left side of face four days before. Examination showed nearly all lower teeth to be present, but several upper teeth on left side missing. The lower teeth on the right side up to the mid-line came into good occlusion with the upper ones, but on the left side there was a downward displacement, so that the cutting edge of the left central incisor was at the level of the neck of the right central incisor. Attempts at closure of the teeth showed independent mobility of the two halves of the mandible. X-ray examination revealed a fracture through the symphysis with an angular turn toward the right before reaching the lower border. There was also a vertical fracture from the sigmoid notch down to the angle on the left side, with little or no displacement. Owing to absence of many teeth from the left upper jaw, the ordinary eyelet method of wiring was not suitable,

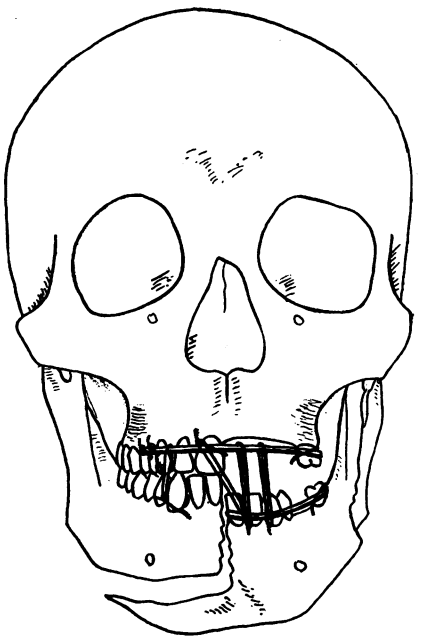

FIG. 5.—Gradual reduction of depressed left fragment by elastic bands. (Case II.)

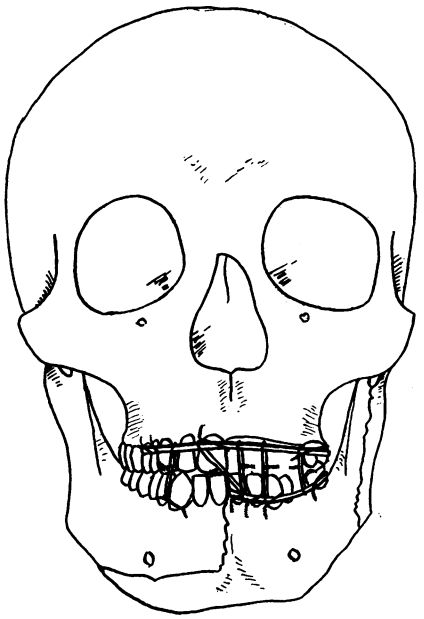

FIG. 6.—Fixation by brass ligature wires after reduction. (Case II.)

so that the somewhat more difficult half-round arch method was used. The case was further complicated by the fact that manipulation would not bring about immediate reduction of the downward displaced left fragment, probably owing to the angular direction of the fracture line. This necessitated gradual traction by means of small elastic bands connecting the upper and lower arches (Fig. 5). At the end of one week, the depressed fragment had been drawn up so that all lower teeth were in good occlusion, and the elastics were replaced by wires (Fig. 6). This gradual reduction by elastic traction is particularly useful in unreduced fractures several weeks old.

CASE III.—A man, aged twenty-nine years, sustained a blow upon his jaw three weeks before admission to the Episcopal Hospital—January 22, 1930. Had received no treatment except a head bandage, and was suffering from insomnia and lack of nourishment. A fracture was found in the right premolar region of the mandible, with marked overlapping of the fragments, the posterior fragment being displaced inward. Considerable suppuration was present. The premolar teeth near the line of fracture had to be removed, and a small incision through the skin made for drainage. Many

teeth were absent, so that fixation was obtained by application of half-round arches to upper and lower teeth. External drainage wound has now healed, and union is progressing satisfactorily, with fragments in good position.

DR. J. J. MOORHEAD, of New York City, remarked that the wiring method as modified by Ivy is simple and effective and much more reliable than the complicated splints such as those of Matas and others. After the immobilization has been done the problem is not complete because every fracture of the lower jaw is essentially a compound fracture and to that end and to that degree osteomyelitis enters into it. The speaker agreed with Doctor Ivy that immediate reduction means easy reduction and that immediate immobilization, properly done by the wiring method, lessens the disability period and is likely to lessen the possibilities of osteomyelitis.

