

TRANSACTIONS
OF THE
PHILADELPHIA ACADEMY OF SURGERY

Stated Meeting, held February 5, 1917

The President, DR. CHARLES H. FRAZIER, in the Chair
SCAPULOHUMERAL AMPUTATION FOR GAS BACILLUS INFECTION

DR. NATHANIEL GINSBURG presented a patient who was admitted into the Mt. Sinai Hospital, March 22, 1916, with a traumatic amputation of the left arm about 7 cm. from the shoulder-joint. The extremity had been accidentally introduced into a knitting machine, which caused the injury. Upon admission the patient was immediately taken to the operating room, and disarticulation of the left shoulder-joint was performed. Extensive laceration of the soft tissue about the remains of the shaft of the humerus precluded any attempt to save much of the extremity. The wound was thoroughly disinfected by mechanical cleansing, and by the application of iodine to the lacerated tissues. The shoulder flaps were loosely sutured and a rubber drainage tube, introduced into the glenoid cavity, emerged at the lower angle of the wound.

Thirty-six hours after the amputation, the patient's temperature rose to 105°, accompanied by a rapid and thready pulse of 132. The wound discharge was foul, of the characteristic odor of gas infection, and the flaps were discolored by beginning gangrene. On the following day the shoulder flaps were black, with foul odor and profuse discharge from the wound. The wound was completely opened, exposing the glenoid cavity, bubbles of gas discharging freely at this time. The skin over the entire left chest was discolored and crepitant. Cultures from the wound showed the presence of the *bacillus aerogenes capsulatus* and the tetanus bacillus.

Irrigation of the wound with a fifty per cent. hydrogen peroxide solution alternating every two hours with a 1-4000 bichloride solution was begun. Extensive necrosis took place, resulting in total loss of the flaps enclosing the glenoid cavity, and spread dorsally until the entire surface of the scapula was exposed, as though it had been cleared by a dissecting-room scalpel.

On April 10, nineteen days following the injury, excision of the

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scapula was performed, employing nitrous oxide and ether anæsthesia, with practically no bleeding in the wound. He received daily injections of 10 c.c. of antistreptococcic serum, on April 11, 12 and 14. The wound continued to discharge profusely—however, healing over sufficiently to allow the patient to be discharged from the hospital on April 27, when he was referred to the Out-Patient Department for further treatment. Now the denuded surface has completely healed, and the patient has returned to work.

GUNSHOT WOUND OF THE THIGH: GAS BACILLUS INFECTION

DR. NATHANIEL GINSBURG presented a patient who had received a load of bird shot, at close range, into the femoral region of the right thigh, on October 12, 1916. He was admitted into the Jewish Hospital one hour later with a large, punched-out wound, corresponding to the saphenous opening, about four inches in diameter and involving the entire thickness of the thigh in this region. The patient was considerably shocked, with rapid and feeble pulse, and presented evidence of the loss of considerable blood. He was bleeding freely upon admission, the hemorrhage being controllable only by gauze packing introduced into the wound. Fifteen hundred units of tetanus antitoxin were injected and the wound was thoroughly cleansed with pure tincture of iodine. The femoral sheath, with the visible pulsating femoral artery, was thoroughly exposed and had miraculously escaped penetration by the shot. The long saphenous vein and the superficial and deep external pudic arteries and the obturator vessels had apparently been opened by the wound inflicted. The X-ray examination the following day (October 13), showed a great number of small shot embedded in the thigh against and surrounding the obturator foramen. There were numerous shot scattered in the lower, gluteal region. In the evening of this day, the foul odor, characteristic of gas bacillus infection, attracted attention and an examination of the wound revealed gas bubbles with crepitation of the surrounding tissue. Dr. David Riesman, who saw the patient, concurred in the diagnosis of gas bacillus infection.

Under nitrous oxide anæsthesia, a fenestrated rubber tube was introduced into the wound, passing completely through the adductor region of the thigh, and irrigation was begun, employing a fifty per cent. hydrogen peroxide solution, alternating with a solution of Bulgarian bacilli every two hours. The infection was apparently confined by the intermuscular septa of the thigh, which enclose the muscles of the median osteofascial compartment, and did not spread beyond this

COMPOUND FRACTURE OF THE PATELLA

region. Extensive necrosis of the muscles corresponding to this area took place.

