

Within two or three minutes of injecting the novocaine the patient is breathing without distress; there is no protrusion of the intestines into the operation area, or out of the abdomen, and the amount of general anæsthetic required is considerably lessened.

The technique is as follows:—

Two strengths of novocaine are used.

$\frac{1}{2}$  per cent. solution and 1 per cent. solution.

In the Presidency General Hospital, a 50 c.c. syringe, and a 30 c.c. syringe are employed, and in all 100 c.c. of  $\frac{1}{2}$  per cent. solution are used for the first step, and 30 c.c. of the 1 per cent. solution are used for the second step.

The actual size of the syringe of course does not matter, but it is easier to work with a big one.

The patient is prepared, and the anæsthetist starts off the general anæsthetic in the usual manner.

When the surgeon is washed up, he fills the 50 c.c. syringe with the  $\frac{1}{2}$  per cent. solution of novocaine, and determines the lowest point of the costal arch on one or other side.

The needle is inserted into the skin and deeper tissues till it is felt to strike the rib, and later the costal cartilage. When the rib or cartilage is felt on the point of the needle the latter is depressed and entered for a short distance under the costal arch. Some of the solution is then forced out into the tissues immediately surrounding the intercostal nerve. The needle is then withdrawn, inserted a little higher up the costal arch, and some more solution forced out, and so on until the ensiform cartilage is reached, when the opposite costal arch is similarly treated.

The abdomen is then opened by whatever incision in the upper abdomen is practised by the operator. The line of incision is not infiltrated.

The 30 c.c. syringe by this time has been filled with 1 per cent. solution of novocaine by the assistant and is held in readiness by him, or is placed close to the operator's right hand.

When the abdomen is opened, the lesser curvature of the stomach is determined and the fingers of the left hand introduced above it until the body of the 1st lumbar vertebra is felt, just above and to the right of the origin of the cœliac axis.

The index and middle fingers of the left hand are then slightly separated. This pushes the aorta further to the left, and leaves an area devoid of blood vessels on the body of the vertebra between the separated fingers. The needle is then introduced into this space and pushed home till it impinges on the body of the vertebra.

The syringe is now attached to the needle and the 30 c.c. of 1 per cent. solution is injected at a fairly slow rate. Care must be taken not to puncture a blood vessel, but if this should happen the needle must be removed and inserted in another place.

This accident has not occurred in any of the 12 cases in the series, which proves that if the

technique is correctly carried out there is not any great likelihood of injuring a vessel.

It was found in the first two cases that there was some difficulty in attaching the 30 c.c. syringe to the needle when *in situ*, as a needle of 6 or 7 inches was really required to reach from the vertebra to the surface of the abdominal wall.

This difficulty was got over by attaching 6 inches of rubber tubing to the needle before it is inserted, and at the other end firmly fixing a metal connection which fits the syringe. There is a glass window in the length of tubing, which will enable the operator to see if a vessel has been injured.

The needle is then withdrawn, and the operation proper proceeded with.

The technique is simple, its result a boon to surgeons, and no ill after-effects have been observed in these 12 cases.

On two occasions the patients breathed very slowly, and seemed as if they would stop breathing altogether, but there was no dyspnoea, and no cyanosis, and the breathing gradually came back to normal rate without any interference.

The amount of 1 per cent. novocaine was then lessened from 50 c.c. (which was used at first) to 30 c.c. and this phenomenon has not happened since.

My thanks are due to Lt.-Col. A. H. Proctor, M.D., F.R.C.S. (Edin.), I.M.S., for the elaboration of the above technique, and the starting of its practice in the Presidency General Hospital; also to Major H. G. Alexander, F.R.C.S., I.M.S., for its very clear description which he wrote out from England.

#### AN INTRA-ABDOMINAL OPERATION FOR OBLIQUE INGUINAL HERNIA.

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OPERATIONS devised for the radical cure of hernia are many. From the simplest one devised by Banks to the most elaborate one practised by Bassini a great deal of ingenuity has been shown by the originators of the various methods. At present there are two theories as to the cause of oblique inguinal hernia, namely the theory of Hamilton Russell and others, who think that the majority of oblique inguinal hernias descend into patent vaginal processes and that "acquired oblique inguinal hernia in the young subject has probably no existence in fact." They believe that the vast majority of all oblique inguinal hernias are due to the presence of congenital sacs. The average worked out from observations of several authorities showed that in normal children 59 per cent. had patent peritoneo-vaginal processes during the first four months and 44 per cent. even during the fifth month. Further, in children with hernia over 80 per cent. had unobliterated vaginal processes.