PANCREATIC CYST

DR. JOHN H. JOPSON, of Philadelphia, reported a case of pancreatic cyst associated with calculous cholecystitis. V. C., sixty-four, white male, was admitted to the Presbyterian Hospital, June 3, 1929. For several years he had been subject to mild intermittent attacks of upper abdominal pain, transitory in nature, and without relation to meals. Two years ago he had an attack of very severe pain, located in the left epigastric region, coming on an hour after eating, not associated with vomiting, which lasted twenty-four hours and required morphia for relief. Four weeks ago he had a second severe attack, followed by vomiting, and lasting longer. He was in bed for three days, and since then he has had almost constant pain in the same region. The bowels, formerly regular, have been extremely constipated. He has lost fifteen pounds in weight. Has no history of jaundice or clay-colored stools. X-rays made elsewhere before admission, and a diagnosis of gastric ulcer and ptosis of stomach and transverse colon reported.

Patient's family and previous medical history were good. He had pneumonia once and operations for carbuncle, and drainage of maxillary antrum. His habits were correct. There was no history of trauma. He was somewhat anæmic and showed signs of recent loss of weight. He was not jaundiced. His physical examination, apart from the abdomen, was practically negative. The abdomen was scaphoid. There was tenderness on deep palpation over the middle and left epigastric regions. No tumor was detected. The liver and spleen were not enlarged. The blood count showed a mild secondary anæmia. The Wassermann and Kahn tests were negative. The blood sugar was 80 and the blood urea nitrogen 13.5. Stool examination negative for occult blood. The gastric analysis gave a maximum free hydrochloric acid of 58, and total acidity of 84. The urine was normal. The blood-pressure was 146/78.

Operation June 11, 1929.—Upper rectus incision. No free peritoneal fluid. Liver had rather unusual bluish discoloration on anterior surface. No nodules in it. The gall-bladder was normal in size, somewhat thickened, and filled with small calculi. The common duct was free of stones. Walls of the stomach and duodenum were normal. Behind the stomach, near the mid-line, and situated retroperitoneally was a fixed mass about eight centimeters in diameter, which on palpation was apparently cystic. It was rather difficult at first to establish a line of demarcation between stomach and tumor. A diagnosis was made of cyst of the pancreas. The gall-bladder was first removed in the usual manner. The anterior wall of the cyst was approached through the lesser omentum, after protecting the abdominal cavity by gauze packs. The cyst was aspirated and about four ounces of thin creamy fluid obtained. The inner lining of the cyst was smooth, white and glistening. The cyst cavity was drained externally by a rubber tube, a cigarette drain was placed in the gall-bladder fossa, and a gauze pack used to protect the peritoneal cavity, and control oozing from the lesser omentum.

Convalescence was smooth. The drainage from the cyst cavity was at first profuse, and straw colored. The gauze packing was not entirely removed until June 22. Following this, cyst drained in lessening amounts, and the tube was first shortened, and finally removed twenty-six days after operation. He was discharged July 12 to the care of his physician. The sinus was small. It drained in scanty and lessening amounts for about a month, and then closed. The laboratory reported the fluid as follows: color bloody, odor foul, reaction alkaline, cell count red blood cells 73,600, white blood cells 600, filtres red, albumen a trace, sugar negative, amylose +4. (Only one ferment tested.) Many thick bacilli seen on smear, gram negative organisms, and a few short chain streptococci. (It seems probable that the specimen underwent subsequent contamination.) Patient reports by letter, February 7, 1930, as enjoying exceptionally good health.

DOCTOR JOPSON added that cysts of the pancreas fall into one of a number of types. He would classify this case as a retention cyst for the following reasons: Its apparent location within the body of the gland; the smooth lining, distinguishing it from proliferation, hydatid or dermoid cysts; the nature of its contents, physical and chemical; the association of cholecystitis, possibly a causative agent by production of chronic pancreatitis, which seems to be considered by most authorities as a factor in one way or another in the development of retention cysts. Disease of the gall-bladder, with or without stones, was present in 41 per cent. of cases in Judd's series, although gallstones were present but once in nineteen cases reported by McWhorter. The above statistics are from Speese's recent article in Nelson's "Surgery." Characteristic symptoms were present. The nature and location of the pain, the associated indigestion and constipation, slow growth, and loss of flesh are quite typical. Jaundice, often a symptom, was absent, as were glycosuria and diabetes, the latter results of associated pancreatitis rather than of cyst itself. Tumor, for some reason, was not detected by any of the examining physicians. The high location of the cyst, in the less usual position above the stomach, was perhaps the reason. It is more usual to have it press forward between the stomach and the transverse colon, as Körte pointed out long ago. The operation of drainage in cysts of the body of the pancreas, with or without removal of the lining membrane, is attended with a low mortality. In this case there was no opportunity to attach it to the abdominal wall and the drainage tract had to be protected by gauze packing. The ability to practise cholecystectomy was fortunate, as Speese points out that cholecystostomy may postpone recurrence and cholecystectomy prevent it.