On October 14, two days after admission, continuous irrigation of the wound with Dakin's solution was begun, the hydrogen peroxide solution being discontinued. The patient was extremely toxic, and intravenous injections of sodium bicarbonate solution were administered daily. Multiple incisions were made over the internal and posterior surfaces of the thigh, opening up the muscular spaces through which drainage was established.

Improvement slowly took place, large masses of necrotic material being removed from the wound and counter openings. On October 21, close application of electric light to the wound, without dressings, was maintained. In view of the fact that the process was now limited, and the patient's condition much improved, irrigation of the wound with a fifty per cent. peroxide of hydrogen, followed by a 1-8000 solution of nitrate of silver, was substituted for Dakin's solution.

The patient was discharged from the hospital November 6, 1916, with loss of the upper portions of the adductor and gracilis and pectineus muscles, and with slight discharge from the wound corresponding to the site of his injury. Numerous shot have been discharged from his gluteal wound since he left the hospital, but most of the bird shot still remain in his body.

Recovery in these two cases can be attributed to early and free drainage which was established, with the continuous irrigation of the wounds.

COMPOUND FRACTURE OF THE PATELLA

DR. JOHN H. JOFSON presented a stout woman, fifty-six years of age, who was admitted to the Presbyterian Hospital in September, 1916, with a bad laceration of the face and a compound fracture of the patella, the result of having been struck by a street car. She was transferred to the operating room almost immediately. Examination of the knee disclosed an irregular wound over the patella, about one inch in length, running transversely. Through this could be palpated a comminuted fracture of the bone, which was broken into many fragments, and the finger passed directly through it into the knee-joint. The patient was etherized, and the entire region of the knee prepared for operation. The preparation consisted in cleaning the skin with benzene, alcohol and tincture of iodine. The wound was enlarged by lateral incisions, which were carried downward and outward to the condyles of the femur. The joint, when opened, was thoroughly

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washed out with a sherry-colored solution of tincture of iodine in water. The patella was broken into probably a dozen fragments, and two or three small detached fragments were removed. The aponeurosis had been lacerated over the bone and torn down toward the external condyle. It was brought together with mattress and interrupted sutures of chromic catgut. Two rubber drainage tubes were inserted in the outer angle of the wound, one extending into the joint, the other to the opening in the joint capsule. The skin wound was sutured except for the drainage track and the traumatic wound, which latter was drained by a piece of rubber tissue. The leg was dressed on a posterior splint and the patient given antitetanic serum.

The convalescence was uneventful. An X-ray taken after operation showed good approximation of the fragments. The splint was removed after four weeks and the patient left the hospital on November 1. There was then about one-third the normal amount of flexion present in the knee and she was able to walk on crutches. She has now regained very fair use of her knee, is able to bear her weight on it, and has good range of motion, flexion being possible to a right angle, and still improving.

This case illustrates among other things the method of treatment of compound fractures of any variety which Dr. Jopson has found most efficacious, namely, immediate transference to the operating room, etherization, sterilization as if for primary operation, followed by cleansing of the wound—sterilization, the introduction of drainage and whatever other measures may seem indicated. Since adopting this plan his results in the treatment of compound fractures have been vastly improved, and severe infections are a rarity.

Compound fracture of the patella is an unusual injury in civil practice. Of twenty-six recent fractures of the patella operated upon by him, this was the only instance in which the fracture was compound. This series was operated without mortality and without joint infection. Stimson has emphasized the fact that patellar fractures are generally compound by reason of external violence, except in those instances where refracture occurs after operation, and where the scar or the skin is tightly adherent to the surface of the bone. In such instances indirect violence may result in simultaneous fracture of the patella and tear of the soft parts covering the bone.

DR. NATHANIEL GINSBURG gave the history of a compound fracture of the patella which was operated upon by him on August 22, 1912, in the Philadelphia Polyclinic Hospital.

