emulsion of lipiodol, which gave an admirable shadow under the x rays. By running this into the cavity through the irrigation tubes, it was possible to obtain a perfect outline of it and to follow the process of healing.

The case from which the skiagrams were taken (see Plate)—that of a large slowly healing empyema in a debilitated child of 6—illustrates the use of this method of investigation. If the time indication had been used for ceasing drainage and the tubes removed at three weeks or so after operation, I believe that a grave risk of recurrence of the abscess would have been run. The other indication, that of the nature of the discharge, would have given very little information, since throughout (probably owing to irrigation with Dakin's solution) it was thin, scanty, and almost sterile. But the x -ray examination showed steady improvement, and it was difficult in view of this to argue either for early stoppage of drainage or for later resection of one or more ribs.

The first skiagram, taken a fortnight after intercostal drainage, shows a typical large cavity in the costo-vertebral groove half filled by the emulsion. The second, six weeks later, shows the reduction of the size of the cavity by the progressive adherence of the two layers of pleura round its periphery. The spike-shaped cavity running upwards seen in the third, taken a fortnight later still, is the usual final stage of such an empyema.

I am at present trying to get the manufacturers of lipiodol to put on the market a similar emulsion to the one used. It appears to me that it should have a fairly wide application in surgery.

REFERENCE

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LEFT SUBCLAVIAN ANEURYSM IN ASSOCIATION WITH CERVICAL RIB

BY

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AND

GEORGE DAVISON, M.B., B.S.

(With Special Plate)

From time to time cases of subclavian aneurysm in association with cervical rib have been reported, but the condition appears to us sufficiently rare to justify the recording of another case.

Case Report

Mrs. B., aged 75, a widow, was seen by us on November 9th, 1933, when she complained of loss of power and pain in the left arm, of three weeks' duration. Her symptoms began with a sudden loss of power in her left arm, which lasted about half an hour. Similar attacks occurred during the next few days, one attack lasting almost the whole day. Power returned to the limb, but the patient continued to have difficulty with finer movements of the hand—for example, fastening buttons. Pain, which radiated from the shoulder down the limb to the fingers, was present with the loss of power, and also passed off, leaving only a feeling of "pins and needles" in the left hand.

The patient stated that she had always been healthy. Thirty years ago, when looking in a mirror, she had noticed a pulsating swelling in the left side of her neck. This had not grown in size nor had it given her any trouble. One month previous to the onset of symptoms she had fallen on her left shoulder. As the patient was a good witness this history may be accepted.

On examination she was seen to be a well-nourished woman, who did not look her age. Above the middle of the left clavicle there was a swelling one inch in diameter, tense

and elastic in consistency, and showing well-marked expansile pulsation; the surface was smooth and the edge well defined above and below, but not medially or laterally; it was freely movable in a line at right angles to the subclavian artery, but could not be moved in the line of the artery. The overlying skin was healthy and freely movable. Compression of the subclavian artery medial to the swelling diminished the size of the latter; compression distal to it increased the tension. On slight pressure over the swelling a systolic thrill could be felt; on auscultation the aortic second sound was clearly heard. On deep palpation a bar of tissue of bony hardness could be felt behind and just medial to the swelling; this bar extended downwards and laterally from the region of the seventh cervical vertebra.

The pulse was strong in both carotid and axillary and the right brachial and radial arteries, but could not be felt in the left brachial or radial. By auscultation the blood pressure in the right brachial artery was 138/80; in the left? 120/100. In other respects the cardiovascular system appeared normal.

As regards the nervous system the only abnormality found was an impairment of the finer movements of the left hand—for example, in picking up a pin.

Her urine was normal and her Wassermann reaction negative.

Radiography showed a well-developed cervical rib on the left side and a small rudimentary cervical rib on the right. (See Special Plate.) The appearances on the left side are difficult to interpret, the outline of the first thoracic transverse process being somewhat obscure. The accessory rib appears to articulate behind with the seventh cervical transverse process and anteriorly with the first rib. It appears to us that the head of the first rib is displaced downwards and medially, and that there has also been a dislocation of the accessory rib from its articulation with the seventh cervical transverse process. There is a faint shadow present in the situation of the aneurysm.