HOUR-GLASS STOMACH

DR. JOHN H. JOPSON presented a woman, aged fifty-four years, who was first seen and first operated upon in 1926 when she was fifty-two years of age. She then gave a history of indigestion extending over many years, in fact, since childhood. After the birth of her first child, twenty-five years before, the symptoms had been very much exaggerated. Her principal complaint was pain in the epigastrium, coming on an hour after eating, and relieved by induced vomiting. The pain was never referred except on one occasion, twelve years ago, when she had hæmorrhages, probably gastric, accompanied by pain in the right shoulder, when she was confined to bed for two weeks. For years she had been very thin, and at the time of her first admission weighed

only ninety-one pounds. The X-ray showed an extreme degree of hour-glass contraction of the stomach, with a large proximal and distal pouch. The first operation was at the Presbyterian Hospital July 19, 1926. Two distinct pathological conditions were found present. There was a marked hour-glass contraction of the stomach, the median portion being stenosed and forming a narrow tube three inches in length, firmly adherent to the under surface of the liver. It apparently represented the site of an old healed ulcer. A more unusual finding was an internal hernia of the small bowel, no evidence of which was present in the X-ray taken before operation, the greater portion of the jejunum and ileum being herniated through a large congenital opening in the transverse mesocolon and another in the right portion of the lesser omentum. The loops of gut lay above the distal pouch of the stomach and between it and the liver. The distal portion of the stomach and the transverse colon were displaced downward toward the pelvis. The opening in the transverse mesocolon was three inches in diameter and just to the right of the ligament of Treitz. The bowel was not adherent and was reduced without difficulty and restored to its normal position below the colon. These openings in the mesocolon and lesser omentum were repaired by suture. The hour-glass contraction of the stomach was treated by gastrogastrostomy, a three-inch opening being made in either pouch. No attempt was made to free the adherent portion of the stomach from its attachment to the liver. The convalescence from this operation was smooth. The patient was relieved from all of her symptoms for two years, and gained considerable weight. At the end of that time she began to suffer with dull pain and swelling in the left lower abdomen. This pain had no relation to eating. She again lost weight, and was readmitted to the Presbyterian Hospital in January, 1929. Physical examination showed a marked degree of emaciation and asthenia, and slight tenderness and some distention in the lower abdomen, left side; otherwise negative. Gastric analysis was normal except for a sub-acidity. The X-ray report was that the gastrogastrostomy opening was very narrow and there was fluoroscopic evidence of pyloric stenosis.

Operation February 6, 1929.—There were extensive adhesions around the site of the previous operation. The pylorus was narrow, but there was no evidence of ulceration at that point. After dissection of the adhesions and mobilization of the stomach, an examination of the gastrogastrostomy opening showed it to be somewhat contracted. The recurrence of obstruction at this point was in part due to this narrowing and in part to perigastric adhesions around it. Three operations were considered, namely, partial gastrectomy, sleeve resection, and double gastrojejunostomy. The last operation was decided upon. There was some trouble in obtaining good exposure of the posterior surface of the stomach, but beyond this there was no particular difficulty. The convelascence was uncomplicated. The patient gained weight after discharge, went back to housework, and when examined in September, 1929, had few complaints except some symptoms of eyestrain, in the way of headache, which were relieved by refraction. Since then she reports herself in good health and is now employed steadily at housework.

The most interesting feature to the reporter in this case was the association of openings, probably congenital, in the transverse mesocolon and the lesser omentum, which permitted herniation of the small intestine into the subhepatic region by way of these openings and through the lesser peritoneal cavity. The drag on the pylorus and distal portion of the stomach, which probably resulted from this herniation, may well have had something to do with the development of perigastric adhesions or ulcer in the pars media which were followed by the hour-glass constriction. He had seen one case of pyloric ulcer in association with diaphragmatic hernia in which practically all of the small bowel had herniated into the left pleura. Other cases of this

character have been reported in literature. The case under consideration had suffered almost from childhood from digestive symptoms. This may have been due to persistent or recurrent herniation of this type. The openings were large, and presumably for this reason strangulation had never occurred.