The patient was a fireman on a railroad engine, who fell from the

OLD REFRACTURE OF THE PATELLA

tender, striking on the right patella. He was operated upon immediately on his admission to the hospital, and the patella was found to have been fragmented into four pieces, with a wound communicating with the interior of the joint. At operation, one fragment was found lying free in the joint cavity, which was removed, and another small fragment, which could not be satisfactorily placed in relation to the other pieces of the patella, was excised. The joint was irrigated with a 2 per cent. formalin solution, followed by sterile water, and the remaining fragments were apposed by a bronze wire passed through the ligamentum patellæ below the quadriceps extensor tendon above. The capsule was sutured as well as the lateral ligaments, the joint being closed without drainage. The leg was immobilized by a posterior splint, in addition to traction, employing twenty pounds of weight.

On the day following the operation, the knee-joint was aspirated and about 200 c.c. of serosanguineous fluid were removed, and 15 c.c. of a 2 per cent. formalin-glycerin solution were injected. The patient was discharged from the hospital on September 28, with good union of the patella. The highest temperature during his stay in the hospital was 99°, and the pulse-rate never rose above 98.

He has been unable to trace the patient since his discharge from the hospital, but there is every reason to believe that he has a good functional knee-joint, since he had a satisfactory operative recovery, and no infection resulted following the injury.

OLD REFRACTURE OF THE PATELLA, WITH SUPPURATIVE ARTHRITIC EFFUSION, AND RESECTION AND TRANSPLANTATION OF THE LOWER FRAGMENT

DR. NATHANIEL GINSBURG presented a man who was admitted into the Jewish Hospital, September 7, 1916, and discharged December 22, 1916. Four months previous to his admission, the patient sustained a fracture of his right patella, which was sutured in another hospital, the fragments not having been wired. He tripped over a curbstone, and fell to the ground, striking his right knee, and sustaining a refracture of the patella, on September 7, 1916. Examination showed a transverse fracture of the right patella, with about five centimetres' separation of the fragments. On the following day a sudden rise of temperature occurred, which reached 103° September 10, seventy-two hours after admission.

On September 11, an examination of the knee-joint suggested the presence of a purulent effusion. The joint was aspirated, and 90 c.c. of pinkish purulent fluid were withdrawn; and 14 c.c. of a 2 per cent.

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formalin in glycerin solution were injected. The temperature immediately dropped to $99\frac{2}{4}^{\circ}$.

The day following the aspiration of the joint, a large submuscular abscess of the lower third of the right thigh was incised, employing local anaesthesia. This infection was associated with the purulent joint effusion, and probably was an extension of the same. The temperature subsided to normal thirty-six hours following drainage of the thigh abscess.

Longitudinal traction was applied to the injured leg upon his admission into the hospital, and was maintained until the open operation upon the patella was performed. Drainage from the thigh wound and from the needle puncture wound into the joint continued for some weeks. On October 25, about seven weeks after his admission into the hospital, his wounds had completely healed. It was now deemed advisable to attempt to bring the patellar fragments together. The operation was performed during one of the clinics for the physicians attending the Clinical Congress of Surgeons then meeting in Philadelphia.

Under gas-ether anaesthesia, a vertical incision was made over the right patella extending from the quadriceps extensor tendon above to the tubercle of the tibia below, and the interior of the joint was exposed. There was considerable capsular and aponeurotic thickening with fibrous induration of the blood-clot which existed between the two fragments. Both fragments were immobile, and could not be apposed in the slightest degree. The joint cavity above the line of fracture was considerably diminished by the firm application of the upper fragment to the femoral surface, owing to the contraction of the quadriceps extensor muscles and the lateral ligaments.

The periosteal attachment of the ligament of the patella was chiselled off the tibia, carrying with it a small fragment of cortical bone. This did not lessen the difficulty, since the lower fragment remained immovable, owing to the induration and diminished elasticity of the patellar capsule and the lateral aponeurotic expansion. The lower fragment was completely excised and lifted out of the wound. The wound clot was dissected, and, after freshening the fracture surfaces, the excised fragment was brought in contact with the upper fragment and held there by a phospho-bronze wire suture passed through the patellar capsule. The lower fragment was fixed on a higher level by interrupted chromic catgut sutures to the aponeurotic expansion from which it had been dissected, and the lateral ligaments and patellar capsule of the knee-joint were also sutured by interrupted

CHRONIC PERFORATING ULCER OF SMALL INTESTINE

chromic catgut sutures. The joint was immobilized by a plaster casing extending from the upper thigh to the lower leg, which was worn for four weeks.

