Further work is required before a standardized treatment can be recommended, and in any case atropine is still essential. Some of the common organophosphate insecticides, however, which themselves are relatively non-toxic to man are slowly converted in the body to very toxic substances—for example, parathion is converted into the very poisonous paraoxon. Repeated dosing with P2S and atropine may therefore be necessary to counteract the effects of successive amounts of, for example, paraoxon, as this is synthesized *in vivo* from the reservoir of parathion.

P2S tends to produce small quantities of cyanide when heated in aqueous solution, the cyanide formation being greater in neutral (pH 7) than in acid (pH 4) solution. Solid P2S decomposes when heated at 150° C. It cannot, therefore, be sterilized by heat either as the solid or in solution. However, Seitz filtration has proved satisfactory. At room temperature aqueous solutions are stable for three months provided that the pH is kept at 4. The solid appears to be stable indefinitely.

P2S plus atropine is unlikely to be effective against poisoning by phosphates in which a diaminoalkyl group is directly connected with the phosphorus atom as in O.M.P.A. or mipafox (Kewitz *et al.*, 1956).

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TWO CASES OF SUBCLAVIAN ANEURYSM ASSOCIATED WITH CERVICAL RIB

BY

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The vascular phenomena associated with a cervical rib, though less frequently observed than the neurological complications, are sufficiently well known that considerable discussion concerning their aetiology has arisen. Coote (1861) first described a vascular complication of a cervical rib which was treated by surgery, an aneurysm of the subclavian artery being present. The infrequency of vascular symptoms was shown in a review of 716 cases of cervical rib by Halsted (1918)—only 19 (5.3%) cases exhibited purely vascular symptoms, whilst 106 had a combination of neurological and vascular phenomena. An aneurysm was present in only 27 of the 716 cases. Eden (1939), in a review of 46 published cases, noted aneurysmal dilatation in nine, while Stammers (1950) stated that such a complication was, in his experience, very rare.

Todd (1911, 1913) postulated that the vascular changes associated with a cervical rib were trophic in nature, induced by irritation of the sympathetic fibres passing in the brachial plexus. Telford and Stopford (1931) enlarged on this theory, but suggested that irritation of the sympathetic fibres produced vasospasm, the infrequency of vascular symptoms being said to result from the distribution of the sympathetic fibres in the plexus. It was suggested that vascular phenomena developed only if there was a concentration of the sympathetic fibres in the lower trunk in its inferior part, the fibres thus being more prone to irritation than in a normal plexus. Their theory was supported by the demonstration of such an arrangement in one of nine subjects studied. The majority of evidence, however,

supports the theory evolved by Lewis and Pickering (1934), who suggested that the vascular symptoms associated with a cervical rib are most probably due to local thrombosis occurring in the subclavian artery, with subsequent ejection of multiple small emboli. Such a view of the aetiology is supported by the two cases reported in this paper.

Case 1

A married woman aged 56 was admitted to hospital and was seen by me on June 17, 1949. She gave a history of sudden onset of pain in the right arm when combing her hair three months previously. The pain was followed by paraesthesia, and since that time she had had periodic attacks of pain and paraesthesia in the right arm and hand, associated with weakness of grip. She had noted some swelling at the right side of the root of the neck for the past five years.

Examination revealed a marked pallor of the distal two-thirds of all the fingers of the right hand. There was full active movement of the digits, and no muscular wasting was apparent. Immersion of the hand in warm water caused the pallor to change to a cyanotic colour. No radial pulse could be detected, but in the right side of the root of the neck a pulsatile swelling could be detected, the pulsation coinciding with the apex beat. X-ray examination revealed the presence of bilateral complete cervical rib. The Wassermann reaction was negative.

A diagnosis of subclavian aneurysm associated with a cervical rib was made, the peripheral vascular changes being thought to be due to multiple emboli, the pain and paraesthesia being ischaemic phenomena.

Operation.—On June 17 a right collar incision was made, the clavicular portion of the sterno-mastoid being partly divided and the brachial plexus exposed. The latter was found to be adherent to an aneurysm of the third part of the subclavian artery, the upper trunk passing anterior to the swelling. The plexus was mobilized and freed and the aneurysm resected, an abnormal vessel arising from its superior aspect being ligated prior to removal of the aneurysm. The anterior two-thirds of the cervical rib was excised and the wound closed. Section of the aneurysm revealed a thrombus adherent to its posterior and inferior walls.

On June 18 the hand was still cyanotic but the pain was relieved; normal colour was present on June 20. The patient was discharged home on June 29, when hand and shoulder movements were normal in range and power. No untoward symptoms were present on examination two months later.

When reviewed on April 13, 1955, the patient stated that she had not experienced any symptoms since the operation. There was no detectable difference in the temperature, colour, and muscle power of the upper limbs, but the right radial pulse was absent.

Case 2

A man aged 39 was admitted to hospital with a history of dull throbbing pain in the left forearm which began suddenly three months previously. The pain gradually extended up the arm and was accompanied by a feeling of coldness in the fingers. When the fingers were cold they were seen to be blue at their tips. Warmth relieved his symptoms, while cold had the opposite effect.

On examination the left hand was cold, clammy, and blue. While there was no wasting, the grip of the left hand was markedly impaired as compared with that of the right. Sensation to touch, pain, and temperature was normal. A pulsatile swelling was present in the left side of the root of the neck. The Wassermann reaction was negative. X-ray examination revealed the presence of a bilateral complete cervical rib.