The methods adopted for relief of hour-glass stomach are numerous. At the present time it is probable that the operation of partial gastrectomy, now so popular, has superseded the other procedures in the majority of cases.

Moynihan, whose experience in the treatment of hour-glass stomach embraces over 100 cases, states that it is gradually displacing other methods in his practise, especially when the ulcer is unhealed or is within an accessible area. However, the speaker had always been intrigued by the double gastro-enterostomy operation since Doctor Gibson presented his paper on this subject in 1923. While the operation has not been a popular one, as Gibson pointed out at that time, and while it is probably seldom performed at present, and he had had no other occasion to use it himself, it is interesting to note that both Gibson and Moynihan had excellent results in the cases in which they found justification for its performance.

Dr. Charles L. Gibson, of New York City, said that every hour-glass stomach is a problem and usually an individual problem. It is hard to decide what is to be done in each particular case. In addition to the size of the pouch there are very dense adhesions, and possibly, volvulus. He showed a print of an X-ray of a trifid stomach where the diagnosis was missed both in X-ray prior to operation and at operation and a gastro-enterostomy was done for what he believed to be the upper and larger pouch and it failed to reveal the condition of the patient. He has operated on two gratifying cases in whom from long-standing symptoms there was emaciation and great detriment to the health. These cases seemed to be particularly well chosen for this operation who have huge stomachs with pouches of about even size and with a very tight constriction. In both cases the operation was satisfactory. Both were followed for five years, at which time they had regained their health and had gained from 25 to 40 pounds in weight, and could eat everything.

In a third case several years ago he did the operation for long-standing symptoms. There were present two great big pouches. The patient died at the end of seven days. Post-mortem showed the condition to be quite irreparable. Doctor Gibson does not think that double gastro-enterostomy in all cases is the best procedure. The large stomachs with the two large pouches of equal size are the best suited. Then, too, in cases where there is a very small cardiac pouch, high up, the procedure is about all one can do. One must remember that in some cases after the meal gets through from one pouch, it meets with another stricture due to cicatrization of an ulcer at the pylorus.

Dr. Carl Eggers, of New York City, discussing the case of pancreatic cyst, remarked upon the close association between affections of the biliary system and pancreatic disease. Exactly what the relationship is, is not easy

to determine. A temporary block in the lower end of the common duct by a stone or congestion may allow bile to flow into the pancreatic duct, and thus start the trouble. Doctors Mann and Giordano, of the Mayo Clinic, have shown experimentally that only in a very few instances is that probable, because the ducts are more likely to empty separately rather than by a common opening into the duodenum. In a certain percentage, however, there is a common end and it would seem feasible that a block at the papilla of Vater might cause the bile to flow into the pancreatic duct.

Clinically it is a fact that in nearly every case of pancreatic disease one finds associated gall-bladder disease. He had had the good fortune to have a number of cases under his care and in a great majority gall-stones were present and in others cholecystitis was present. In order to exclude infection as a factor in these he had cultures taken of the peritoneal fluid, retroperitoneal fluid, and, where he operated on the gall-bladder, of the gall-bladded, and in every case they were negative for all the different organisms. This seems to show that infection as such plays little or no rôle, in the production of pancreatic disease but rather that it is due to chemical reactions. The onset is sudden and acute and this also speaks against the theory of infection. If a gall-bladder inflammation were present and the cause of the pancreatitis the patient would have a few days of illness preceding the onset of his pancreatic disease.

As to Doctor Jopson's case of pancreatic cyst and calculous cholecystitis, he had seen a few such cases and believed that these cysts are secondary cysts or pseudocysts which develop as a late stage of acute pancreatitis. He had operated upon three patients of this type, one of whom he had followed from the very beginning. He saw her early for an abdominal condition supposed to be either an acute appendicitis or gastric perforation. He made a diagnosis of most likely acute hæmorrhage pancreatitis and advised admission to the hospital. This was refused by the patient and she was treated conservatively for several weeks when a mass developed in the epigastrium which required admission to the hospital. At this time the clinical picture had entirely changed. There was a large mass in the epigastrium. Operation disclosed a large pancreatic cyst behind the stomach. Turbid fluid was removed and floating in it was a necrotic portion of the pancreas. All cultures were negative. The gall-bladder was full of stones but was not disturbed at this time, but it was removed at a later date. It seems that these pancreatic cysts like the one Doctor Jopson has shown are conditions secondary to acute disease in which there is death of a certain amount of the pancreatic tissue. If the head of the pancreas is involved the patient dies. If the tail end is involved it becomes separated as a slough and usually flows out with the drainage of the cyst.

