

surgical scarlet fever, and the latter by less intense toxæmia, abundant pus, and adhesions. In the majority of cases there is probably a mixed form of infection and the formation of adhesions may then depend on the streptococcus or staphylococcus being the predominant partner.

As to the treatment of non-purulent appendicitis I can only endorse what I advocated in my former paper, that owing to the impossibility of determining the exact pathological condition, and to the insidious nature of the disease, I consider it a duty to operate on every case within 24 hours after admission to the hospital, and the operation I perform differs from that employed in obvious purulent cases in that I commence with a two-inch incision, which is promptly extended if the appendix cannot be brought easily to the surface. Recently I have seen a case operated on in which the appendix was deeply adherent, and after one hour's poking with two fingers at the bottom of a small dark hole the surgeon succeeded in breaking off the top of the appendix, which afterwards could not be discovered even with the aid of head-lights. Such a procedure is really more dangerous than the disease itself. The appendix is next carefully ligated and although the vessels may be of small calibre they deserve serious attention. I operated on a most simple case about a year ago, and five days later had to re-open and to enlarge the wound in order to clear out a huge mass of blood-clot which occupied the greater part of the right abdomen, the result of hæmorrhage coming from a small vessel in the meso-appendix which had escaped ligation. The patient recovered. Having ligated and separated the mesentery from the appendix a circular incision is made around the latter close to the cæcum, which exposes the mucous coat; this is ligated with fine silk. Pressure forceps are then applied to the distal portion of the appendix, about one-third of an inch from the ligature; the appendix is divided between and the stump is covered over by three or four Lembert sutures which take a firm grip of the cæcal wall. I find that the pressure forceps prevent any leaking when the appendix is divided and no peritoneal soiling takes place. Some surgeons divide the appendix with a hot iron, quite oblivious of the fact that the formation of eschars, even within the forgiving peritoneum, is inconsistent with modern ideas as to the healing and treatment of wounds.

In all recent surgical text-books one sees illustrations of what is usually described as the "cuff" operation; in this the peritoneal coat is circularly divided and dissected down towards the cæcum. The mucous coat is then ligated with silk, the appendix is divided, and the above-mentioned web of serous membrane is drawn over the stump by sutures. The advocates of this finicking procedure evidently have not studied the late Mr. Greig Smith's definition of a good intestinal suture. (See the diagram, Fig 129, "Abdominal Surgery," illustrating the best and the worst methods.) As he stated, "Halsted first pointed out the importance of catching up a few fibres of the submucosa to give holding power to the suture; to pick up many fibres by pushing the needle along the line of fibrous layer gives greatly increased firmness to the suture grip. The muscular and peritoneal coats are easily torn through, the fibrous coat is not easily torn." The parts are finally thoroughly dried with gauze pads and the external wound is united by interrupted silkworm-gut sutures, which are usually removed from the seventh to the tenth day, and the patients are discharged at the end of the third week. In conclusion, I should like to add that in this series of 140 cases 53 were purulent; in all I had nine deaths, six of which occurred in fulminating cases, as stated before, and I venture to think that a mortality of 22 per cent. in the remaining 134 operations compares favourably with the results of any other form of treatment.

Buenos Ayres.

A CASE OF RUPTURED GLUTEAL ANEURYSM; TRANSPERITONEAL LIGATURE OF THE INTERNAL ILIAC ARTERY.

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THE rupture of an aneurysm is always a grave incident in surgery. The rupture of a gluteal aneurysm can never fail to be of interest to surgeons because of the classical case of the great Syme who by a memorable example pointed out for

all time the way to deal with it. Circumstances may, however, at any moment render it impossible in the course of an operation for turning out the clot to rest content with applying a ligature to the bleeding gluteal artery, even though the bleeding may be stayed thereby, and the surgeon may find it imperative to proceed at once to tie the feeding trunk of the internal iliac artery. Such was the state of things in the case which I desire here to place on record.

A man, aged 44 years, but looking many years older, wasted, anæmic, and ill with a history of rheumatic fever in childhood and with physical evidences of cardiac and vascular disease, a coachman by occupation, was admitted to St. Mary's Hospital on Feb. 23rd, 1902. At the beginning of his illness five weeks before admission he had suffered some pain in the course of the right sciatic nerve with tingling in his toes, but he had no pain now. He had not been ill recently nor had he met with an accident, but one day on getting down from his box he had noticed a swelling in the right buttock. This swelling had steadily increased so that on admission it was of huge size, reaching from the crest of the ilium to below the great trochanter. It was fluctuant and non-pulsatile, while towards its lower end it became dusky in colour, and immediately above the trochanter there was some inflammatory redness. Believing that it might possibly be an abscess, with which ready-made diagnosis the man had been sent to the hospital, my house surgeon, Mr. A. Whitmore, made a small inch-long exploratory incision a couple of inches above the great trochanter, where the skin was red, but finding nothing except blood-clot immediately closed the wound. He acted, indeed, with excellent judgment. Per rectum it was thought that some swelling could be felt high up on the right side of the pelvis and that a vessel was beating over it. Personally, I was unable to satisfy myself of the accuracy of this observation. Abscess being excluded by the exploratory incision, the diagnosis clearly lay between ruptured aneurysm, simple hæmatoma owing no known cause, and new growth. So markedly fluctuant, however, was the swelling that new growth seemed to be out of the question, and the belief was held that we should in all probability have to deal with a ruptured gluteal aneurysm, and preparations for meeting any difficulty which might arise in the course of operation were made accordingly. This was undertaken on Feb. 25th, my colleague, Mr. Silcock, very kindly helping me.

