have described presents certain clear advantages over the usual operation, which consists in division of the junction between artery and vein followed by suture of each. The dissection and freeing of the anastomosis from the surrounding parts is sometimes very difficult and tedious, while it involves risk of injury to the vessels themselves and to neighbouring structures—for example, nerves—which may be adherent. These disadvantages are obviated by the transvenous operation, which thus offers the same facilities as does the transsaccular operation in cases of simple traumatic aneurysms and varicose aneurysms, and which I have previously emphasized.² I may say that since my former communication my further experience in the two latter types of cases fully justifies the claims I made for the transsaccular route. I have adopted it in every case where it was feasible, and it has invariably been successful.

While the case I have cited was an ideal one for transvenous aneurysmorrhaphy, in view of the presence of the venous aneurysmal sac, I do not advocate its adoption in all instances. Each case should be considered carefully when the local conditions are exposed at operation, and a decision should then be taken by the surgeon.

I desire to express my indebtedness to my former colleague, Mr. Harold Squire, for the admirable drawings of this case, and to Captain P. Cheal for his assistance at the operation and his after-care of the patient.

REFERENCES.

¹ BRITISH MEDICAL JOURNAL, December 9th, 1916. ² Ibid.

SOME OBSERVATIONS ON ABDOMINAL WAR SURGERY.

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THREE qualifications are essential to the surgeon who undertakes the treatment of wounds of the abdomen.

The first is speed in operating. He should not spend more than half to one hour over the operation. This will be greatly facilitated by making a liberal incision, which may, if necessary, extend from the ensiform process to the symphysis pubis; large incisions cause practically no shock and heal well. The second qualification is gentleness. The more gentle the surgeon's manipulations the less the shock, and this again is aided by a liberal incision. The third is good judgement. During a push it is very important for the surgeon to be able to judge whether a given case is likely or not to recover if he decides to operate; and time that might be devoted to saving other lives may be wasted in operating on an abdominal case that is hopeless from the first.

It is generally said that a patient who is alive thirty-six hours after a wound of the abdomen, is better left alone; a small percentage of such patients recover. My experience is that very few patients with injuries of the hollow viscera of more than twenty-four hours' standing are benefited by operation. If the lacerations are severe he usually already has diffuse peritonitis and operation does no good. If they are slight, they may already be shut off by adhesions, and the patient has a chance of recovering, which will be diminished by having the adhesions pulled asunder.

Indications for Operation.

The most important guide to a patient's condition is the pulse rate and blood pressure. If the pulse rate is over 120 chances of recovery are very small, but not always hopeless if a speedy operation is performed. To quote two instances:

CASE I.

An American had a shell wound over the stomach. The foreign body was localized 2 in. deep to the site of the injury. It was thought that haemorrhage was the chief trouble and not injury to many viscera. On operation the foreign body was found in the transverse mesocolon which was much torn, no hollow viscera were injured, but a large vessel was bleeding vigorously. The vessel was secured and the wounds sewn up; 300 c.cm. of 6 per cent. gum solution was injected intravenously, and the man made an uninterrupted recovery.

CASE II.

A man had a penetrating shell wound of the left buttock, and also a shell wound of the left arm, with fracture of the humerus,

a shell wound of the left leg complicated by fracture of the fibula, and a wound of the right arm.

After resuscitation his pulse was 138; he was warmed up further in the theatre and given hot drinks, and improved somewhat, but was still in a very feeble condition. It was decided to operate. The wounds were excised, the fractures put up, and the abdomen opened, while assistants adjusted the splints. One perforation of the large bowel and eight perforations of the small intestine were sutured, and the blood and extravasated faeces swabbed out. A rubber dam drain was left in Douglas's pouch. He was then infused with 1,000 c.cm. of gum solution. This was followed by a rigor. He vomited on and off for two days, but from that time onwards steadily improved, and was evacuated about eighteen days later, eating his food well and in excellent condition.

A very useful guide is the effect of moving a patient from the resuscitation ward to the theatre. He may have a pulse of 110 in the resuscitation ward, but by the time he has been carried the few yards to the theatre the pulse rate may have increased to about 130, and be difficult to count. This is a strong contraindication to operation. If he cannot stand being moved to the theatre, he will not survive an operation.

My practice has been as follows:

Any patient who is in a fit condition, and who, from the site of the wound, the physical signs, and the localization by x rays of the foreign body, probably has a wound of a hollow viscus, or a large foreign body in the liver or spleen, or shows signs of much haemorrhage, is after being sufficiently resuscitated, when this is necessary, taken to the theatre.

