ANEURISM OF ABDOMINAL AORTA.

DISTAL COMPRESSION—CURE OF THE ANEURISM—DEATH
FROM GANGRENE OF THE JEJUNUM ON ELEVENTH
DAY—NECROPSY—REMARKS.

BY

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E. B—, æt. 32, a shoemaker by trade, was admitted into the Infirmary in October, 1883. He had been in the army nine years, and had syphilis five years ago. No history of strain or injury.

Two weeks before admittance he was suddenly seized with severe pains in his back and epigastric region ; these became much worse during the night, and at the same time he noticed a pulsating swelling in the abdomen, which had not been previously observed. He continued in the same condition up to the time of admission.

On admission the patient's general appearance was healthy ; there was slight hypertrophy of the heart and a

trace of albumen in the urine. He lay chiefly on his right side ; there was no marked tension or tenderness of the abdomen ; strong pulsation could be seen and felt between the costal cartilages of the eighth and ninth ribs in the middle line. A large tumour could be felt deep down in the epigastric region, shading off into the right and left hypochondriac and umbilical regions ; moveable by the hand but not with respiration. Pulsation was distinctly expansible, and movement was greatest on the right side. There was a slight systolic murmur over the swelling. Compression of the aorta below the tumour caused pain and uneasiness in the region of the tumour, but the size and pulsation were lessened. The dimensions of the tumour were about six to seven inches from side to side, five to six inches from above downwards, and reached apparently from the vertebral column to the anterior abdominal wall. No diminution or inequality of pulsation in the femoral arteries. Bowels confined ; no vomiting.

As the usual remedies, including rest, low diet, narcotics, &c., gave no relief, and the patient was evidently getting worse, he was extremely anxious that some operation should be performed.

On October 31st the patient was placed under the influence of chloroform, and compression of the abdominal aorta just above and to the left of the umbilicus was commenced. Carte's tourniquet was used, and the usual precautions taken in the application and continuation of the pressure. Chloroform and ether were used alternately, and compression was applied for four and three-quarter hours. During the latter half of this period the pulse became very rapid, feeble, and irregular, and the breathing embarrassed. A small quantity of urine was drawn off by catheter, and showed a marked increase of albumen. After the completion of the operation an ice-bag was applied to the abdomen, and the patient passed a good night. On the following morning all the physical signs of the aneurism were less marked. The ice-bag was discontinued on the second day. There was slight vomiting on

the first and third day after the operation (which apparently was due to the chloroform and morphia), but otherwise the patient expressed himself as much better, and the tumour was smaller, harder, and pulsation less marked.

He continued to do well for several days, but on Nov. 8th persistent vomiting, chiefly of dark grumous material, set in. Pulse 192, and feeble; thirst was intense, there was congestion of the face, and some dulness over the right lung was detected. From this time the patient gradually became worse, and died November 11th, or the twelfth day after the operation.

Post-mortem examination (forty-eight hours after death).—Body fairly well nourished. Head normal. The heart was found hypertrophied, and the cavities dilated. The aorta was free from atheroma. Lungs emphysematous. Serous effusion in right pleural cavity ($1\frac{1}{2}$ pts.). Slight consolidation of middle third of right lung; congestion of base of left lung.

Abdomen.—No evidence of peritonitis. Intestines normal, with the exception of about two feet of lower portion of jejunum, which was very dark in colour in its entire thickness, had a peculiar earthy smell, and contained black grumous fluid, similar to the vomit during life. Immediately below the celiac axis was a large sacculated aneurism, which sprang from the front of the aorta; the orifice being oval (1×2 inches). This was filled with a spongy red clot protruding slightly into the lumen of the vessel (see woodcut, p. 195.) The vertical diameter was about four inches, the horizontal five inches, and the antero-posterior four inches. The clot covered the front and partly the sides of the aorta; there was no erosion of the vertebræ. The duodenum curved over its anterior surface from the right upper corner to the lower margin of the sac, and was closely attached. The pancreas lay loosely on the upper surface. The left renal vein was firmly adherent, and crossed over the anterior surface about the centre of the sac. The aneurism in shape resembled a retort with