With the exception of some slight superficial wound discharge, convalescence was uninterrupted and the patient was dismissed from the hospital on December 22, 1916, with union of the patellar fragments and sufficient flexion and extension of the leg to allow him to act as an orderly in the hospital. The X-ray examination of both knee-joints shows the superior position with relation to the femoral condyles occupied by the injured patella.

Dr. JOHN H. JOYSON said that some time ago he showed before the Academy a case of old fracture of the patella in which there had been much difficulty in approximating the patellar fragments. A plastic operation on the quadriceps tendon was performed, and an elevation of the tubercle of the tibia after the method of von Bergmann, after which the fragments could be brought in apposition and wired. Firm union was secured. Dr. Ginsburg's method amounts to a free transplantation of the lower fragment and the result is excellent. He would much prefer this method to the use of a bone inlay as suggested by Albee, as he believes convalescence would be much shorter and the resulting union stronger.

CHRONIC PERFORATING ULCER OF THE SMALL INTESTINE, INVOLVING THE BLADDER WALL

Dr. GEO. ERETY SHOEMAKER presented a woman fifty-three years of age, who had been operated upon by him December 4, 1916, for the relief of ulcer and partial obstruction of the small intestine, chronic appendicitis, chronic cholecystitis. The patient was very stout and for a number of years had had pain and abdominal distention with occasional nausea and vomiting without definite localization as to origin. She had been in the Medical Wards of the Presbyterian Hospital twice under suspicion of pyloric ulcer. Definite symptoms associated with that condition were, however, wanting. The obscure attacks continuing, she was admitted to the reporter's service for exploration on recommendation of her physician.

Patient had formerly weighed more than 200 pounds, but had lost 47 pounds, and claimed to be unable to eat general diet without bringing on attacks of severe abdominal cramp-like pain, with difficulty in moving the bowels. There was no history of jaundice; the pains never went to the right shoulder and were never located in the gall-bladder region. They had only lately been in the right lower quadrant,

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shifting to the umbilicus. Repeated previous gastric analysis had shown low total acidity, low free hydrochloric acid, contents usually alkaline; there was no food retention. The X-ray studies had resulted in a diagnosis of pyloric ulcer by the röntgenologist, but there was no food relief, no pain late after food ingestion. There was now no leucocytosis and no jaundice. Shortly after admission to the hospital, a sharp attack of generalized abdominal pain occurred with persistent vomiting. Lavage of the stomach brought brownish material with a fecal odor. The bowels moved freely immediately afterwards and there was no further vomiting. The condition was now evidently one of partial obstruction. No pelvic lesion was present except a very small movable nodular mass in the region of the right ovary, which was not accounted for. There was frequent urination and much bladder irritation. The thighs and vulva were inflamed and incrustated from urinary contact. There was no incontinence. Because it was necessary to explore both the upper and lower abdomen, the incision was made to the right of the navel and extended upward and downward as required. The gall-bladder contained more than one ounce of bile; was compressible, moderately adherent, its walls a trifle thicker than normal and of a dull brown color, which indicated a low degree of chronic inflammation. No stones could be felt. The pylorus was thoroughly exposed and palpated, but no thickening or other evidence of disease could be demonstrated. There were no adhesions. The appendix was long, passed behind the cæcum, and had no meso. It was removed after splitting the outer mesocolon, cutting off the base first and gradually working down to the tip. Adhesions in the neighborhood had formed a well-defined Lane's kink which was released. A congenital fold of peritoneum passed downward from the root of the appendix to the pelvic wall at the insertion of the infundibulopelvic ligament. That was ligated and incised. Further exploration revealed about two feet from the ileocæcal an angulated knuckle of small bowel, infiltrated over an area of an inch or more in diameter. There were no neighboring adhesions. The bowel was separated and brought into the wound which produced a fistulous opening. The intestine was larger above than below the site of partial obstruction. The mesentery was thickened, but not hard, near the insertion into the bowel. About 8 inches of small intestine was resected, the ends being burned off with the cautery and turned in with catgut, afterward being covered with Lembert suture of celluloid linen. Side-to-side anastomosis was then performed by suture. The infiltrated point of the bladder showed excavation which did not at this time perforate the mucous membrane, though

CONGENITAL PYLORIC STENOSIS

it may at some time have done so. The diseased area was excised, the bladder wall sutured with two rows of chromic catgut. An abdominal cigarette drain was introduced near the site of the intestinal anastomosis. A retention catheter was placed in the urethra. There was no post-operative vomiting, no distention, intestinal gas passed freely. Bowels were moved by glycerin enema. There was a few drachms of purulent brown fluid at the drainage site by the third day; the drain was removed at this time and was not replaced. No gas and no fæces escaped at any time. The external irritation from the urine rapidly cleared up.