Others think that excepting in children such hernias in adults are caused by strain on an



abdominal wall weakened at its vulnerable points. It is certain, however, that to have a hernia, acquired or congenital, there should be a weak spot in the abdominal wall and an increase of intra-abdominal pressure. Of the many weak points on the abdominal wall the region of the inguinal canal is one. The increase of intra-abdominal pressure may be rapidly developed or may be of intermittent character or caused by a single sudden powerful strain. These are the two factors which are believed to cause all hernias, except those which are present at birth. Where the peritoneal processus vaginalis persists unobliterated, descent of the hernia is extremely easy, but where there is no pre-formed sac the increase of intra-abdominal pressure required to bring it about must be considerable and the descent is slower, gradual and occurs later in life. There are of course exceptions in both classes of cases. Even where there is no peritoneal sac, the peritoneum forms a marked dimple at the internal abdominal ring viewed from inside due to its adhesion at that point to the cord as it passes down.

The object of Bassini's operation is twofold namely, (i) removal of the sac and closing its opening at the internal abdominal ring and (ii) strengthening of the abdominal wall in the region of the canal. Those who believe in the theory of preformed sacs are quite satisfied with removing the sac and closing the neck, i.e., the opening at the internal abdominal ring; while those who think that hernias are caused by an acquired or inherited weakness of the abdominal wall, which permits a process of peritoneum to be pushed out through the canal perform Bassini's operation or some modification of it.

The causes of recurrence of hernia are (1) incomplete removal of the sac, (2) considerable and permanent weakening of the abdominal wall in old subjects, (3) suppuration, which may have been caused by faulty technique or neglect carefully to stop all hæmorrhages, which, if allowed to persist, lead to formation of hæmatoma and sepsis, and (4) post-operative vomiting or coughing which causes the ligatures to tear through the tissues.

Statistics regarding recurrence in the two types of operation show that there is nothing to choose between either form of operation.

I consider that these extra-abdominal methods of dealing with inguinal hernia, however ingenious they may be, especially those in which an attempt is made to strengthen the canal and to fix the stump left after removal of the sac, are clumsy and unreliable. It is doubtful if it is possible to strengthen the canal effectively by any method. Union between muscle and ligament must be fibrous and weak and in an individual with a very lax and weak abdominal wall and in whom the exciting cause, which is possibly an intermittent increase of intra-abdominal pressure, persists, it will surely give way. Even the effort of coughing or vomiting immediately after the

operation will tear the muscle apart from ligament or loosen the ligatures.

Further, dissection in the admittedly weak inguinal region, and mutilation of tissues caused in separating the cord from the sac and the sac from its coverings are very harmful. Thus, pain and hyperæsthesia over the cicatrix due to inclusion of nerves in ligatures, (2) atrophy of the testis due to injury to the vas, spermatic artery, or owing to pressure of a tightly sutured canal wall, (3) formation of a varicocele due also to tight suturing, (4) torsion of the testis due to twisting the gland during manipulation, (5) orchitis and epididymitis, results of rough handling of the vas or due to congestion of the pampiniform plexus, are not uncommon complications after Bassini's operation for radical cure of hernia. Besides repair of mutilated tissues by scar tissue always leaves them weaker than before.

Any attempt to obliterate the sac completely from outside must be defective because beyond the internal abdominal ring there may be and often is lax posterior parietal peritoneum ready to be forced out or descend. It is often the case that increase in size of a hernial sac however it may have originated is effected at the expense of the posterior parietal peritoneum. The chief cause of recurrence to my mind is this incomplete removal of the sac. It is impossible by any operation in which we approach the sac from without so to remove it as not to leave the so-called dimple which may at any time form the nucleus of a fresh hernia.

Fixing the neck of the sac to the anterior abdominal wall has the disadvantage of weakening the abdominal wall where the stump is fixed, and where recurrence often takes place, as the ligature strangles the muscle fibres at the site, and replaces it by fibrous tissue. Further, it does not strengthen or obliterate the loose parietal peritoneum.

It seems to me therefore that the factors in the operation, which should be depended on most to prevent recurrence, are the careful obliteration of the opening in the sac and tightening up of the loose parietal peritoneum round it, and these can be effected only by an intra-abdominal operation, which is a far more simple operation than the present extra-abdominal ones. The terrors of opening the abdomen are past. In any case, the abdominal cavity has to be entered whatever operation is performed. The method I have practised in these cases is so simple and—to my mind—so efficient that I will take the liberty of describing it now in the hope that it may find favour with some surgeons and may be given a thorough trial. In this operation not only is the inner opening completely closed without leaving a dimple, but in the process three layers of peritoneum are superimposed over the point where the opening existed leaving the canal quite unaffected and intact. Loose folds of parietal peritoneum are also tightened. There is no manipulation or separation of the delicate



constituents of the cord from the sac and therefore no damage to them. The sac itself is not handled and being serous in structure and when no longer kept open by abdominal contents is later obliterated by adhesions of its walls or atrophy or both.

