collapse. Not infrequently these cases exhibit premonitory symptoms, consisting of extreme restlessness, blanching, and increase of pulse rate, which are sufficiently definite to lead one to make sure that a tourniquet is readily available. A lesion of a main arterial trunk is almost invariably present in such cases. Experimentally, it was found that manipulation of a large vessel in a wound caused considerable variation in the general blood pressure, even if the vessel were uninjured. These cases lend support to the view that disturbance of the nervous mechanism of the vascular system may be the initial pathological factor in the production of surgical shock.

Amount.

The amount of blood employed was usually 600 c.cm., but amounts of 900 to 1,200 c.cm. have been injected as the condition of the patient demanded. The donor's blood pressure usually fell about 10 mm. Hg, but recovered to normal within an hour.

Accidents.

(a) *Incompatibility* has been met with on three occasions. In two of these transfusion was abandoned, no ill effects persisting; they occurred early in the series, and were probably due to faulty comparison of the bloods. (These cases are not included in the series.) The third case occurred in a patient suffering from pyaemia, and merits a detailed note.

The patient was being transfused for the third time, the same donor being employed as in the second transfusion, performed without mishap three weeks previously. The recipient's condition was normal until about 200 c.cm. of blood had been injected, when acute collapse, with symptoms of haemolysis, occurred, and death took place abruptly. Autopsy revealed no evidence of embolus in lungs or cerebrum, and as a specimen of blood taken from recipient's vein was found to be haemolysed, I have no doubt that death was due to incompatibility.

In addition to emphasizing the necessity for ascertaining the symbiosis of the two bloods before every transfusion, the case seems to indicate that incompatibility may develop as a result of multiple transfusion; unfortunately it was impossible to determine whether the antagonism in this case was peculiar to the blood of the individual donor, or a true incompatibility to an entire blood group. Incompatibility usually declares itself after 10 c.cm. of blood have been injected; in this case injection had proceeded for a considerable time before any symptoms appeared. Accidents of a similar nature have been reported by other observers; a suggested explanation given by Bond is that "a definite alteration has been found to occur in the direction of increased haem-agglutinin content of the blood in the interval between two transfusions," and that this was responsible for the unfortunate result.⁴

(b) *Injury to Donor.*—This occurred once, probably the result of the transfusion tube having been reintroduced to the donor's vein after being employed on the recipient. Infection spread distally in the radial vein, which was removed through an incision at the wrist in the manner of Babcock's operation for varicose veins; complete recovery followed. A transfusion tube should not be filled a second time, and to avoid this it is convenient to employ a tube of 600 c.cm. capacity. In closing the donor's wound I make a point of removing half an inch of the vein opened in case it may have suffered damage during the proceedings.

Conclusions.

The cases are tabulated according to the clinical condition and operation performed. The figures, it should be remembered, represent a considerable proportion of the desperate cases met with in base hospital work, and afford no guide to the general death rate in the various clinical conditions. Transfusion for pyaemia was to some extent experimental, and was in fact an attempt to do something further than merely drain secondary abscesses. Patients who had recovered from some slight septic lesion were employed as donors. I think the number of recoveries in these very severe cases justifies an extension of the method as a therapeutic measure. The results in Class II indicate the usefulness of transfusion as a prophylactic against shock; it seems reasonable to hold that it should come into general use in civil practice as a preliminary to any severe operation.

Clinical Condition and Operation Performed.	Cases Transfused.			Cases not Transfused.		
	No.	Recov-ery.	Death.	No.	Recov-ery.	Death.
CLASS I.						
(a) Secondary haemorrhage; ligation of main artery	52	35	17=32.7%	52	28	24=46.1%
(b) Secondary haemorrhage; amputation of limb	14	10	4=28.5%	14	7	7=50.0%
CLASS II.						
Sepsis or gangrene; amputation of limb	39	35	4=10.2%	29	20	9=31.0%
CLASS III.						
Pyaemia	19	12	7=36.8%	—	—	—
Totals	124	92	32=25.8%	95	55	40=42.2%

A number of sphygmomanometric records were taken of the effects on blood pressure of various substances used in intravenous injections, and will be made the subject of a future communication.

REFERENCES.

¹ Professor Sir E. Sharpey Schafer: *BRITISH MEDICAL JOURNAL*, December 8th, 1917. ² Major Roger Lee: *Ibid.*, November 27th, 1917. ³ Captain O. Robertson: Memorandum on Blood Transfusion, Medical Research Committee, April 4th, 1918. ⁴ Colonel C. J. Bond: *BRITISH MEDICAL JOURNAL*, March 22nd, 1918.

MASTOIDITIS.

BY

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For the last ten years I have been in daily contact with cases of suppurative otitis media, or its complications, in the out-patient department and operating theatres, and some opinions founded on this experience may be of interest.