The original exploratory incision was first laid open and then gradually enlarged in the upward direction. With a spoon and a stream of sterile water more than two pints of old and recent blood-clot were rapidly evacuated, and so vast was the cavity that of necessity the incision was by degrees extended from the crest of the ilium to below the great trochanter. From the depths of the cavity laminated clot was turned out, one large portion being spherical in form, and looking much as if it had at one time been part of an aneurysmal sac. Deeper clots and laminated fibrin being detached it was now for the first time obvious that active hæmorrhage was taking place from the sciatic notch. This was controlled by sponge pressure until all clot had been quickly removed and we were then able to see that blood came in spurts from within the sciatic notch, evidently from the gluteal artery itself. Happily, this bleeding was under complete control by the finger but the actual bleeding point could not be seen, and evidently lay deeply on the inner side of the bone. After several unsuccessful attempts to seize the bleeding point with pressure forceps, Mr. Silcock ultimately made a lucky hit with a pair of forceps bent at the end to a right angle and completely stopped the bleeding. It seemed to us both, however, that no reliance could be placed on these forceps for the permanent arrest of hæmorrhage, especially as the very awkward projection of the handles of the forceps from the wound made it impossible to secure them in such a manner as to be perfectly safe in the various unavoidable movements of the patient. His condition allowing it, it was therefore resolved to tie the internal iliac artery at once. With the man still lying on his side the abdomen was opened in the right semilunar line, a position which favoured the fall of the intestines out of the way towards the left. Exceeding thinness of the abdominal wall was, moreover, helpful in making the discovery of the vessel comparatively easy. The covering peritoneum having been incised a single ligature of small silk was applied in the usual way. This transperitoneal ligature of the internal iliac artery had not indeed added much to the length of the operation and the condition of the patient when he left the table was exceedingly good, this being due, of course, in no small

measure to the efficient way in which the bleeding had been controlled. He rallied well and for three days gave promise of recovery. His temperature then suddenly rose to 103° F., pneumonia set in, and from this he died on March 2nd. Whether this was in any degree the result of septicity in the wound I cannot say, but it is quite certain that perfect asepsis was not maintained and perhaps in all the circumstances—the size and depth of the cavity and the great probability that the parts were septicly inflamed before the operation—this is no matter for surprise. Nevertheless, it is deeply to be regretted because there had been no return of bleeding and at the necropsy the internal iliac artery from the site of ligature onwards into the gluteal artery itself was found firmly occluded by healthy clot. The peritoneal and abdominal wounds were soundly healed. There was grey hepatisation of the lower lobe of the right lung with extensive vegetations on the mitral and aortic valves.

The point of chief interest in this case is the necessity which arose in the course of the usual operation of turning out the blood-clot and aneurysmal remains of ligaturing the main trunk from which the diseased gluteal vessel sprang. In more accessible parts this would hardly have called for comment but in the case of the gluteal artery the surgeon cannot lose sight of the fact that the opening in the vessel may perchance be intra-pelvic and the application of a ligature impossible. It was a happy chance and nothing else that the bleeding point was in this instance secured by bent forceps on the inner side of the bone. Had we failed to secure it in this manner it would have been a matter of exceeding difficulty if not impossibility to stay the bleeding and the patient might have bled to death before the iliac artery could have been tied. I do not know how such a state of things could be foretold before the ruptured sac was laid open and the clots were turned out, and it is a question whether in the case of ruptured gluteal aneurysm it would not be good practice to secure the internal iliac artery before proceeding to deal with the aneurysm itself. Here it is that transperitoneal ligature comes to the surgeon's aid, for in comparison with the old method of reaching the vessel this procedure is easy of execution and without much risk. And if such a step involves departure from the principles which hold good in dealing with ruptured aneurysm it is surely justified by the anatomical arrangement of the vessels in this region of the body and absolves the surgeon from the necessity of following a law which may be here inapplicable and of no avail.

ON THE PRECIPITIN OF COBRA VENOM: A MEANS OF DISTINGUISHING BETWEEN THE PROTEIDS OF DIFFERENT SNAKE POISONS.

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PRELIMINARY ACCOUNT.