Most of the treatment of pancreatic disease should be preventive by treating the associated gall-bladder disease. This is another argument in favor of operating on patients with gall-stones rather than allowing the condi-

tion to go on. Acute pancreatitis has a high mortality unless operated on early.

DR. JOHN E. JENNINGS, of New York City, remarked that there seems to be a question in Doctor Jopson's first case as to whether the cyst was coincidental or the result of previous pancreatic disease. He had had the same experience as Doctor Eggers following localized pancreatitis. On palpating the pancreas in the course of gall-bladder or gall-duct surgery one sometimes finds indurated localized masses in the pancreas although a diffuse process is the rule. In three different cases of acute hæmorrhagic pancreatitis he found localized hæmorrhages of the pancreas, which did not involve the head. In one case after incision and drainage, a large portion of the pancreas separated, leaving a cyst cavity which took two weeks to heal. The speaker agreed with Doctor Eggers as to the probability of the origin of these cysts. As to his remarks on the cultures taken for the discovery of infection, he asked whether in these studies anaërobic cultures were made. In a few cases in which he had been able to study hæmorragic and local septic processes, he was able to find anaërobic bacteria and perhaps an analysis of this situation would help to a better understanding of the more acute inflammations and infections of the pancreas which are so violent, so fatal.

SPASMODIC TORTICOLLIS

DR. CHARLES H. FRAZIER read a paper entitled "Interruption of the Afferent System Alone in the Treatment of Spasmodic Torticollis," for which see page 848.

DR. BYRON STOOKEY, of New York, remarked that the greatest advance in modern times in the treatment of torticollis was presented by Doctor Keen in 1890 in Philadelphia, and it is a great pleasure to hear this subject treated in so masterful a manner by Doctor Frazier forty years later.

Torticollis is an extremely ancient disease judging by the deformity of the skulls which have been removed from some of the ancient Egyptian tombs. The lesion producing torticollis may occur at a number of neural levels in the integration of nerve impulses controlling neck movements. Torticollis may be found in lesions of the spinal accessory nerve and in aneurism pressing upon the spinal accessory nerve. Lesions of the cervical cord cause torticollis and may be referred to as spinal reflex torticollis. Lesions of the more ancient motor system, namely the paleokinetic system, especially globus pallidus and the striatum, may cause torticollis as well as lesions of the more recent motor system, namely the motor cortex and pyramidal pathway.

Apart from disturbances of the neural mechanism at these different levels, local processes may produce torticollis. The most noteworthy of these are found in the congenital form thought to be due to faulty position of the fœtus *in utero* with damage to the blood supply of the sternocleidomastoid muscle and subsequent scar tissue formation. It has been a disputed point as to whether this could be attributed to faulty position or to injury at the

time of birth. However, in one or two instances the position of the fœtus has lead to the diagnosis of wry-neck before the child's birth and in another instance torticollis was found to be present in a child delivered by Cæsarian section which of course rules out the possibility of injury to the sternocleidomastoid muscle by birth. Thus it is fair to infer that congenital wry-neck may be due to the position of the fœtus in utero. It is also possible that injury to the sternocleidomastoid muscle may take place at birth and that subsequent scar contraction may produce rotation of the head and limitation of head movements. Many other local causes may be cited producing torticollis, especially those involving bony changes of the cervical vertebræ and local inflammatory conditions of the vertebræ and muscles.

In considering torticollis we are thus confronted with two major groups, those produced by local changes of the muscles or vertebræ and those brought about by a lesion of the neural mechanism. The surgical treatment of torticollis likewise can be divided into two main procedures, those designed to treat the local effects by local tenotomy or myotomy and those intended to interrupt the neural impulses in either its afferent or efferent arc or both. Tenotomy and myotomy are successful in so far as they treat those forms of wry-neck due to local lesions but are totally inadequate for those forms in which the neural mechanism is implicated.

Isaac Minnius, 1641, is credited with having performed the first open section of the tendon of the sternocleidomastoid and Bujalski, 1835, with having first sectioned the spinal accessory nerve though this is usually credited to Campbell de Morgan, 1866.

