

EXCISION OF A SUBCLAVIAN ANEURYSM.

By L. R. BRAITHWAITE, LEEDS.

IN 1898 Sir Berkeley Moynihan¹ published a case of subclavian aneurysm treated by complete excision, and claimed for excision as against ligature : (1) A lower mortality (based on Delbet's statistics²) ; (2) An absence of recurrence ; (3) A lower percentage of cases of gangrene ; and (4) A higher 'quality of recovery.'

Cases of excision of subclavian aneurysm will be found to be exceedingly rare. Schopf, of Vienna,³ has recorded a successful case of excision of a 'subclavio-axillary' aneurysm, but as the ligature was applied to the proximal vessel 'from the axilla under the clavicle,' the aneurysm was probably more axillary than subclavian. Halsted, in America,⁴ records what is probably the best case of excision of a subclavian aneurysm, the proximal vessel being ligatured in the first part, and complete recovery of the patient resulting. In this case "the greater part of the clavicle, a piece of the deltoid muscle, and about six centimetres of the subclavio-axillary vein were removed with the aneurysm."

Moynihan's case was attacked by a novel method, the greater part of the clavicle being excised and turned down, with its adherent pectoral muscle. Later it was wired back into position. In this case death resulted on the fifty-ninth day after operation, and was due to the development and rupture of a second aneurysm proximal to the one excised, the whole of the vessel wall being the seat of patchy degeneration.

A careful search in the literature on subclavian aneurysm has revealed no other case of excision. It is this fact which decided the author to publish the case which follows.

During the Great War, penetrating and perforating injuries of the subclavian vessels have been fairly common (28 cases are recorded⁵), nearly all involving artery and vein. When an aneurysm resulted, as happened in 24 cases, it was purely arterial in respect of 13, and in 11 was arteriovenous. Unfortunately, nearly all were lost sight of, but in the few in which an attempted excision was made a fatal issue resulted on the table in every case.

Complications due to extravasation of blood and to infection, with their resulting obliteration of all the normal anatomical details in the vicinity, as well as the almost immediate and severe hæmorrhage following manipulation of what was always a false sac, made operative interference exceedingly dangerous. It was only undertaken when a rapid increase in the size of the swelling made it imperative.

In two cases where the author acted as assistant these difficulties were so great, despite removal of the clavicle and the upper angle of the manubrium sterni, that the exact origin of the hæmorrhage was not discovered until after death. It would be unreasonable to include such cases in a discussion on the treatment of true aneurysm of the subclavian artery, but it is thought that the republication of a method which has given some measure of success may help in the treatment of aneurysms of this vessel which may yet arise as the result of war injuries.

Sir George Makins,⁵ speaking of arteriovenous aneurysm, says : "Is it better to divide the clavicle or not ? In the majority of cases, unless the junction of the subclavian and axillary arteries requires to be exposed, it is quite unnecessary if the sternomastoid be divided ; section of the bone increases the severity of the operation, and entails risk of injury to the aneurysmal sac or the veins. I think the procedure should be reserved for cases of exceptional difficulty, and rarely resorted to. My own experience leads me to regard operation for arteriovenous aneurysms in this region as the most difficult and dangerous of any that can be undertaken."

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Author's Case.—T. J., age 46, a miner, admitted Nov. 29, 1913. Three months previous to admission to the General Infirmary, Leeds, he noticed some pain in the region of the right shoulder, shooting down the arm. He thought it was rheumatism, and as it did not improve he saw his doctor, who treated him by local applications, but without relief. Two months before admission he noticed a lump over the collar bone, saw his doctor again, and was eventually sent to the Infirmary, where the condition was diagnosed as an aneurysm of the subclavian artery.

After admission he said the pain was of an aching character, shooting down to the thumb and three outer fingers; it was always present, but was easier when he lay down. As the pain grew less in intensity it left a numbness in the hand and fingers.

