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[*Volume LV of the 'Medico-Chirurgical Transactions,' published by the Royal Medical and Chirurgical Society of London.*]

LONDON:

PRINTED BY

J. E. ADLARD, BARTHOLOMEW CLOSE.

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Received April 2nd—Read April 9th, 1872.

On February 17th, 1872, I was asked by Dr. Pavy to see a patient under his care in the clinical ward of Guy's Hospital, afflicted with an abdominal aneurism. The following history of the case was then read to me as reported by Messrs. E. Younger and R. J. Pye-Smith:

Thomas C—, æt. 30, was admitted into Guy's Hospital on February 9th, 1872. He had been a soldier in the 88th Foot for ten years, nine of which he had spent in India. He had left the service six years; and since then he had been working at heavy wharf work. He had had syphilis sixteen years ago, and dysentery when in India; but in all other respects he had been a healthy man. He had never been accustomed to take spirits.

Six months ago whilst walking, he first felt a sharp pain in the epigastrium; it was so severe as to compel him to sit down. He kept at rest for two days, when the pain ceased, and he returned to his work; the pain, however, rapidly

recurred and he again left off work. Since then the pain has continued to recur at shorter and shorter intervals, and with greater severity. He kept at his work with occasional intermissions up to the present time.

Four days before admision he began to have pain in the loins and testicles, especially on the left side. For the last fortnight he has been losing flesh.

On admission.—The man is a sturdy looking fellow, but seems despondent. His appetite is bad. Nothing abnormal can be made out in the chest. A pulsating and expanding tumour occupies the epigastric and left hypochondriac regions : it seems to be about the size of a fist. On auscultation a double bruit is heard over the tumour, but not in the back. Patient complains of pain in the tumour, and of occasional severe shooting pains from the left testicle and left side of the abdomen to the back. The urine is healthy. Pulse 64; respiration 20; temperature 98·9°.

When I saw him the aneurismal tumour was very marked, it was clearly so placed just beneath the diaphragm as to forbid the adoption of any treatment on its proximal side. I consequently determined to try distal pressure by means of Lister's abdominal tourniquet, keeping the patient under the influence of chloroform, feeling that no other plan of treatment was open. The bowels were, however, ordered to be freely opened before any treatment was adopted. In these suggestions Dr. Pavy readily concurred.

February 20th.—The bowels having been emptied by a turpentine enema, milder injections having failed, and a day given for rest, pressure was commenced at 2 p.m. The man was anæstheticised by Mr. C. Oldham ; the tourniquet was adjusted above the umbilicus, close below the tumour, but some little difficulty was felt at first in controlling the pulsation in the two femoral arteries; after three hours the instrument was so readjusted as to control both.

At the end of six or seven hours the stomach was found to be considerably distended and the tumour was thought by the ward clerk to be slightly harder. The feet became rather cold, but there was very little venous congestion. Pressure

was continued up to 2 a.m., twelve hours in all. The tumour continued to pulsate the whole time.

21st.—The patient has been sick two or three times during the night, bringing up a little thin greenish fluid. He had passed a quiet and satisfactory night, having taken a dose of morphia. He feels no pain. He has taken scarcely any food, although cold milk was ordered. The tumour was generally thought to be harder. Pressure was recommended to be reapplied at 2 p.m., twelve hours after it had been removed.

Chloroform was again given and the instrument adjusted, the man vomiting slightly. After about three hours the breathing became unsteady and feeble. The pulse also was very weak. The feet became cold and the veins congested. The tourniquet was consequently removed after it had been on for four hours, all these symptoms having become more marked.

A subcutaneous injection of morphia was given and an enema of beef tea, but the latter was rejected.

Towards night the pulse became thready and the man was clearly sinking. He died at 5 a.m., on the 22nd, about eleven hours after the removal of the clamp, and thirty-nine hours after its first application.