SINCE Bordet¹ in 1899 first demonstrated that the serum of a rabbit which was treated by intra-peritoneal injections of the serum of another species of animal acquired after a time the property of forming a coagulum or precipitum, when mixed with the serum of an animal of the same species, this phenomenon has been worked out by other observers² for the sera of many species of animals and for various other proteid substances. It is not my intention in this note to trace in detail the evolution of the subject up to the present day. It will suffice to mention that specific precipitins have been prepared for the sera of many species of animals and for such proteid substances as casein of milk, the albumin which occurs pathologically in urine, crystallised egg albumin, pure serum globulin from the sheep and from the bullock, and Witte's peptone. The research made

with the precipitins of the latter four of these substances was among the last published works of the late Dr. Walter Myers. In a paper in THE LANCET³ he showed that the precipitin prepared by injections of egg albumin had no action on the other proteids with which he worked—namely, serum globulin from the sheep, serum globulin from the bullock, and Witte's peptone. He found, however, that the precipitin of serum globulin from the sheep did form a slight coagulum with the globulin got from bullock's serum and that, *vice versa*, the precipitin prepared with bullock's serum globulin precipitated to a slight degree the globulin got from sheep's serum. Myers also demonstrated that the precipitins are used up in the course of their action. He looked upon this fact as strong evidence that the action of these bodies is a chemical action.

It would appear, then, from these observations that we had at hand a means of distinguishing between various proteids and mixture of proteids, for there can be no doubt that this animal test is more delicate than any chemical method of discrimination at present available. Up to within a few months ago all workers on the precipitins of immune sera looked upon this reaction as practically a specific one. Thus, for example, it was thought that a precipitin prepared with human serum, while forming a slight precipitum with monkey's serum, especially with the serum of the anthropoid apes, gave absolutely no reaction with the sera of other animals more distantly related to man; and that the same law held good for the precipitin of horse's serum when tested with the serum of the ass, and of fowl's serum when tested with the serum of the pigeon, &c.

Quite recently, however, two French observers, Linossier and Lemoine,⁴ have published a summary of their researches with the precipitins prepared for the sera of several species of animals. In a series of most interesting papers these workers have shown that the precipitins for proteid substances in general are not absolutely specific to any one chemical form of proteid, and, further, that the precipitin prepared for the serum of one species of animal is not absolutely specific for the serum of that species or even of allied species. Thus they found that a precipitin prepared by injections of the serum of an animal precipitates also the proteids in the saliva, in the semen, in the milk, and in the muscle juice of the same species of animal, and also that such a serum precipitin causes a certain amount of precipitation with sera of other species of animals. But they showed that while the reaction is not absolutely specific a marked degree of specificity is demonstrable, inasmuch as the precipitum obtained is less voluminous as the animal the serum of which is being tested is separated in the animal scale from the animal the blood of which was used for the preparation of the precipitin. They have shown, in short, that there is in this phenomenon a marked relative specificity. This relative specificity is apparent from the following two facts: (1) the minimum quantity of precipitin necessary to give a precipitum is much less in the case of the corresponding serum than in the case of other sera; and (2) the precipitum obtained is much more voluminous with the corresponding serum than with other sera. Further, these workers found that in order to give a numerical expression to this relative specificity it is only necessary to ascertain at what maximum dilution the different sera begin to be precipitated under the action of a known precipitin, the proportion of precipitin to diluted serum remaining the same in all the preparations. Thus working with a serum prepared with the blood of the ox they found that the precipitin obtained began to cause a precipitation when mixed with the following sera at the maximum dilutions of serum of ox, 1 in 5000; serum of horse, 1 in 300; and serum of man, 1 in 50. It follows, then, that in order to demonstrate the specificity of proteid precipitins the proteid which is being experimented with must be greatly diluted before an exact and trustworthy result can be obtained. In the case of sera these observers advocate that to get a specific reaction the serum to be tested should be diluted at least a thousand-fold. They show, further, that the test is so delicate that 0.01 milligramme of the proteid used for preparing the precipitin can be easily detected if a suitable amount of precipitin is brought in contact with this quantity. As it is,

¹ Annales de l'Institut Pasteur, 1899, pp. 225 and 273.

² Nuttall: Journal of Hygiene, vol. i., 1901, p. 367. Uhlenhuth: Deutsche Medicinische Wochenschrift, 1901, Nos. 16, 17, and 45. Wasserman and Schütze: Berliner Klinische Wochenschrift, 1901, No. 7. Tarchetti: Brit. Med. Jour., Epitome of Medical Literature, June 29th, 1901, p. 104. Grünbaum: THE LANCET, Jan. 8th, 1902, p. 143.

³ THE LANCET, July 14th, 1900, p. 98.

⁴ Comptes Rendus de la Société de Biologie, Tome liv., 1902, pp. 85, 276, 320, and 369.