The term "suppurative otitis media" is a misnomer, as in every case the disease starts in the mastoid antrum, and the suppurative otitis media is only an outward and visible sign or symptom of this invisible disease. I had swabs taken from the bottom of the mastoid antrum in fifty consecutive cases of operation for suppurative otitis media, and in every one pathogenic micro-organisms were found. The cases were not selected, but were taken as they came, and ranged, according to the duration of the discharge, from one day to seventeen years; and, according to the age of the patient, from one year to sixty-nine. It is therefore not a matter of wonder that treatment by drops, syringing, powders, etc., is ineffectual.

During 1915 I had further proof in a school clinic at which the patients could be seen and treated daily. The patients were divided into sets. One set was treated with drops, another set by hydrogen peroxide and syringing, another by massive lavage, etc.; but in no case was there any sign of improvement of any sort, but, on the contrary, the few cases which came to operation later on at the hospitals showed more extensive bone destruction than might have been expected from the duration of the disease. This experience was repeated during the years 1917-18, when, as officer in charge of the aural centre at Blackpool, 4,148 cases passed through my hands; 90 per cent. were cases of suppurative otitis media. They were treated daily by all known methods, with no good result of any kind, and remained in their original category of B 3. A great waste of men who, by means of operation (no beds were available), might, in the space of three months, have been raised to category A 1.

As the mastoid antrum is the real cause of suppurative otitis media, the only feasible treatment is by operation— and early operation. During my period as officer in charge of the aural centre I took particular note of all operated cases, and found that among 53 cases only 9 could justifiably be called healed. Of these 9, 5 underwent a radical operation, and 4 a modified mastoid, or Heath, operation.

In the former cases the best hearing was 7/17 watch, whilst in the latter the hearing was practically normal (15/17). These cases had not been operated upon by any one surgeon, but were drawn from all over England. Of the 44 unhealed cases, 33 had widely patent Eustachian tubes. This is interesting, as one very seldom, if ever, gets trouble from the tubes after Heath's operation; and the reason is, I think, because in it the drum heals up and so prevents what may be called a draught from the throat via the tubes through the ear. This draught, owing to the loss of the drum, and the inefficient closure of the tympanic orifice of the Eustachian tube in the radical operation, keeps on re-infecting the ear with micro-organisms from the throat. Ten of the 53 cases had had more than one operation performed, and another six had well marked facial paralysis.

In all except 5 cases the radical operation had been performed so that the statistics read: 48 operations, 5 healed, 10 operated upon more than once, 6 cases of facial paralysis, and 43 of the 48 in the same condition, possibly worse than they were prior to operation. The number of Heath's operation was small, in all probability because they were in a higher category than B 3, and so would not be found in a low category area such as Blackpool was.

From these statistics even the most ardent supporters of the radical operation can hardly claim satisfaction, and it cannot be wondered at that from them, and my other experience, I am of opinion that, save in very exceptional cases, it is hardly a justifiable procedure. These "very exceptional cases" are hard to define, as I have seen advanced cases of cholesteatoma recover after Heath's operation, and there is no necessity for a radical operation, if the internal jugular vein is ligated as a preliminary step, in cases of lateral sinus thrombosis. I think I should confine the indications for the radical operation to those cases in which there is present a non-functioning labyrinth, in which the operation has to be followed or continued by a complete labyrinthectomy.

The actual technique of the Heath operation has so often been described that it need not be repeated, but one or two variations I have found useful may be mentioned. As a preparatory dressing I find that iodine 2 per cent. in carbon tetrachloride is by far the nicest and does not blister or irritate the skin. The flap, which I described in the *Annals of Otolaryngology* (June, 1916), is the most useful, and, after one has used it for a few operations, can be so fashioned in nearly every case that the stitch which holds it closes the post-auricular wound and obviates the use of skin stitches. One skin stitch at most is all I ever use.

As after-dressing I prefer ribbon gauze soaked in freshly prepared eusol for a week, until the flap stitch is removed, and then instillations of rectified spirit with no syringing of any kind, as the drier the ear is kept the better.

After-complications are rare. I have never had a case of facial paralysis, but have had one of very large keloid in the post-auricular scar (possibly due to the use of scarlet-red ointment), which disappeared under treatment by radium. There was one case of metastatic ophthalmia; it occurred in a child, aged 7, who was admitted to my wards in 1912 with semi-acute mastoiditis on the right side. I operated by the Heath method, and for a day or two all seemed to go well, when a septic temperature with no localizing symptoms began. I opened the post-auricular wound, and, after washing it out, packed it from behind. The temperature dropped, and there seemed nothing to hinder her convalescence until the fourth day after the second operation, when she developed hypopyon in the left eye. This was accompanied by no pain, redness, or discomfort, and there was no wound or abrasion of the cornea. The vitreous gradually became infected, and she is now (1919) waiting to be taken into hospital to have the shrunken remnant of the left eye removed. Her ear is perfectly healed, the membrana tympani is normal, and the hearing 17/17 watch. The mastoid infection was streptococcal in origin. A point of interest in this case was the fact that the metastatic ophthalmia occurred on the opposite side to the operated ear, and hence the side on which the child lay in bed.