On the 22nd, Dr. Moxon made a post-mortem. I give the account in his own words :—

"An aneurism the size of an orange was found to exist which included the cæliac axis and the origin of the superior mesenteric artery; it communicated with the aorta by an opening the size of a halfpenny, it was crossed by the pancreas. The sac contained on an average a layer of clot one third of an inch thick, lining its interior but not very adherent; and this clot rested below on a rounded mass of clot one inch thick : it was marked over by plexiform white lines—the edges of planes of fibrin running through it—the remains of parts which had successively been temporarily exposed to the current. (Vide drawing from prep., Plate III). The remainder of the aorta was singularly free from disease.

"The pressure was found to correspond with the bifurcation of the aorta, an ecchynosed patch existed on the peritoneum

of the abdominal parietes corresponding to the seat of the pressure; a second in the mesocolon, a third in the mesentery with the mesenteric half of a coil of jejunum four feet from the duodenum. The duodenum and four feet of intestine above the injured bowel were thickened, œdematous and distended with fluid, whereas the bowel below was natural and empty. There had evidently been obstruction of the bowel at the injured spot.

"The peritoneum was generally injected of a deep red colour, and lymph existed along the intestinal coils, indicating a peritonitis of ten or twelve hours' standing. The tissues about the compressed aorta were loaded with effused blood."

Remarks.—The interest of this case is very great, and the lessons to be learnt from it are not without their value, for whilst in a clinical point of view it illustrates the fact that peritonitis as a consequence of contusion of the intestine or peritoneum is a danger which must be taken into account in the use of the abdominal tourniquet under all circumstances, it demonstrates the pathological fact that pressure upon the *efferent* artery of an aneurism or distal pressure, for twelve or sixteen hours, is as capable of producing the formation of a solid coagulum in a sacculated aneurism even in a large artery, as pressure upon the *afferent* vessel, or proximal pressure.

I do not propose, however, to dwell upon the first clinical fact. The danger it illustrates must be admitted; it is one which apparently is not to be avoided; it seems to appertain to the application of pressure by an abdominal tourniquet for any purpose; it is an extra element of danger in its use which should always be considered.

Upon the pathological fact, however, as illustrated by the drawing from the preparation, much more may be said, for it reopens the whole question of the distal treatment of an aneurism; and whilst demonstrating to a nicety the value of distal pressure on a large artery for a sacculated aneurism, it suggests the value of other forms of practice upon

its distal side; for if pressure for a few hours upon the efferent artery of an aneurism (sufficient to arrest the flow of blood through its channel) is enough to bring about the mechanical closure of a sacculated aneurism by means of a clot, and, consequently, its cure, surely the application of other means which are calculated to fulfil the same purpose may be employed to effect the same end.

Of these means the acupressing power, as applied by Porter ('Dublin Quart. Jour. Med.,' Nov., 1867); the temporary ligature as adopted by Hunter, Astley Cooper, Travers, and others; and, possibly, Lister's carbolised catgut ligature, appear the chief.

I would also suggest, that some instrumental means should be looked for by which the inner and middle coats of an artery may be divided and allowed to recurve as in torsion—without destroying the external coat; acting on the knowledge that an artery after a contusion may become occluded, and the fact Moore has given us, that a blow upon the common iliac artery may so detach its inner coats as to allow them to recurve and thus close the vessel.

In the instruments that have been hitherto employed for the temporary occlusion of an artery, the compressing force has been either enough to destroy all the coats of the vessel, as in the permanent ligature, or so diffused, as only to compress the vessel. Whether we have in the artery constrictor of Dr. Fleet Spiers of New York ('Medical Record,' New York, April 1, 1871) what is wanted, is an open question, but in justice I am bound to say that from repeated experiments upon vessels removed after death, it does all he states—it divides the inner and middle coats of the artery and produces their recurvation as in torsion, and in the brachial artery of a living subject after amputation, it arrested hæmorrhage as readily and effectually as torsion.

In the case before us we have a pathological proof that temporary pressure on the distal side of the aneurism is enough to bring about its cure. In Edward's case ('Lancet,' Jan. 9, 1858) the same fact is clinically illustrated upon the innominate artery.

In Porter's case, already mentioned, the treatment by distal acupressure is also encouraged.

The results, moreover, of the distal ligature for carotid aneurism as first practised by Wardrop are not unsatisfactory, four out of seven cases recovering, although as applied to other arteries less favorably situated the practice has it is true, been less favorable.