Operations designed to interrupt the neural impulses were at first limited to section of the spinal accessory nerves, but realizing that this was an inadequate procedure, since the innervation of other neck muscles was involved, Keen, 1890, at the suggestion of Weir Mitchell, sectioned the dorsal branches of the first three cervical nerves after identifying them among the neck muscles. This operation thus cut off both the afferent and efferent supply of the neck muscles since peripheral nerves were sectioned. Thus Keen's operation may be referred to as peripheral section of the innervation of the neck muscles in which both afferent and efferent impulses were destroyed.

In so far as the speaker was aware, the first published report of an attempt to reach the afferent innervation of the neck muscles by hemilaminectomy and intradural section of the dorsal roots of the first four cervical nerves for the treatment of torticollis was made by Alfred S. Taylor, of New York, in 1910, and published in Johnson's "Operative Therapeusis" some years later. Heretofore nerve section for torticollis served both the afferent and efferent arc, whereas by Doctor Taylor's hemilaminectomy the afferent arc only was sectioned intradurally, namely the dorsal roots of the first four cervical nerves and the spinal portion of the spinal accessory nerve.

The patient was still very much improved when last heard from, fourteen years later, although not completely cured. In 1923 Harvey Cushing presented a patient before the meeting of the Society of Neurological Surgeons

in Boston upon whom he had sectioned intradurally the spinal accessory and the dorsal roots of the first four cervical nerves of the same side with great improvement of the torticollis. Doctor Cushing's patient complained of some hoarseness which probably was due to the fact that the spinal accessory nerve was sectioned at the formen lacerum. Thus after the nerve had received the accessory portion which is derived from the most caudal portion of the nucleus ambiguous which is referred to Edinger's nucleus and supplies the laryngeal musculature, it seems to me that if the spinal accessory is to be cut within the dura it should be cut just below the point at which is received the accessory portion and thus even a temporary paralysis of the laryngeal muscles would be avoided.

Doctor Stookey performed, in 1924, at the Neurological Institute, a hemilaminectomy and a dorsal-root section of the first four cervical nerves together with the spinal accessory upon a patient with spasmodic torticollis. While the patient was considerably improved he was not completely improved and he feels now that were he to repeat this procedure he would certainly do a bilateral dorsal-root section.

Doctor Foerster, of Breslau, has published a series of seven cases surgically treated in which he has done an intradural section of both the ventral and dorsal roots of the first four cervical nerves as well as the spinal accessory for relief of spastic torticollis.

The attempt to destroy the neural arc by sectioning the afferent system alone in so far as the cervical nerves are concerned is, it seems to the speaker, a decided step forward.

THE CURABILITY OF CANCER

Dr. John B. Deaver, of Philadelphia, read a paper with the above title for which see page 841.

Dr. Franz Torek, of New York, remarked that the question of curability arises every time we have to deal with a case of cancer and, except in cases of very slight malignancy, such as those on the forehead, cheek and the like, the prognosis will have to be guarded. It is difficult to predict what is going to happen, and this has led to the three- and five-year limits of safety; but whatever limits we place, they are perfectly arbitrary. All surgeons had had the experience that some cases show the first manifestations of recurrence later than five years after the operation—some very much later. Doctor Torek remembers one case of sarcoma of the liver which came under observation eleven years after a sarcoma of the eyeball had been removed. With this gloomy side to the picture, one does well to be guarded in prognosis. Fortunately, the cases one sees long after the five-year limits who are well, are much greater in number than the gloomy cases. What one must ask oneself is, are all these patients waiting for a later period in which recurrence is going to come? As long as one is unable to tell what the exact nature and causation of cancer are, the answer to this question will remain more or less uncertain. Those who believe it is a local manifestation of a constitutional disease

will be much more pessimistic than those who believe it is a local disease which later becomes constitutional.