*Operation.*—The bladder should be carefully emptied and a three to four inch paramedian incision made either on the left or on the right side according to the situation of the hernia. The skin incision is made very close to the middle line commencing from half an inch above the pubic crest and extending perpendicularly upwards. The anterior sheath is incised about a quarter of an inch from the middle line and the rectus muscle retracted outwards. The transversalis fascia, extra-peritoneal fat and peritoneum are then incised and their edges picked up together by forceps everted and retracted. A warm towel is then introduced into the abdominal cavity and the intestines kept away from the inguinal ligament and the internal abdominal ring, which is found about two inches to the outer side of the middle line. The finger may now be introduced through the internal abdominal ring into the hernial sac to demonstrate it.

Pick up with four or five forceps the peritoneum from the circumference of the ring a quarter of an inch away from its margin, being careful to avoid lifting up the cord. The circular fold of peritoneum thus lifted up is now closed by a purse-string suture of fine catgut. This suture is then covered by peritoneum picked up either by interrupted or continuous Lembert stitches from the surrounding loose parietal peritoneum. Thus not only is the opening of the sac most efficiently obliterated but the loose peritoneal folds lying immediately around it are utilized to strengthen the closure. A Lembert suture as mentioned provides a covering of two layers of peritoneum above the purse-string suture. The abdomen is now closed in layers. The operation is practically bloodless, efficient and quick. It can, however, only be done in cases of reducible hernia. The operation may be performed under novocain infiltration anaesthesia, supplemented if necessary by a few whiffs of ether.

#### A NOTE ON THE VALUE OF RECTAL INJECTIONS OF POTASSIUM PERMANGANATE IN THE TREATMENT OF PNEUMONIA.

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IN the *British Medical Journal* for July 17th, 1926, there appeared an article by Dr. Herbert W. Nott of Little Sutton, Birkenhead, on the value of rectal injections of potassium permanganate solution in the treatment of pneumonia. His technique is slow rectal injection of a warm solution of potassium permanganate of

strength 2 grains to the pint, in quantities of from 4 ozs. to one pint, three to four times a day. He further states '...no one knows why potassium permanganate held in aqueous solution and injected into the rectum, should give such good results.'

Since reading his article, and at the suggestion of Major J. M. R. Hennessy, I.M.S., Senior Medical Officer, Port Blair, I have given this treatment a trial, and make these notes on the results obtained.

I began the treatment on the 9th September, 1926, and from that date up to March 21st, 1927, have treated twenty-two cases, with 50 per cent. of recoveries. At first sight this recovery rate may appear to be a very poor one, but it should be understood that our patients are usually very debilitated, that pneumonia among them in Port Blair is apt to prove an extremely fatal disease, and that it is only in the few patients who come to hospital at the earliest indications of disease that it runs a comparatively mild course. The majority of cases come to hospital late in the disease, and have probably carried on their work until the second or third day of illness.

The salient features observed with this line of treatment were:

- (1) The rapid disappearance of respiratory discomfort.
- (2) The early fall in temperature.
- (3) The early commencement of expectoration.
- (4) The ease with which expectoration is performed.
- (5) The improvement in appearance and well-being of the patient.

After each injection there is a drop of about one degree in the temperature for from half an hour to an hour, and it was always noted that 24 to 36 hours after starting treatment there was fairly free expectoration. The sputum had a yellowish tinge, and did not have the tenaciousness so characteristic of the sputum in lobar pneumonia.

There is also a marked controlling effect on the pyrexia, as will be seen from the temperature charts, and this good effect was seen even in cases of massive pneumonia of the lungs; e.g., Case No. 6.

In Port Blair, although pneumonia is not a very important cause of admissions to hospital, yet the cases which we get are almost always of very severe type; frequently too the patients are long standing sufferers from chronic malaria; and under these circumstances a 50 per cent. mortality represents a real reduction. It may be remarked that no case was treated solely with permanganate injections; subsidiary treatment of the usual type being also followed. The method seemed of special benefit in the case of children and in patients seen at an early stage of the disease.

Whilst I was away on leave the treatment was carried out in a few further cases and also in some of the other hospitals in Port Blair with some success. Since my return from leave I