The convalescence was somewhat stormy due to the long-standing gastric catarrh with flatulence. The anastomosis never leaked; the wound healed solidly while in the hospital. Normal bowel movements were readily secured. The patient is now doing well, January 17, six weeks after operation. Cystoscopy by Dr. Laws shows bladder normal.

Laboratory Diagnosis.—Dr. Pfeiffer. Inflammatory infiltration and ulceration of bowel and bladder.

CONGENITAL PYLORIC STENOSIS

DR. DAMON B. PFEIFFER presented a specimen of congenital pyloric stenosis. The patient was a girl, aged four weeks, the only child of healthy parents. At birth the baby weighed 7 pounds 13 ounces, and was apparently normal. For the first week the child took the breast and showed no digestive disturbances. During the second week she began to vomit occasionally. Various milk formulas were tried without effect and the vomiting grew worse while the baby lost weight rapidly. The bowels moved scantily. In the fourth week Dr. Charles A. Fife was called in consultation by the attending physician, Dr. George A. Parker of Southampton. Visible gastric peristalsis could not be observed at times, but no epigastric tumor was palpable. The child displayed evidence of ravenous hunger, taking food eagerly and sucking its thumbs. With the diagnosis of hypertrophic stenosis of the pylorus, the patient was referred to the Abington Memorial Hospital, for operation. The weight by this time was barely four pounds. The pulse was exceedingly thin and weak and the temperature subnormal.

Under ether anesthesia, a posterior gastrojejunostomy was made without special difficulty. Hypodermoclysis was given during the operation and the patient left the table in good condition. She vomited once the following day and the stomach was washed out, a small quantity of biliary material being obtained. Feedings of whey were begun.

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The next day the baby showed evidence of excessive weakness and died a few hours later.

At postmortem the peritoneum was everywhere glistening and showed no evidence of peritonitis. The gastrojejunostomy was mechanically satisfactory. The pyloric canal for a distance of about an inch was tightly constricted, as had been observed at operation, by a thickened muscularis measuring 6 mm. in depth at its thickest part. There was no apparent edema. The longitudinal incision through this part of the muscularis was made after removal of the specimen and shows beautifully the distinctness of the separation of the muscularis from the submucosa and the elasticity of the latter, thus illustrating the ease and effectiveness of a Rammstedt procedure which was considered but not practised in this case. It shows also the sharp limitation of the muscular thickening to the gastric side of the pylorus, an important point to observe in performing the Rammstedt operation, because of the ease with which the duodenum may be opened.

The case illustrates the fact which has been pointed out by Holt, Downes and others, that sudden collapse may occur in these weakened infants with or without relief of the obstruction, and shows the advisability of resorting to surgical measures at an early period.

ILLUSTRATION OF A DISSECTION SHOWING A UNIQUE CONCEPTION OF DIRECT INGUINAL HERNIA

DR. P. G. SKILLERN, JR., presented the specimen shown in Fig. 1.

SURGICAL EXPERIENCE AND SURGICAL KNOWLEDGE

DR. JOSHUA EDWIN SWEET delivered the *Annual Oration* before the Society—the title of his address was as above, and the address will be found on page 673.



FIG. 1.—A unique exposé of direct inguinal hernia, chanced upon in the dissecting room of the University of Pennsylvania. On stripping the general layer of parietal peritoneum backward from the anterior abdominal wall in quest of the deep epigastric artery this finger-like hernial sac was revealed with its tip in the hernial orifice. Its connection with the general layer of parietal peritoneum was exactly like that of the finger of a glove to the rest of the glove. To show the hernial orifice the sac was drawn somewhat backward. Hesselbach's triangle is well shown, with the hernial orifice near its base.