He is then anaesthetized. I have found Coxeter's gas and oxygen apparatus (invented by Boyle) the best—an injection of morphine and atropine having been given previously. It is usually necessary to let the gas and oxygen flow through the ether bottle that is provided, when the time for sewing up the parietes draws near.

All the entry and exit wounds are first thoroughly excised, and flavine packs introduced and left in. In most cases it is found best to make a separate incision to explore the abdomen. A para-medial is the most generally useful incision, as it is easier to make a complete examination through such an incision. In a wound of the side a para-costal incision is often suitable if the foreign body is localized near the entrance wound, and therefore it is not necessary to examine the whole of the abdominal contents. In the majority of cases the foreign body, from its position and the distance it has traversed, may have damaged many organs, and it will therefore be assumed that a para-medial incision has been made. I then make a systematic examination of the whole of the stomach and intestines, if necessary exploring the posterior surface of the stomach through the lesser sac and taking care that as little of the intestine as possible lies outside the abdomen at one time. This need not take long if a liberal incision is employed. A piece of gauze is clamped to each perforation to mark it. Then the solid viscera are inspected and the foreign body looked for and removed.

The next step is to suture all the perforations. A single continuous suture which inverts the peritoneum is all that is necessary to close a perforation. If a loop of intestine is in rags it may be necessary to resect it, and in this event an end-to-end union is best. But the mortality from shock is very great in these war resections, and it is better to sew up many perforations and tears rather than resect bowel; in fact, this latter procedure should be avoided if it is in any way possible to suture the wounds and preserve a sufficient blood supply. The large intestine will stand more traumatism to its blood supply than the small. Either fine catgut or linen thread may be used for suturing the intestine, but preferably the former. For the bladder, catgut should always be employed. For haemorrhage from the liver, spleen, or kidney, mattress sutures of catgut may be tried, but gauze packing, left in, will usually be found to control haemorrhage best. Relatively seldom is it necessary to remove the kidney or the spleen except for secondary haemorrhage which is usually due to sepsis. Wounds of the pancreas require a gauze pack to stop haemorrhage and prevent the pancreatic juice running over and digesting the abdominal contents. But pancreatic wounds are very fatal owing to concurrent damage to contiguous important structures. If there is a large foreign body in the liver it should be removed, if feasible, as it sometimes leads to dangerous hepatitis.

The blood and all faecal soiling is now sponged out with gauze wrung out in hot saline. If there is much faecal contamination a drain is left in Douglas's pouch. A rubber dam generally suffices, and drainage is often considerable for forty-eight hours, after which the drain is removed. Drainage is specially necessary after wounds of the colon and rectum. If the colon is greatly damaged colostomy of the damaged portion should be performed. Lacerations of the diaphragm, unless minute, should always be carefully sutured. The abdomen is closed in layers.

In wounds of the right chest, with a large foreign body penetrating into the liver, I have found the following technique useful. After performing thoracotomy and dealing with the lung, the foreign body is removed, if possible through the hole in the diaphragm, which is enlarged if necessary. The diaphragm is then sewn to the costal pleura, as in the operation for subdiaphragmatic abscess. A gauze drain is left in. By this method the risk of any septic discharges from the liver wound running down into the abdomen is avoided; they drain straight to the outside of the chest, through the diaphragm. The pleural cavity is of course closed off. In wounds of the left side of the chest involving the spleen and stomach, in which the foreign body is localized near the diaphragm, when thoracotomy is being performed the rent in the diaphragm can often be enlarged, the foreign body removed, and the wound of the stomach and spleen dealt with. The diaphragm is subsequently sewn up and the chest closed.

If a wound of the bladder is small but leakage of urine has occurred into the abdomen, it is not always easy to find the wound. In one case I was unable to do so, and performed suprapubic cystotomy; a tube was left in for a few days, by which time the original wound had healed; the patient made a good recovery. A foreign body should always be removed if inside the bladder. In wounds of the buttock or back, penetrating the abdomen, the back wounds should always be dealt with first, as patients suffer considerable shock from being turned over late in the operation.

After-Treatment.

It is important to keep the patient warm. Fowler's position is adopted after about six hours, and the patient is only gradually raised if there is much shock. Saline and brandy are given by the rectum. I allow plenty of fluid by the mouth as soon as the patient wishes it; if perforations have been properly sewn up it will do no harm, and if they have not they are sure to leak anyhow when the peristaltic power returns. Moreover, if the stomach be wounded it is easily made watertight, as the walls are thick. These patients are always thirsty, and need fluids badly. For flatulence pituitary extract, injected intramuscularly, is often useful.