the body to the left, and the beak (origin of the superior mesenteric artery) to the front and right; the left side was fixed, and the right more moveable (see woodcut, p. 194). The branches of the celiac axis ran along the top of the sac and were adherent to it. The phrenic and right renal arteries were given off from the sac; the left renal from the aorta just behind it. The superior mesenteric seemed to be the branch chiefly involved; it was dilated and formed a secondary aneurism. The main branch was almost, and the lesser branches completely, occluded. There was a recent loose black clot in the right iliac artery, and the deep-seated abdominal veins were much distended with blood.

Remarks.—The only reported cases we have been able to find in which operative treatment has been attempted, are the following:—

1. A cured case is reported by Dr. Moxon and Mr. Durham in the 'Med.-Chir. Trans.,' of 1872, vol. lv, when proximal compression by Liston's tourniquet was applied for ten hours under chloroform.

2. Mr. Bryant relates a case in the same volume which was treated by distal pressure with Liston's tourniquet for twelve hours, and after an interval of twelve hours the tourniquet was reapplied for a further period of three hours. The patient died thirty-nine hours after its first application.

3. Dr. Greenhow reports a cured case of abdominal aneurism in the 'Med.-Chir. Trans.,' vol. lvi, for 1873.

4. Dr. Murray, of Newcastle, has also reported a case cured by proximal pressure upon the abdominal aorta.

From the above list it will be seen that, with one exception, surgeons have previously chosen proximal rather than distal compression in cases of abdominal aneurism. It may therefore be of interest to draw attention to the main points in the present example. Firstly, as to the symptoms during the operation, and the result thereof, and secondly as to the conclusions that may be drawn from the case.

Firstly, there was marked alteration in the circulation, shown by a great temporary increase of albumen in the urine, presumably from the higher blood-pressure in the renal arteries, great acceleration and smallness of the radial pulse with rapidity and oppression of breathing from diminution of blood in the lower extremities, and corresponding increase in the lungs. This interference did not subside when pressure was discontinued, but persisted and gave rise to partial consolidation of the lung. This raises the question whether venesection performed shortly after the operation would have been of service in restoring the equilibrium of the blood-pressure.

The next point is the obstinate vomiting and hiccough which began on the sixth day (distinct in time and character from the early vomiting due to the anæsthetic and morphia). This persisted more or less until death, and strongly resembled the vomiting of intestinal obstruction. The most probable causes of the vomiting appeared to be—

1. *Nervous* from pressure on the aortic plexus of the sympathetic.
2. Congested state of the stomach.
3. Intestinal obstruction arising either from peritonitis, laceration of the small intestine by the pad of the tourniquet, or, lastly, gangrene of the intestine from occlusion of the superior mesenteric artery.

On careful consideration of the whole case, and remembering the character of the vomit, gangrene of the intestine appeared to be the real cause. This seems to be proved by the autopsy, for gangrene of a considerable length of the gut was obviously the cause of death, and this condition was clearly due to the arterial thrombosis. This complete blocking of the superior mesenteric artery was an unfortunate but unpreventable result of its arising from the distal part of the aneurism where the clot was firmest, as other vessels arising nearer to the upper portion of the sac remained patent.

The conclusions we draw, then, from the experience of

this case, are, that the operation was justifiable and even hopeful ; that it accomplished the purpose intended ; and that recovery would probably have taken place had not the process of cure been (unavoidably) too thorough ; and that further, although fatal consequences must almost inevitably follow from these conditions, they cannot be recognised so precisely in cases similar to ours as to prohibit the use of the means of cure we adopted.

The specimen is presented to the museum of the Royal College of Surgeons.

(For report of the discussion on this paper see 'Proceedings of the Royal Medical and Chirurgical Society,' New Series, vol. i, p. 426.)