

P. GORTVAI: INSUFFICIENCY OF VERTEBRAL ARTERY TREATED BY DECOMPRESSION

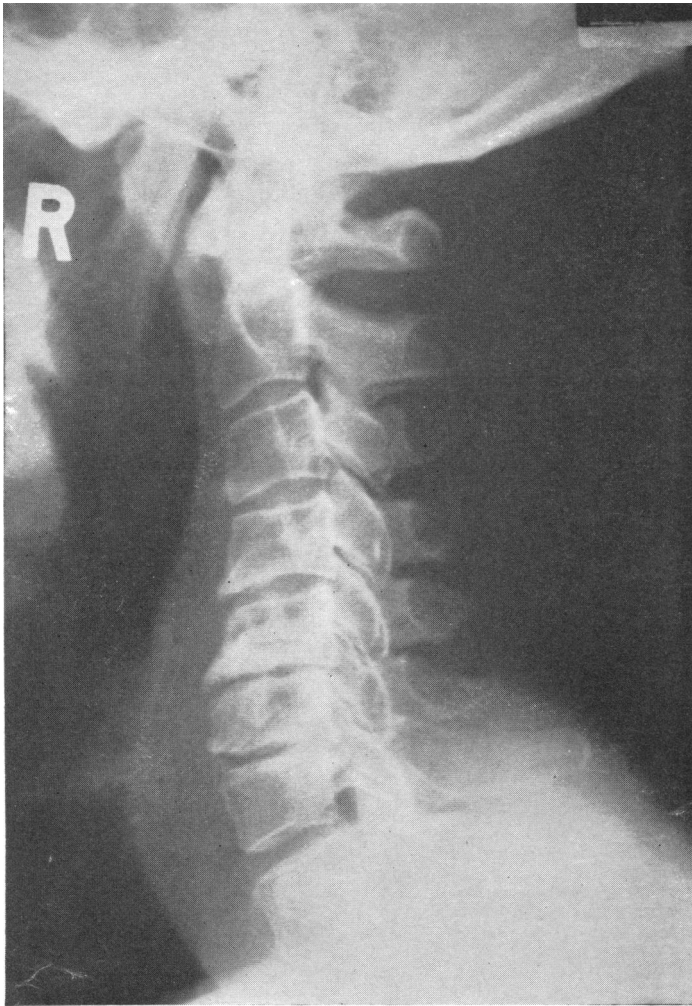


FIG. 1



FIG. 2

FIG. 1.—Lateral x-ray film of the cervical spine showing degenerative changes of the lower cervical vertebrae, most marked at C5-6.

FIG. 2.—Aortic-arch arteriogram, with head turned to left. There is a catheter in the right subclavian artery reaching to the arch of the aorta. The right vertebral artery is absent. The left vertebral artery is thicker than normal and is narrowed at C5-6 by a bony spur projecting from the body of C6 at the arrow.

FIG. 3.—Post-operative tomogram of the cervical spine showing the bony defect at the site of previous arterial compression, indicated by the arrow.