While early surgery is always the important thing, in addition to that it must be as radical as is possible. In this connection the speaker said that a recurrence, meaning thereby a return of the disease after all vestiges of abnormal cell growth have been removed, in his opinion does not take place. A so-called recurrence is an evidence that the riotous cell growth originally present had not been completely removed but that there had remained behind some of the cell growth and had caused the recurrence, so-called. This is in no way a slur at surgery, because our senses are unable to recognize cancerous deposits of a microscopically small size, and in many cases one is unable to tell whether there is a distant metastasis present already. To cite a concrete case: a woman two years and nine months ago was operated upon for uterine cancer and a hysterectomy performed. There was no local recurrence. Last August she began to be unable to swallow solid food. X-ray showed a large tumor with a well-defined outline in the thorax, and the œsophagus was angulated by this tumor to such an extent as to be obstructed. Naturally, at first it was thought to be a metastasis from the uterine cancer, but the outline was so well-defined that both X-ray men and physicians thought it was a well-encapsulated tumor and made a diagnosis of mediastinal dermoid. She was operated upon three and one-half weeks ago and a carcinoma of the lung found. This was resected and the patient made an operative recovery. When did this metastasis take place? It may have been swept by the blood current to the thorax long before the first operation was done, but the speaker is certain that subsequent to a complete removal of the primary cancer it could not have been swept there. One must admit the possibility that it may have been forced into the circulation at the time of the operation by pressure on the diseased organ, and such a possibility is of importance because it throws light on the subject of the curability of cancer as far as it concerns the method of handling the cases. One can be sure that rough handling and forcible retraction of the tumor by a husky assistant could quite probably bring about metastasis. In dealing with malignant tumors it is important to handle them in a gentle way, not only at the time of operation but at the time of examining the patient. Metastasis from the uterus may be caused by the first examination of the patient, if the handling is very rough. It is perfectly well understood that it is necessary to plan and carry out an operation of this kind so that all diseased tissue will be removed, but not so well understood that at the time of removal these cancerous tissues must be handled gently. The surgeon who makes it a habit to handle them gently will have fewer metastases than the one who does not pay any regard to that.

Research into the chemistry of the body may lead to a solution as to the constitutional condition or the susceptibility of certain individuals. Traumatism or chronic irritation is to some extent responsible for the creation of certain cancers, but inasmuch as one knows that the very same kind of

traumatism which seems to produce cancer in some cases, fails to do so in a vast majority of other cases, one feels that there must be a susceptibility or predisposition which acts in certain instances to cause the irritation or trauma to produce the cancer.

WATER INTOXICATION

DR. ALEXANDER RANDALL, of Philadelphia, called attention to four or five physiological observations to see if any deductions could be drawn from these bearing upon the picture of water ingestion in urological surgery. Taking first a case of benign prostatic hypertrophy as the most uncomplicated picture (as likewise one in which urologists are accustomed to consider a high water intake to be of particular value), he spoke of the clinical picture not infrequently seen either pre-operatively, or post-operatively, in which the patient does not seem to be doing as well as expected, and yet in whom no particular group of symptoms points to complications in the pulmonary system, the circulatory system, or the renal system. This picture is one in which a little lassitude or asthenia suggests that the patient is not at his best—that there may be slight headache, perhaps abdominal distention, hiccough, nausea or even vomiting. This picture does not necessarily have to be in the immediate post-operative period. Carrying this in mind, he asked the audience to correlate with it the following physiological observations that have been scattered in the literature now to be correlated under a possible syndrome, showing that these patients perhaps are suffering from water intoxication.

The subject of water intoxication in man was first presented by Rowntree in 1923, who stated that symptoms of poisoning and the mode of death in higher animals had never been determined. Satiety has been man's safeguard; gastric distress, regurgitation and vomiting protecting him from too great an ingress of fluid. In lower animals it has long been recognized that the salt water mollusk placed in fresh water dies: that the fresh water amœba placed in distilled water likewise dies, and this has been supposed to be due to the diffusion of salts from osmosis. Loeb showed that such an amœba would remain alive if sodium chloride as diluted as 8 to 100,000 be placed in the distilled water.

In Rowntree's animal experimentations he showed that intoxication followed a very definite syndrome of symptoms. Experimental dogs would show asthenia, restlessness, urinary frequency, diarrhœa, nausea, retching, vomiting, tremor, ataxia, coma and death. In man the following train of symptoms occurs: increased blood-pressure, headache, dizziness, restlessness, chills, fullness of the abdomen, vomiting, dyspnœa and peripheral muscle cramps.

Doctor Randall stated that several members of his staff had tested this intoxication by drinking between three and four litres of water in an hour and that uniformly, each one developed asthenia, headache, and dizziness; the intake being no further pushed in this personal experimentation.

The second physiological observation which Doctor Randall brought forward was the statement made by Crile, that if fluid is pushed to an excess the body protects itself by eliminating it into the stomach from whence regurgitation and vomiting rid the system of such excessive fluid intake.