EXAMINATION.—There was a rounded swelling about the size of a hen's egg above and behind the middle third of the right clavicle in the position of the subclavian artery. The skin was not adherent to it, and it was not tender except on deep pressure. There was an expansile pulsation synchronizing with the heart-beat, and over it a loud systolic murmur. Both carotid and radial pulses were equal on the two sides. There was no history of syphilis or of trauma. Wassermann

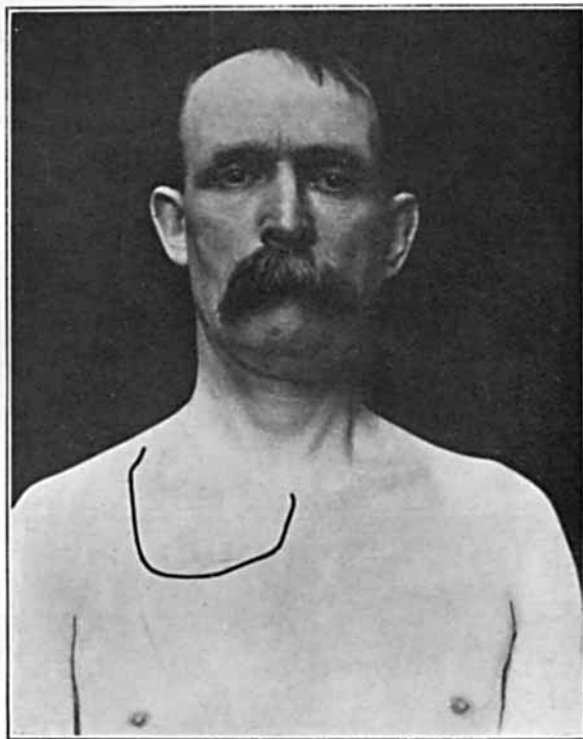


FIG. 362.—The curved incision for excision of a subclavian aneurysm.

test was positive, and for three weeks before operation he was given potassium iodide in 20-gr. doses three times a day.

OPERATION, Dec. 22, 1913.—The operation was planned exactly on the lines recommended by Moynihan.¹ Ether was administered by Dr. H. J. Macvane, the patient being flat on his back. The area of operation was sequestered by screen, and the skin very carefully prepared by the biniodide spirit and Harrington method. Mr. E. R. Flint very ably assisted with the operation. A curved incision with its convexity downwards was made over and below the clavicle (*Fig. 362*), and the flap of skin and platysma turned upwards, exposing the clavicle freely; the external jugular vein was divided and turned up in the flap. Most of the clavicular head of the sternomastoid was divided. Preliminary holes were bored through the clavicle for the subsequent suture, and it was then divided in two places, turning down rather more than the middle half of it on to the chest, together with the attached portion of the pectoralis major muscle (*Fig. 363*). The omohyoid, reduced to a film of muscle fibres, was cut away, and a very full exposure of the whole area obtained. The extent of the aneurysm was then evident, the tumour extended outwards beyond the limits of the wound, and inwards it appeared to merge into the scalenus anticus

muscle, which apparently became inserted into it. Upwards it was limited by the brachial plexus, which was firmly adherent to it. Curling over the face of the tumour were two very big arteries, the transversalis colli above and the suprascapular below; these were carefully stripped off and retracted, the former upwards, the latter towards the clavicle. Several small veins were divided and removed. The internal jugular and subclavian veins were very prominent though never in the way, whilst the phrenic nerve was easily seen and avoided.

It was very striking at this stage to notice the lack of definition of the tumour above and to the inner side compared with its sharp line of demarcation from the subclavian vein below. (*Fig. 363*).

The scalenus anticus was now defined, after dividing the dense bands of fibrous tissue which passed from it to the sac. The tubercle on the first rib was easily felt, and it was found that the sac extended for about one-third of an inch into the second part of the vessel; its limit could be seen by strongly retracting the scalenus anticus inwards. The brachial plexus presented great difficulties, the wall of the sac being very thin at this part and most firmly adherent. Having cleaned the sac as well as possible, an attempt was made to pass an aneurysm needle round the sac at the level of the first rib; the intention being to slide a ligature from the body of the sac

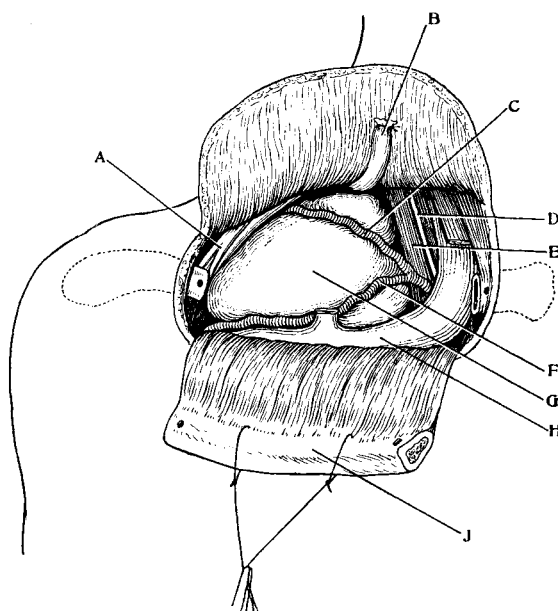


FIG. 363.—Excision of subclavian aneurysm. (A) Brachial plexus; (B) External jugular vein; (C) Transversalis colli artery; (D) Phrenic nerve; (E) Scalenus anticus; (F) Suprascapular artery; (G) Aneurysmal sac; (H) Subclavian vein; (J) Clavicle (turned down).

