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The forearm was found to be fixed midway between pronation and supination; the thumb was strongly adducted with the terminal phalanx rigidly flexed, and the fingers were stiffly bent into the palm. On firmly flexing the wrist the fingers could be partly straightened, but the thumb was immovable and the hypothenar muscles were much wasted. Faradism gave no reaction, but galvanism set up sluggish contractions. There was considerable anaesthesia in the hand and fingers. The outlook was most unpromising, but the man readily accepted the suggestion that an attempt should be made to put slack into the pronator radii teres and most of the flexors by taking an inch out of the upper part of the radius and ulna. After this it was found that he could get his fingers straighter and had much more power of rotation of the forearm; but the improvement was not marked, so most of the tendons at the front of the wrist were exposed by operation, split, cut, lengthened, and sutured.

In October the man was re-admitted because non-union had followed the operation on the bones, and as the tendons seemed to need more slack being put into them, another inch was removed from the bones by the electric saw, and the fresh ends were adjusted by wire sutures. An operation was done for lengthening the long flexor tendon of the thumb. The limb was adjusted in a plaster-of-Paris apparatus as before, the wound healed perfectly well, but, as before, there was no solid union and the question is, "Can anything more be tried for him?"

*Remarks by Mr. OWEN.*—The pathology of the case is probably this, that the tight and long-continued compression of the forearm kept the muscles completely starved of blood, and so injured them that a myositis supervened, which, in its turn, was followed by an intractable fibroid degeneration of the tissue with permanent contracture. It was Volkmann who first described the disease and found the name for it, *ischæmic* (*τοχω*, restrain; *αλμα*, blood) *paralysis*.

I have seen a good many cases of ischæmic paralysis in children, but I have never previously met with an instance in an adult; and I should not be surprised to learn that no other case in an adult has been recorded, for an adult, as a rule, would absolutely decline to submit to the agony of the tight compression. In children the myositis has sometimes been determined by a few hours' compression, and, of course, the tighter the compression the shorter need be the period. My own experience of operation in these cases has been most unfavourable, but my colleague, Mr. Herbert Page, was enabled to speak more hopefully in a case which he recorded in a valuable clinical lecture in THE LANCET of Jan. 13th, 1900, p. 83.

### PARK HOSPITAL, HITHER GREEN, S.E.

A CASE OF ENTERIC FEVER; LARYNGEAL PERICHONDRITIS, TRACHEOTOMY; RELAPSE, PERFORATION, LAPAROTOMY; NECROPSY.

(Under the care of Dr. A. KNYVETT GORDON, Senior Assistant Medical Officer.)

THE value of absence of liver-dulness as an indication of free gas in the peritoneal cavity is not so great as was at one time thought, but the sudden appearance of this sign during the course of typhoid fever is necessarily of great importance and is very suggestive of perforation. The mortality after laparotomy for perforation in typhoid fever must always be high, for the patient's general condition before the perforation occurs is usually very bad, and the added shock of the perforation and of the operation is sufficient frequently to prove fatal even if no marked peritonitis should have

followed. Mr. J. E. Platt has collected 103 cases, and in 21 of these the patients recovered.<sup>1</sup> This is a mortality of nearly 80 per cent.