The third physiological observation to which he drew attention was one recorded by Richards in his studies on renal function. Richards has shown that the glomerular filtrate while passing through the tubules is subjected to a marked reabsorption of both water and certain solids. His experiments showed that glomerular fluid contained higher estimations of chlorides than pelvic urine, and that therefore chloride was one of the products which was normally reabsorbed by the tubule cells. Further experiments demonstrated that the amount of reabsorption of chloride depended to a certain degree upon the length of time that the fluid remained in contact with tubule cells, and that when a marked diuresis was produced there was a greater concentration of chloride in the urine apparently due to the fact that the rapidity of secretion failed to give tubular reabsorption sufficient time to be completed. Therefore, under such marked diureses, the experimental animal lost salts over and above what would normally be eliminated.

Fourthly, Doctor Randall called attention to Edsall's disease, or salt starvation, first described by Edsall, and explained by him to be due to excessive diuresis. Edsall pointed out that men subjected to high temperatures and profuse perspiration, no matter what their occupation, would be found to be imbibing fluids of high salt content, pointing to the heavy beer drinking of the steel mill workers, who often put table salt in their beer; as also the oatmeal water used by harvest hands and football players. Edsall's conclusions were that the symptoms described by him were produced by salt starvation through diuresis and one can now see how closely it is allied with the picture of water intoxication.

Finally, the speaker presented an observation recorded by Austin, Stillman and van Slyke in their studies on urea excretion. These investigators attempted to produce in themselves a high diuresis. On tap water they were able to reach a rate of elimination of eleven litres per diem. This produced great water disgust and could be maintained with difficulty. They found that if they took one-half strength normal salt solution instead of ordinary tap water, that they could drink a great deal larger quantity per diem, that disgust for water was not so marked, and that a diuresis as high as nineteen litres per diem was obtained.

Correlating these various observations with clinical experience and the picture of the prostatic as above cited, Doctor Randall stated that he felt that we possibly overdid the question of water administration in some of these patients whose clinical condition did not appear satisfactory, and in whom no particular complication was demonstrable. Likewise, he stated, that to offset the possible occurrence of water intoxication, he was now having all patients on his service who were on a forced fluid intake given water in which has been dissolved a tablet representing a third strength of Ringer's solution.

They have noted that the patients do not object to such, and Ringer's solution was chosen as it incorporated the other valuable body salts, rather than to use plain salt solution, which might represent but one chemical factor in the picture.

Dr. Edwin Beer, of New York City, said that the recognition of symptoms of water intoxication is very difficult. The tendency to base it upon aminal experimentation, as developed by Rowntree's work, is of questionable accuracy. Robert Koch over twenty years ago, while being shown about a New York hospital, saw the water faucets in the various corridors and asked what they were for. He had never seen them in Germany. When the attending physician told him "distilled water for drinking," he said: "Why are you poisoning your staff? Don't you know that distilled water is injurious to the body, not only to the mucous membrane of the mouth but to the œsophagus, the stomach, and wherever it touches?" Much of the earlier animal experimentation was with water distilled in copper and many of the results were invalidated by the fact that damage was caused by the copper in the water. In other cases osmosis was disturbed by the fact that distilled water was not isotonic to the tissues of microscopic animals. When it comes to the higher animals, as well as the lower, a definite set of symptoms develops, such as Rowntree has called attention to: lassitude, dizziness, and if fed on water in large enough quantities a series of symptoms simulating strychnine poisoning will develop. These are all controllable by hypertonic saline solution.

In the treatment of prostatic patients, Doctor Randall has encountered some of these symptoms due, he believes, to an excessive introduction of water. Water per os undoubtedly leads to a train of symptoms difficult to explain! But water subcutaneously and by rectum rarely produces any such syndrome. In Doctor Beer's experience the only prostatic or renal patients who have showed marked disturbance of water metabolism were those who had a high degree of insufficiency; in these it may rarely, or better very rarely, produce such a syndrome that one thinks the patient is going into uræmia. On the other hand, the benefits of water (especially with glucose) by rectum or subcutaneously are so great that one must not be estopped from using it in large quantities. It not only stimulates diuresis but dilutes all poisons. It is well known that crystalloid poisons in great dilution may be introduced without in any way incommoding the body. Although one must be on the lookout for the indications of excess in the use of water by mouth, as well as for the discomfort from ingestion of water, one should bear in mind on the other hand that there is nothing like water, preferably with saline or glucose, to control the intoxication induced by the disease for which the patient is being treated.