A diagnosis of subclavian aneurysm with embolic phenomena associated with a cervical rib was made and operation advised.

Operation.—On May 19, 1954, a left collar incision was made and the brachial plexus exposed. An aneurysm of the third part of the subclavian artery was present, the upper trunk passing anterior and lateral and the middle trunk lying also anterior to the swelling, both trunks being adherent to the aneurysm. The plexus was mobilized and the aneurysm resected after division of the clavicle to remove the distal portion; the anterior two-thirds of the cervical rib was excised and the wound closed. No fixation of the clavicle was provided, the arm being retained in a sling.

On May 24 the finger movements were normal, the left hand still colder than the right, but pain had been abolished. The radial pulse was absent. Shoulder movements were begun on the fourteenth post-operative day and the patient was discharged home. When seen one month after operation there were full movements of all the joints of the left upper limb, whilst the clavicle was firmly united and the grip of the left hand was equal to that of the right. He returned to his work of dyer's operative on June 30. In February, 1955, his left hand was slightly colder and paler than the right, but function was normal and no further symptoms had been experienced.

The pathological report by Dr. I. Stewart on the sections of the aneurysm was: "The inner wall of the vessel is deformed by a flattened excrescence coated by a thin layer of laminated fibrin. Its substance is of fibrillae in which cells of the type seen in cartilage lie in pockets singly or in pairs. There are three distinct zones: in one the cells are ranged in columns with small vessels and few fibrillae; in the second and third the structure resembles cartilage but the cells differ in number. The appearances indicate repeated intravascular thrombosis with subsequent organization and cartilage deposition."

Discussion

Both cases described above exhibited purely vascular symptoms, the common initial symptoms of pallor and dull diffuse pain due to ischaemia being well demonstrated. It was thought that the release of emboli from the subclavian aneurysm accompanied by vasospasm produced the vascular symptoms, and section of both specimens reported showed intra-arterial thrombosis. It is evident, however, that there was also a vasospastic element in the development of their symptoms, as shown by their amelioration and improvement in the circulation of the limb after operation. It is feasible to suggest that the vasospasm is due to irritation of the sympathetic fibres in all the trunks, as these were adherent and stretched over the aneurysm. But complete recovery occurred after only a few days, indicating that the vasospastic element was merely a factor in the production of symptoms.

In treatment, excision of the rib alone or scalenotomy without any attack on the aneurysm has often been advocated. It is suggested that excision of the aneurysm is essential to eliminate further vascular symptoms. In Eden's (1939) case excision of the rib alone proved insufficient to prevent further embolic phenomena, and it is for this very reason that excision of the aneurysm should be undertaken.

Summary

Theories of aetiology of the vascular symptoms associated with cervical rib are reviewed.

Two cases of subclavian aneurysm associated with cervical rib are described.

Complete excision of the aneurysm and rib is advised to prevent recurrence of symptoms.

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SPLINTER HAEMORRHAGES

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Splinter haemorrhages are recognized as a characteristic physical sign in patients with subacute bacterial endocarditis. They were first described in this condition by Horder (1920), who thought they were due either to "toxic" damage to capillary walls or to minute emboli. In their textbooks on cardiology Lewis (1942), White (1947), and Wood (1950) state that capillary fragility is increased in bacterial endocarditis and that the splinter haemorrhages and petechiae found in this condition are due to the abnormality in the capillaries. However, Bramwell and King (1942) consider that the white centres which are often seen in the petechiae in bacterial endocarditis indicate that they are embolic in origin.

McNaught (1939) and Sheldon (1941) described splinter haemorrhages seen in bacterial endocarditis in patients who had no other evidence of this disease, and this prompted us to investigate the incidence and significance of these lesions in more detail.

Present Investigation

We have examined the finger-nails of 429 patients and normal individuals and 35 cadavers. The lesions classified as splinter haemorrhages were all beneath the finger-nails; the toes were not examined. The lesions were usually brown or black in colour, but when fresh they were red, and changed in colour during the next few days; they did not blanch on pressure. They were 1 to 3 mm. long, linear, and longitudinally situated beneath the distal third of the nail. They did not fade or disappear spontaneously, but grew out with the nails and could eventually be cut off. As

TABLE I.—Incidence of Splinter Haemorrhages in Different Types of Disease

Type of Disease	Patients with Splinter Haemorrhages		No. of Patients Without Splinter Haemorrhages
	No.	%	
Systemic arterial embolus (5 had mitral stenosis)	6	86	1
Probable bacterial endocarditis (mitral stenosis, negative blood cultures)	2	67	1
Uncomplicated mitral stenosis	10	44	13
Rheumatic fever (no evidence of mitral stenosis)	3	27	8
Proved bacterial endocarditis (mitral stenosis, positive blood culture) partially treated	1	25	3
Patients with marked purpura at time of examination	1	25	3
Arthritis other than rheumatic fever	1	20	4
Renal disease	4	20	16
Blood diseases not exhibiting purpura	6	19	25
Hypertension	3	18	19
Malignant neoplasms	4	17	14
Heart disease other than mitral stenosis	12	15	68
Miscellaneous	5	13	35
Pulmonary disease	11	12	79
Peptic ulcer	3	12	22
Nervous disease	3	11	24
Endocrine disease	2	11	17
Normal individuals	0	0	35

a rule the patient was unaware of their existence, but occasionally mild discomfort had been experienced. When the "haemorrhages" were associated with a history of recent trauma to the finger-nails they were ignored, as were blemishes which could conceivably have been due to dirt or

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