A well-nourished boy, aged 15 years, was admitted to the Park Hospital on Sept. 20th, 1900, suffering from an attack of enteric fever which was stated to have begun on the 16th. On admission he was found to be moderately ill: there were slight abdominal distension and enlargement of the splenic dulness, nocturnal delirium, headache, and slight diarrhoea. The temperature was 39.8° C., the respirations were 25, and the pulse was 110. The mouth was very dirty, the tongue and gums being covered with dried mucopurulent secretion; there was one carious molar tooth discharging pus which was extracted on admission. He became worse and his attack ran a severe course which, however, with the exception of hæmorrhage from the bowel on Sept. 28th, 29th, and 30th, did not present any special features until the morning of Oct. 15th. On that day the respiration became stridulous and he rapidly developed symptoms of laryngeal obstruction; there were great distress and rapidly increasing cyanosis with very slight epigastric recession. In the afternoon, about 10 hours after the onset of the stridor, a high tracheotomy was performed after injection of eucaine subcutaneously, no general anæsthetic being required. A No. 5 Parker's tube was inserted, with complete relief of the symptoms. On the next day it was possible to see the larynx with difficulty and a large swelling was found over the right arytenoid cartilage and ary-epiglottic fold; it was bright red in colour and was causing almost complete glottic obstruction. On Nov. 2nd he was able to breathe without the tube for a short time, and the metal tube was replaced by a rubber one which he wore for gradually decreasing periods until his death, but his voice did not return at all. As seen with the laryngoscope the swelling appeared to be lessening gradually; there was no sudden discharge of pus but the sputum was mucopurulent throughout. The temperature, which had been raised at first daily to 40° C. but had been controlled easily by tepid sponging, began to fall on Oct. 10th and reached normal on the 15th, the pyrexia having thus lasted 28 days. On Oct. 28th the temperature rose again and a relapse occurred, the second attack being considerably milder than the first and presenting no features of interest until the afternoon of Nov. 10th, when he vomited slightly, but was not otherwise worse. On the 11th, at 10 A.M., he became suddenly worse, the chief symptom being rapidity of breathing; there was no abdominal pain at all and the temperature, which ranged from 38° to 39° C., did not fall; there was no marked collapse, vomiting, or hiccough. On examining the abdomen there was greatly increased distension, and the liver dulness, which had been normal at noon on the preceding day, had completely disappeared; the abdomen moved very slightly, and the diaphragm was acting; a long tube was passed per rectum as far as the sigmoid flexure, but no gas escaped.

It was thought that perforation had occurred, and as the boy, though much emaciated by his long illness, was not moribund it was decided to open the abdomen. This was done at 3.30 P.M.—probably six hours after perforation—through an incision in the right linea semilunaris, chloroform being administered through the tracheotomy tube. In the incision, which was four and a half inches long, the deep epigastric artery was cut and was ligatured, bleeding being completely arrested. On opening the peritoneum foetid gas escaped and a quantity of clear serous fluid welled up, but there was no sign of pus; a coil of small intestine presented which was brightly injected on its surface. The appendix was felt, and on tracing the ileum back a perforation was found, from which faeces were escaping, four and a half inches from the ileo-cæcal valve and about three inches from the presenting coil. This perforation was of the size of a crowquill and was situated in an ulcer one and a half inches long and three-quarters of an inch wide. Lembert's sutures of fine silk were now passed so as to invaginate the entire ulcer and the intestine a quarter of an inch on each side, the stitches reaching to half an inch from each end of the visibly ulcerated surface. As the boy's condition did not admit of a prolonged peritoneal toilette the fluid was sponged out as gently as possible and the abdomen was sewn up with silk-worm gut, a gauze drain being left at the lower angle of the wound. The whole operation lasted an hour and 20 minutes

<sup>1</sup> THE LANCET, Feb. 25th, 1899, p. 505.

was probably in accordance with the needs of the injury. In four days' time—during which he had suffered intense distress—the splints were taken off, the hand being much swollen; they were afterwards re-applied. The splints were removed from time to time and gentle massage was done during 30 days, after which the splints were entirely left off. The hand, however, remained swollen for at least two months, and during this time he lost the nails of his first and second fingers. The thumb-nail also blackened, but it did not come off. When the swelling went down there was very little feeling in his hand, and his fingers and thumb were stiff and useless. About a fortnight after the accident two sloughs appeared—an extensive one over the outer side of the forearm near the elbow and a deep one over the tuberosity of the scaphoid bone. The resulting sores took respectively three and four months to heal.

The forearm was found to be fixed midway between pronation and supination; the thumb was strongly adducted with the terminal phalanx rigidly flexed, and the fingers were stiffly bent into the palm. On firmly flexing the wrist the fingers could be partly straightened, but the thumb was immovable and the hypothenar muscles were much wasted. Faradism gave no reaction, but galvanism set up strong contractions. There was considerable wasting of the hand and fingers. The outlook was not very hopeful, but the man readily accepted the treatment. It was decided that the thumb should be made to put slack in the ligaments, and most of the flexors by taking the thumb out of the line of the radius and ulna. A splint could get his fingers straight, and the rotation of the forearm; the thumb was marked, and the tendons of the flexors were exposed.

In October the man had been in the hospital for some time, and seemed to be improving. The thumb was now in a position to be used, and the fingers were freer. The man was discharged in December, and was able to do his work.