Owing to the patient's age and the relatively unimportant disability present operation was deemed inadvisable. Yet, even in the absence of positive operation findings, we feel that the facts recorded justify a definite diagnosis of aneurysm of the third part of the left subclavian artery in association with cervical rib. The onset of the nervous symptoms may be attributed to a displacement of the first rib, and with it of the cervical rib, produced by the fall on the shoulder.

Literature

Keen¹ in 1907 stated that ten cases had been reported of cervical rib in which the symptoms suggested aneurysm of the subclavian artery, but that at operation no aneurysm was found in one case (Pancoast's) and only a flattening of the artery in a second (Murphy's). He records that in a case of cervical rib of his own he found at operation that the calibre of the subclavian artery lateral to the rib was twice that of the vessel on its medial side, but that no definite aneurysm was present. In another case (Ehrich's) aneurysm developed following operation. Keen points out that in several cases the abnormal dilatation and pulsation of the vessel disappeared following operation. He considers that true aneurysm, as distinct from temporary dilatation of the vessel, is very rare, and, in addition, warns against abnormal pulsation produced by an abnormally high position of the artery being diagnosed as aneurysm. He cites one case, however (Adam's), in which at necropsy a definite cylindrical aneurysm was found extending from the outer border of the scalenus anterior to the commencement of the brachial artery.

Halsted² has collected records of 716 cases of cervical rib, in twenty-seven or more of which aneurysm or dilatation of the subclavian artery distal to the rib was noted. These include six in which the surgeon "believed the vessel abnormally large" and two in which an aneurysm

appeared promptly after removal of the rib. In an investigation on the cause of the dilatation he performed experiments in which an artery was partially occluded by a metal band. He concludes that circumscribed dilatation of an artery may arise distal to a constriction, the dilatation being at a maximum when the lumen of the vessel is reduced to a third or a quarter; and that it is constriction of the subclavian artery which produces the dilatation sometimes noted distal to a cervical rib. The portion of the artery distal to the constriction forms a relatively dead pocket, and, in his opinion, the dilatation is probably due to the whirlpool-like play of blood in this. He believes that probably vasomotor paralysis, trauma, and sudden variations in the blood pressure in the artery play no part. Halsted does not distinguish simple dilatation of the artery and "true aneurysm."

Since Halsted's article at least two further cases have been reported.

Moore³ records a case in a man of 55 in which there was a saecular aneurysm the size of a cherry springing from the anterior surface of the artery just distal to the rib. There was neither bruit nor thrill over the aneurysm, it was increasing in size, and there was no difference in the radial pulses. The Wassermann reaction was strongly positive. Good recovery followed ligation of the artery on either side of the aneurysm.

Billington⁴ describes a patient of 42 who came under observation with a pulsating swelling in the left side of the neck; there was a difference in timing of the radial pulses. One month later the left radial pulse had disappeared and pain was severe. After a further five months the pulsation in the swelling had gone. There were no nervous signs. X-ray showed a fully developed cervical rib on the right side and an incomplete rib on the left. The Wassermann reaction was negative. The patient made an uneventful recovery following excision of the aneurysm. The aneurysm consisted of a fusiform swelling $2\frac{1}{2}$ in. in length and with a maximum diameter of $3\frac{1}{4}$ in. It was almost completely occluded by thrombus. No primary disease of the intima was found.

Discussion

It appears to us that Moore's case was of a different nature from the others, and produced by different factors; the aneurysm was saecular in character and not associated with a difference in the radial pulses, and there was evidence of a syphilitic infection.

The case we have described seems to fall into line with the others recorded and with Halsted's experimental results—that is, there is a circumscribed dilatation of the subclavian artery immediately distal to a constriction caused by a cervical rib. We shall not attempt to define the conditions under which the dilatation of an artery shall be termed aneurysmal, but maintain that, clinically at least, the swelling in our case is an aneurysm of the third part of the subclavian artery. It is worthy of note that this aneurysm had evidently been present for thirty years without enlargement and without symptoms.

Summary

A case has been described of left subclavian aneurysm in association with cervical rib. The aneurysm had been present for at least thirty years, but neither it nor the rib had produced any symptoms until a fall on the shoulder caused a displacement of the rib.