LAVAL UNIVERSITY, Montreal, has been separated from Laval University, Quebec City, and will henceforth be known as the University of Montreal.

TWO CASES OF ACUTE PERFORATED GASTRIC ULCER: OPERATION: RECOVERY.

BY

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THESE two cases are reported in order to illustrate once more the necessity of bringing such cases under treatment at the earliest possible moment if success is to be hoped for.

CASE I.

Pte. C. E., R.A.F., aged 49, was sent to hospital in an ambulance about 7 p.m. on December 20th, 1918.

He stated that before joining the army he had been an upholsterer. He had suffered from indigestion for years—that is, he had pain and tenderness in the epigastrium with occasional attacks of vomiting, and was always subject to "wind." He had been able to keep these symptoms more or less in check by dieting himself, until after he enlisted, when he had to have the food that was supplied to the troops. For two days before admission he had had rather more pain and had been sick once. On the day of admission he had had tea, consisting of tea and bread and jam, about 5 p.m.; shortly afterwards he was seized with sudden acute pain in the epigastrium and was sick.

He was a tall spare man, with very few teeth, and those he had were in a deplorable condition. The tongue was clean. He stated that his bowels had acted in the morning. Pulse 80; temperature 97.8°. He was very pale and wore a scared look. The pain was less severe and more generally distributed over the abdomen than when first seized. The epigastric region was distended. The rest of the abdomen was somewhat retracted but rigid. Tenderness was most marked a little to the right of the middle line midway between umbilicus and xiphoid cartilage. This area was tympanitic and there was complete absence of liver dullness. The patient was seen, at my request, by Major Brasher, R.A.M.C.(T.), who confirmed the diagnosis of perforated gastric ulcer.

He was prepared at once for operation and taken to the theatre, Major Brasher kindly administering the anaesthetic for me. An incision was made from just to the right of the middle line between the xiphoid cartilage and the umbilicus. When the parts were retracted, the liver held up, and the stomach pulled gently downwards, the perforation was found to be on the anterior surface of the stomach, close to the pyloric end and rather nearer the lesser curvature. Bubbles of gas were escaping, as well as fluid that looked like weak tea. The perforation was of fair size; there was very little induration around it. It was closed with fine silk, invaginated, and sewn over in the usual way. Not much fluid was seen in the abdomen, but what was there was mopped away and two large drainage tubes with wicks inserted; one drained the right kidney region, and the other was placed in the pelvic cavity through a separate incision in the middle line above the pubis. There was no recent peritonitis to be seen anywhere, nor were there any adhesions to be found pointing to previous peritonitis. He made a completely uninterrupted recovery. He was kept on sips of water for forty-eight hours, and given salines by the rectum. He had been on chicken diet for three weeks before leaving hospital, and was discharged from hospital on February 17th, 1919, stating that he had not felt so well for a very long time.

CASE II.

Pte. M. S., Royal Irish Rifles, aged 38, was sent into hospital at about 8.30 p.m. on December 31st, 1918, in an ambulance. He was examined by Captain E. J. Coombe, R.A.M.C.(S.R.), who diagnosed perforated gastric ulcer. He was sent into one of my wards and seen by Major Brasher, R.A.M.C.(T.), and myself, and the diagnosis confirmed.

The patient stated that he had been subject to indigestion for a very considerable time, and that it had been worse during the past week. He had been in his usual state up to about 6 p.m. on the day of admission, when he was seized with violent pain in the epigastrium and was sick. On arrival he was somewhat collapsed, very pale and cold, with subnormal temperature and pulse of 88. He had very few sound teeth, and was generally of poor physique. The bowels had acted in the morning. He stated that the pain was easier and had become more general over the abdomen. The lower part of the abdomen was flat, but not retracted. The upper part was full, and the liver dullness quite absent. The epigastrium was tender, but no one spot could be found.

He was prepared for immediate operation, and taken to the theatre, where Major Brasher gave the anaesthetic. An incision was made to the right of the middle line, and as soon as the peritoneum was opened gas and greenish stomach fluid escaped. The perforation in this case was much larger, and was situated at the pyloric end of the stomach on its anterior surface, rather closer to the greater curvature. The induration around was distinct. The perforation was closed in the usual way, and a tag of omentum stitched over the site of the perforation. As much of the fluid as could be found was mopped away, and two drainage tubes with gauze wicks were inserted—one through the operation wound into the right kidney region, and the other through a separate incision below the umbilicus.