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It was thought that perforation had occurred, and as the patient was much emaciated by his long illness, was not able to stand, it was decided to open the abdomen. This was done on Nov. 12th at 10 P.M.—probably six hours after perforation—by a vertical incision in the right linea semilunaris, chloroform being administered through the tracheotomy tube. The incision, which was four and a half inches long, the peritoneum was cut and the gastric artery was cut and was ligatured, bleeding was completely arrested. On opening the peritoneum gas escaped and a quantity of clear serous fluid came up, but there was no sign of pus; a coil of small intestine presented which was brightly injected on its surface. The appendix was felt, and on tracing it back a perforation was found, from which fæces were escaping, four and a half inches from the ileo-cæc valve and about three inches from the presenting coil. The perforation was of the size of a crowquill and was situated in an ulcer one and a half inches long and three quarters of an inch wide. Lembert's sutures of fine silk were now passed so as to invaginate the entire ulcer and the intestine a quarter of an inch on each side, the stitch reaching to half an inch from each end of the visible ulcerated surface. As the boy's condition did not admit of a prolonged peritoneal toilette the fluid was sponged out gently as possible and the abdomen was sewn up with silk worm gut, a gauze drain being left at the lower angle of the wound. The whole operation lasted an hour and 20 minutes.

<sup>1</sup> THE LANCET, Feb. 25th, 1899, p. 505.

and the boy at its conclusion, though very feeble, was warm, and there was a fair radial pulse. He rallied from the anæsthetic and was doing well until four hours after the operation, when he vomited some bilious fluid; this was followed by sudden collapse and some blood was noticed in the dressings. He died almost immediately.

*Necropsy.*—At the post-mortem examination, which was made 24 hours after death, about two ounces of blood-clot were found in the right side of the abdomen and there was a clot of the size of a hen's egg in the abdominal wall at the lower angle of the wound. On dissection the end of the deep epigastric artery was found from which the ligature had slipped. The perforation which had been sewn up was found to be watertight; there were several ulcers from which the sloughs had separated in the lower end of the ileum, and three higher up with the sloughs *in situ*. There was no other perforation and there was no other ulcer which appeared to be likely to have perforated subsequently. The tracheotomy wound was through the first two rings of the trachea in the middle line; the right arytenoid cartilage was represented by a few fragments in an abscess cavity which involved the right ary-epiglottic fold and also extended across the middle line posteriorly to the left arytenoid region for a space of a quarter of an inch. The whole cavity would have held about two drachms of pus, though it was quite empty at the necropsy. There was no sign of ulceration in the rest of the larynx.

*Remarks by Dr. GORDON.*—The points of interest in this case are many. Perichondritis laryngis is rare if attention is paid to the condition of the mouth; this, which I regard as a most important point in the treatment of enteric fever, consists in extracting all carious teeth on admission and in subsequently having the mouth swabbed and the teeth brushed with a solution of peroxide of hydrogen and bicarbonate of soda. When perichondritis does occur it almost always suppurates. In this case the suddenness of the onset is remarkable; to open the abscess intra-laryngeally would have been impossible without a preliminary tracheotomy, the distress was too great; afterwards the abscess burst of its own accord.

With regard to the abdominal condition the diagnosis of perforation was able to be made early—certainly in the first 12 hours—owing to the very marked disappearance of the liver dulness; and it is interesting that the perhaps too classical signs—collapse, abdominal pain, and sudden fall of temperature—were all absent. It was fortunate that the perforated ulcer presented itself almost immediately, so that no prolonged exploration, with its attendant risk of causing additional perforation, was necessary.

It is, I take it, uncertain whether cases of perforation ever recover without operation, though I believe that such recoveries are more probably cases of peritonitis, apart from perforation, of sudden onset. If a diagnosis can be made in the first 24 hours, and the patient is not obviously moribund, I believe that it is best to open the abdomen in the right linea semilunaris at once; if, on opening the peritoneum, there is no escape of gas or evidence of peritonitis the incision can be at once closed, but if a perforation can be found without prolonged exploration, and sewn up, the chances of recovery are better with the operation than with rest and opium alone.

The immediate cause of death in this case was, I believe, the slipping of the ligature in the motion of the abdominal wall caused by the vomiting. It is impossible to say whether, after six weeks' acute illness, the patient would have otherwise recovered, but at all events one more case is added to those in which the condition on opening the abdomen was found to be a surgically hopeful one.

For permission to publish this case I am indebted to the courtesy of Dr. R. A. Birdwood, medical superintendent of the hospital.