inwards under the scalenus anticus, and so on to the proximal portion of the second part of the artery beyond the sac. The scalenus anticus was retracted until the carotid artery was seen, and the needle passed from before backwards. On reaching the rib there was a very smart spurt of arterial blood, which ceased on withdrawal of the needle.

The supposition that the sac had been perforated was confirmed when, on passing the forefinger down along the needle track, there was a very fierce and copious escape of blood, and the finger passed into the sac of the aneurysm, which at this point was eroding the rib, the roughened surface of which could be easily felt.

Fortunately the left forefinger had been introduced (the operator is right-handed), and, as any attempt to withdraw the finger was followed by the most alarming hæmorrhage, it was pushed deeper in, blocking the lumen of the proximal vessel, whilst with the right hand a Moynihan's cholecystectomy forceps, with a short curved beak, was applied to the second part of the vessel at the inner border of the first rib.

With the hæmorrhage thus controlled, the left forefinger being still within the sac, the assistant rapidly cleared the outer margin of the sac, exposing the efferent vessel and dividing it between two stout catgut ligatures half an inch beyond the sac.

The whole sac was now turned upwards and inwards, a kangaroo tendon ligature was applied to the subclavian artery just proximal to the cholecystectomy forceps, a second ligature

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of stout catgut was applied in the groove left by removal of the forceps, and the sac was then removed.

The area was now completely dry; the clavicle was drawn up, and sutured in position with chromic catgut, the sternomastoid was replaced, and the wound closed, leaving a small tube drain at the outer angle.

Subsequent History.—There was no shock, and, although the arm was a little cold and blue for a day, the patient never had a bad symptom or sign. The wound healed by first intention without any suppuration. He was up in three weeks, the pain had completely vanished, and

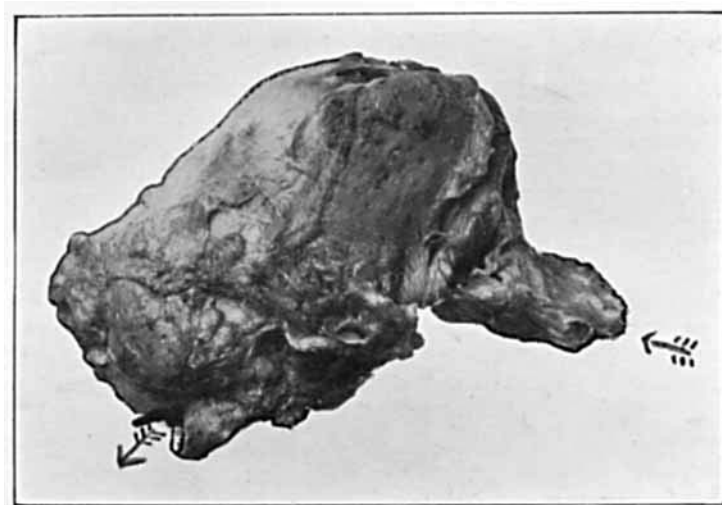


FIG. 364.—Subclavian aneurysm.

he was discharged from the hospital on Jan. 17, 1914. When seen again, in June, 1914, he was very well indeed; there was no pain of any kind, sensation in the hand was normal, and there was no difference in the radial pulses. He returned to 'surface' work at the pit during the summer of 1914, and in 1919 had worked at the coal face. The only drawback, in what may otherwise be considered a perfect result, is that the portion of clavicle which was excised did not unite by bony union, but is movable in false joints.

There is no recurrence of the aneurysm.

REFERENCES.

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- ³ SCHOPF, *Wien. klin. Woch.* 1891, Sept.
- ⁴ HALSTED, *Bull. Johns Hopkins Hosp.* 1892, July, Aug.
- ⁵ MAKINS, *Gunshot Injuries to the Blood-Vessels* (Wright, Bristol, 1919).