In conclusion, I would therefore respectfully submit that these facts, taken together, seem to indicate that the distal treatment of an aneurism is well worthy of renewed attention.

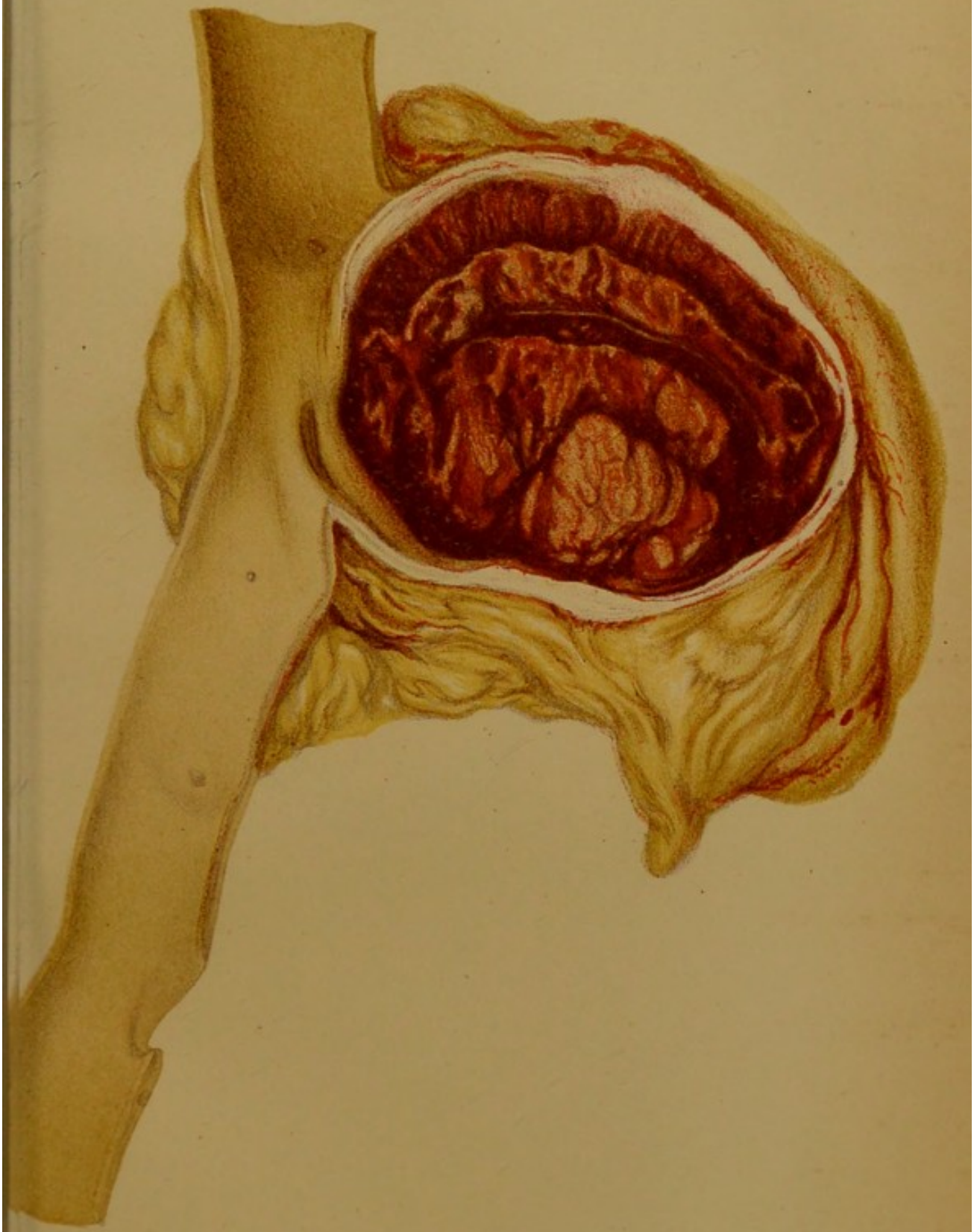
That this distal treatment may be carried out by means of pressure, digital or instrumental, by some acupressing power, some temporary constricting power, whether by ligature or otherwise; or by the use of some apparatus, by which the inner tissues of an artery may be lacerated and allowed to recurve, as in torsion, without the destruction of the outer. And although many of those remarks are as applicable to the treatment of an aneurism on its proximal side as on its distal, they are far more so to the latter, for it is to be remembered that a large number of aneurisms to be treated at all must be dealt with on their distal side.