## NORTH LONSDALE HOSPITAL, BARROW-IN-FURNESS.

### A CASE OF FRACTURE OF THE PELVIS WITH INJURY TO THE BLADDER AND PELVIC VESSELS.

(Under the care of Mr. P. L. BOOTH.)

THE close apposition of the urethra and bladder to the pubic bones, and the frequency with which the rami of these bones suffer in fracture of the pelvis by a compressing force, serve to explain the injury of one or both of these organs

so commonly met with. The hydrostatic test of the soundness of the bladder is usually considered to be fairly trustworthy, but it can certainly not be relied on for minute or valvular punctures as in the case recorded below. The injection of a few cubic inches of air seems to be more useful, for the free gas in the peritoneum is readily recognisable, but Mr. Walsham has recorded one case<sup>1</sup> in which profound collapse occurred immediately after the injection. In all cases extra-peritoneal rupture of the bladder is more difficult to recognise than the intra-peritoneal form. For the notes of the case we are indebted to Dr. H. H. Broome, house surgeon.

A man, aged 36 years, was assisting to unload a cart full of clay when suddenly a large mass, weighing several hundredweights, fell and struck him in the back. He was stooping at the time and the force of the blow knocked him forwards on to his abdomen, where he remained for several minutes buried, with the exception of his head and legs, beneath the mass. He was dug out and taken to the North Lonsdale Hospital, Barrow-in-Furness, where he was admitted as an in-patient at 5 P.M. on Dec. 10th, 1900.

On admission the patient was in a condition of extreme collapse with a feeble running pulse. He complained of pain in the right and left loins, and shortly after being placed in bed he voluntarily passed seven ounces of almost pure blood. He stated that he urinated about one hour before the accident.

On examination it was found that there was great tenderness in the right and left loins and also in the right groin. There was pain on pressing on the anterior superior iliac spines and also on pressing on the pubic symphysis, but no crepitus was elicited and no irregularity in the outline of the ischio-pubic arch or horizontal ramus could be made out. There was no injury to the spinal column or cord. A catheter passed easily into the bladder and two ounces of blood mixed with urine were drawn off. No irregularity could be felt in the wall of the bladder and the point of the instrument could not be made out through the anterior abdominal wall. The bladder was then distended with 14 ounces of boric solution and rose above the symphysis, giving rise on percussion to a corresponding dull area in the hypogastrium. On withdrawing the fluid exactly the same amount as was injected (14 ounces) was obtained and the dull area disappeared. There was no evidence of free fluid in the abdominal cavity. It was thought probable that one or both kidneys were injured, but as the collapse was so great it was decided not to explore. Ice-bags were applied to the loins and ergot was administered hypodermically every four hours.

On the morning of Dec. 11th the patient was still collapsed, with cold extremities and profuse clammy perspiration. The temperature was 100.1° F., the pulse was 140, and the respirations were 25 to the minute. There was tenderness to pressure in the hypogastrium and swelling and fulness were present in both loins. The patient was much troubled with retching but there was no actual vomiting. On catheterisation one ounce of bloody urine was withdrawn. In the afternoon at 3 o'clock he voluntarily passed one ounce of bloody urine and at night another ounce was withdrawn by the catheter. During the whole course of the day only three ounces of urine mixed with blood were obtained from the bladder. On the morning of the 12th the patient was profoundly collapsed; the pulse was 172, the temperature was 101.6°, and the respirations were 40. The extremities were cold, numb, and cyanosed. Death occurred at 10.50 A.M.

*Necropsy.*—At the post-mortem examination both horizontal rami of the pubic bones were found to be fractured at a distance of three-quarters of an inch from their junction with the body on either side. There was no displacement of the broken ends, as the ischio-pubic arch was intact, but several fragments were detached from the pelvic surface of the ramus, and on the right side two of these had penetrated the extra-peritoneal surface of the bladder, passing through the walls in an oblique direction. The space between the inferior surface of the bladder and the posterior surface of the symphysis was filled with a mass of blood-clot which passed backwards around the neck of the bladder to the posterior wall of the pelvis and thence extended upwards, behind the peritoneum on the posterior abdominal wall, as high as the posterior surface of the liver. This large clot passed up along the sides of the rectum, extended for

<sup>1</sup> The Transactions of the Royal Medical and Chirurgical Society, 1895.