We are indebted to Dr. Whately Davidson of Newcastle-on-Tyne for the radiograms of the case.

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A CASE OF BLINDNESS AFTER N.A.B.*

BY

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The organic preparations of arsenic used medicinally are divisible into two groups—the pentavalent and the trivalent. The former derives from arylarsinic acid and comprises atoxyl, soamin, arsacetin, hectine, orsudan, indarsol, stovarsol, treparsol, and tryparsamide. The trivalent group obtains from arsenobenzene, and contains salvarsan and its allies. The synonyms of salvarsan are "606," arsenobillon, arsenobenzol (France), and arsphenamine (U.S.A.). Similarly, neosalvarsan is known as "914," N.A.B. (novarsenobillon), novarsenobenzol (France), and neoarsphenamine (U.S.A.).

Cases of blindness after administration of the pentavalent group were early recognized, and were collected by Lawford in a paper opening a discussion in 1916 (*Trans. Ophth. Soc.*, vol. xxxvi, p. 12). He mentioned cases of blindness following atoxyl reported by Koch, Kopke, Morax, and McAdams. In 1910 Ernest Clarke (*ibid.*, vol. xxx, p. 240) reported blindness after soamin and orsudan; and it is known to occur after stovarsol and treparsol. Tryparsamide is a drug which has been in use recently for neural syphilis and trypanosomiasis (Lees, *ibid.*, vol. lii, p. 208), but there is an admitted danger of optic atrophy, and its administration calls for care, especially during the first few injections. (See also Woods and Moore, *Journ. Amer. Med. Assoc.*, vol. lxxxv, p. 329).

Reports in the Literature

With regard to the trivalent arsenical preparations, the report of the Salvarsan Committee of the Medical Research Council in 1922 (Special Report No. 66) includes a section on the toxic effects of these drugs. It refers to an enormous amount of material from military hospitals and civil treatment centres. Altogether 140,636 cases are included, and no blindness was reported, although there were forty-nine fatalities. German figures are also mentioned. In 1914, 74,018 German cases were reported, including one in which blindness resulted. Further German figures in 1917 referred to 265,158 cases without any blindness. Thus, in a grand total of 479,812 cases, only one case of blindness was reported after the use of the salvarsan group.

In 1916 Lawford stated (*loc. cit.*, p. 25):

"After '606,' optic nerve lesions and lesions of the third, seventh, and eighth nerves have often occurred, which develop from a few days to six weeks after the injection. These usually, but not invariably, disappear if further treatment by '606' or mercury is adopted. These lesions are undoubtedly syphilitic, but are precipitated by salvarsan."

In 1927 J. G. Hopkins wrote (*Amer. Arch. of Ophthal.*, vol. lvi, p. 543):

"The production of optic atrophy by arsphenamine in a previously uninjured eye has never been proved, but with a pre-existing neuritis of primary optic atrophy, it may appear to cause damage."

In 1928 S. O. Chambers also reviewed the literature, and finds that reports of damage to the eye from salvarsan are very rare (*ibid.*, vol. lvii, p. 412). In 1930 Dr. Gunn said that the trivalent preparations did not cause amblyopia (*Trans. Ophth. Soc.*, vol. i, p. 392). In 1931 E. A. Seale (*Journ. Med. Assoc. of South Africa*, p. 528) reported the case of a man, aged 54, who

* Read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, Bournemouth, 1934.

DENIS BROWNE: X-RAY EXAMINATION OF EMPYEMA CAVITIES

FIG. 1.—Skigram taken from side to side, with child lying upon sound lung, a fortnight after operation. A. Point of entry of de Pezzer catheter between ribs. B. Fluid level of emulsion, filling half cavity.

FIG. 2.—Skigram of same child six weeks later, showing diminution of cavity. Letters A and B as in Fig. 1.

DENIS BROWNE: X-RAY EXAMINATION OF EMPYEMA CAVITIES

FIG. 3.—Skigram of same child ten weeks after operation, showing typical final stage, with narrow cavity running upwards from point of drainage.

T. G. QUINN AND GEORGE DAVISON: LEFT SUBCLAVIAN ANEURYSM IN ASSOCIATION WITH CERVICAL RIB