On the second or third day it is usual to administer an enema after an injection of pituitrin. I have often noticed considerable shock after these enemata, though they have been carefully given, and have seen two cases die of shock after an enema. One of these was a patient with a large tear of the hepatic flexure of the colon that had been sutured. Three days later he was doing well, and his pulse was only 100. He was given an enema, and collapsed immediately. At the *post-mortem* examination the wound of the bowel was found quite sound, and nothing abnormal was seen. Miss Wade—a very observant sister who nursed many of these abdominal cases—tried different enemata and aperients under my direction; she always noticed some degree of shock after an enema, but found that castor oil was more satisfactory than anything else; after its administration shock was negligible. Mention is made of this as it may be worth further investigation, and apply also in cases of severe civil abdominal operations.

Results.

I kept notes of 34 consecutive cases during the final campaign of 1918. I retained them in the casualty clearing station till convalescent; 23 of these made a good recovery, 11 died—a recovery rate of 67 per cent. Six of this series had wounds of the chest penetrating the diaphragm into the abdomen.

By operating on war wounds of the abdomen some lessons are learnt that should prove of great help in civil abdominal surgery. The foremost of these is how speedily an abdominal operation can be performed without roughness and without undue sacrifice of thoroughness; the

shock of a severe operation is thereby greatly lessened. Gas and oxygen is an excellent anaesthetic for a civil abdominal operation of an urgent and critical character. It is now common to examine the whole of the abdominal contents systematically in a short space of time; lastly, a single layer of continuous suturing is ample for most cases requiring resection of bowel or anastomosis.

A satisfactory feature of these abdominal wounds is that if a patient recovers from the immediate injury he usually becomes a strong healthy man again and an asset to the community, whereas many wounds of the extremities—for example, fractured femur—nearly always leave some permanent disability.

A SUGGESTION FOR A HEALTH CENSUS.

BY

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In a paper published recently in the *Medical Officer*¹ I pleaded for a health census. The subject is of such importance to the community that I wish to draw attention briefly to it in your widely circulated JOURNAL. The points made are: (1) That the Ministry of Health is essential to attain the maximum of efficiency and for the co-ordination of the different authorities dealing with the subject; and (2) that prevention of illness takes the first place in any national scheme, and of next importance to this comes the protection of the community from communicable disease. It is now fully realized that any measures, however far-reaching, will be of little use unless better houses are provided for the poorer classes.

The waste of man and woman power from ill health is an economic problem of the first importance to the country, and money wisely expended on health, particularly on the prevention of disease, will prove a sound investment for the nation.

Medical examination for the army has proved the enormous number of unfit in this country. Medical examination of school children had already drawn serious attention to the large percentage of defective children, and had also made evident that many of the conditions by early discovery and efficient treatment could be prevented from irretrievably ruining the child's health and future.

It seems to me to be the duty of medical officers of health to indicate what may be considered the only method likely to achieve these invaluable ends—the prevention or the early treatment of disease. The advantages of this are likely to appeal to an intelligent community, though compulsory measures for any ordinary purpose are rightly resented by the average Briton. If active measures are to be taken, now is the time, for the existing organizations with trained doctors and suitable buildings can readily be turned to a good purpose. It is suggested that examination of every man, woman, and child under sixty years of age should be made periodically, and that each person examined should be supplied with a "health record card," on which would be entered all particulars of the physical condition found on such examination, this card to be produced at all subsequent examinations and necessary corrections and additions made upon it.

Four examples of well known diseases are offered as illustrations of the importance of such a scheme.

1. *Cancer*.—Every decade shows an increase of the progress of this dreadful disease. Though the cause of it has not yet been discovered, many conditions well known to surgeons predispose to its development. By removing these predisposing causes cancer can be prevented. In the public mind pain is so closely associated with the name of cancer that an apparently insignificant swelling, or a small painless sore, or a trifling haemorrhage from one of the internal organs, is apt to be ignored. Yet each of us knows that any of these may be the first evidences of cancer. Surgeons are agreed that 75 per cent. of cases now seen by them have poor chance of cure from even the most radical operations, but that in the great majority of patients there was a time when a suitable operation could have effected a good result and permanent cure.

2. *Arterio-sclerosis* claims an increasing number of victims at the most efficient and productive period of