Up to the present time the distal treatment of aneurism has been, with rare exceptions, judged mainly upon the results of the application of the permanent ligature. The distal treatment by pressure and other allied means has not had a fair trial. The case I have had the pleasure of bringing before you somewhat forcibly illustrates the value of distal pressure; and if it be the means of leading the minds of surgeons to reconsider the value of the distal treatment my object will have been attained; for I have a strong feeling that the distal treatment of aneurism by means of pressure in one of its forms, is likely to be followed by as much success as has already attended the treatment by pressure when applied to the proximal side of an aneurismal tumour.

DESCRIPTION OF PLATE III.

Abdominal aneurism involving the cœliac axis and origin of the superior mesenteric artery filled with coagulum after the application of pressure by means of Lister's tourniquet for twelve hours, and again for four hours after twelve hours' intermission.

The patient died from peritonitis eleven hours after the removal of the tourniquet, the peritonitis having been clearly the consequence of contusion of the peritoneum and intestine by the pressure of the instrument. The preparation was taken from Thomas C—, æt. 30, a patient of Dr. Pavy's and Mr. Bryant's on February 22, 1872.



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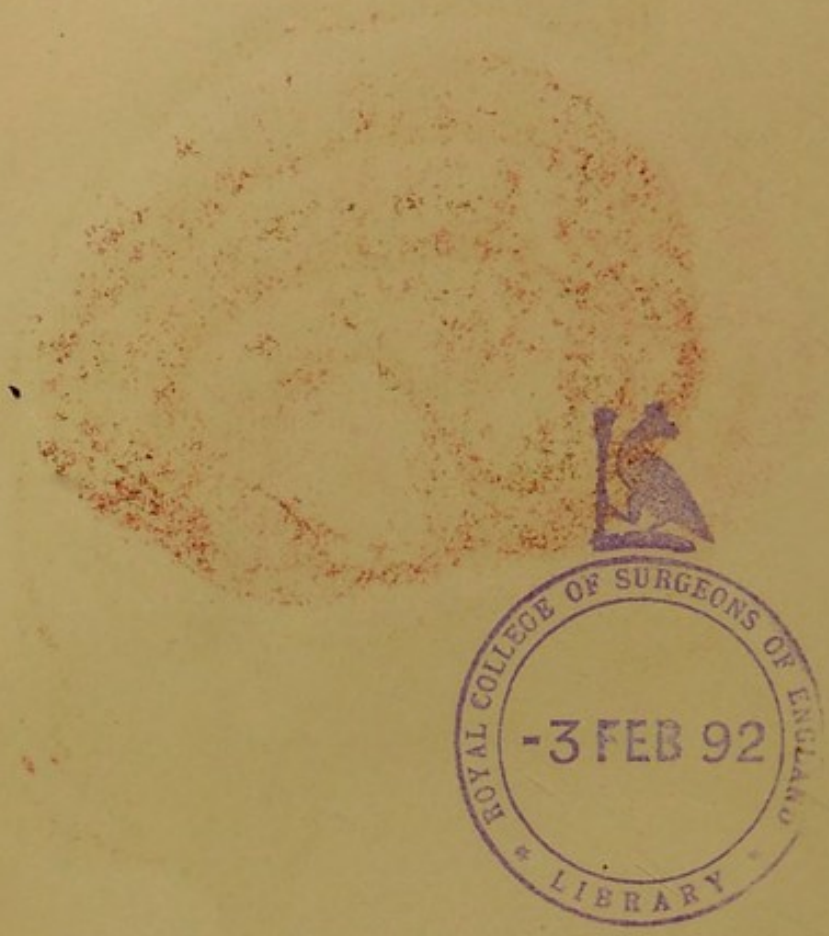
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