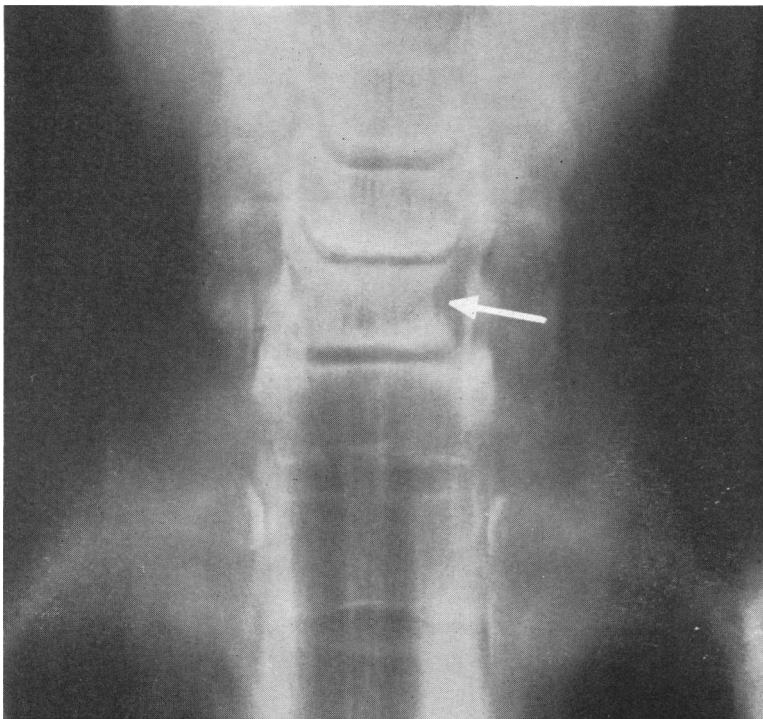


FIG. 3

though quite ineffective in removing resident organisms (Lowbury *et al.*, 1963) was found to have a considerable suppressive effect against bacteria inoculated later. It is, of course, uncertain how much of this suppressive effect occurs after treatment with these antiseptics when transient organisms are acquired naturally; the result presumably depends on the amount of moisture present on the skin and in the inoculum, and is likely to vary with the individual and with environmental conditions.

### Summary

Suspensions of *Staph. aureus* and *Ps. pyocyanea* were allowed to dry on marked areas of the palms of both hands. A number of alternative methods of disinfection and ablation were compared in respect of their activity in removing these "transient" contaminants. A Latin-square design and standard methods of washing, rinsing, and sampling were used.

All the methods tested had a large effect. In the experiments with *Staph. aureus* the most active methods (washing with povidone-iodine surgical scrub and rinsing with 0.5% aqueous chlorhexidine diacetate solution) caused reduction of 99.97% and 99.86% respectively in mean counts of samplings from the treated areas, as compared with untreated control areas; these effects were slightly but significantly greater than that of bar soap and water, which caused a reduction of 99.62% in the mean count. Similar results were obtained in the experiment with *Ps. pyocyanea*, though with that organism an effect

significantly better than that of soap and water was obtained only with chlorhexidine solution.

A chlorhexidine solution was significantly more active in removing *Staph. aureus* from the hands than a solution of hypochlorite (Milton 1 in 80); the latter did not cause a significantly greater effect than rinsing with distilled water.

Dried suspensions of *E. coli* were more effectively removed from hands wearing rubber gloves than from ungloved hands.

Suspensions of *Staph. aureus* allowed to dry on hands which were previously washed with a hexachlorophane or an iodophor detergent preparation or treated with chlorhexidine cream showed a significantly smaller proportion of survivors than similar inocula on hands which had not been treated with an antiseptic.

We wish to thank our colleagues of the M.R.C. Unit for their collaboration; Mr. M. Wilkins for technical assistance; Bayer Products for supplies of PhisoHex with orthophenyl phenol, and Berk Pharmaceuticals Ltd. for supplies of Betadine surgical scrub.

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## Medical Memoranda

### Insufficiency of Vertebral Artery Treated by Decompression of its Cervical Part

[WITH SPECIAL PLATE]

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Vertigo, dizziness, weakness of the limbs, and episodes of falling to the ground without loss of consciousness, called "drop attacks" by Kremer (1958), have been attributed to insufficient blood supply in the territory of the vertebro-basilar system (Kubik and Adams, 1946; Silversides, 1954; Meyer, Sheehan, and Bauer, 1960). The symptoms are often provoked or exacerbated by movement of the neck. Obstruction of the vertebral artery caused by extension and rotation of the head was demonstrated in cadavers at the atlas and axis (de Kleyn and Nieuwenhuyse, 1927; Tissington Tatlow and Bammer, 1957) and in the foramina transversaria (Virtama and Kivalo, 1957). Hutchinson and Yates (1956) described distortion of the second part of the vertebral artery in cadavers affected by cervical spondylosis. Associated atheroma was found in 19 of the 48 cases examined.

Sheehan, Bauer, and Meyer (1960) demonstrated distortion of the vertebral artery by cervical osteophytes during life by transbrachial vertebral angiography. Extension and rotation of the head increased compression of the artery.

Surgical treatment of vertebro-basilar insufficiency has been devised previously. DeBakey, Crawford, Cooley, and Morris (1959) and DeBakey, Crawford, and Fields (1959) treated atheromatous obstruction at the origin of the vertebral artery by thromboendarterectomy or a by-pass operation. Fusion of the cervical spine was sometimes advocated but seldom performed.

No previous account could be found describing decompression of the second part of the vertebral artery for drop attacks and ischaemic symptoms precipitated by movements of the neck.

### CASE REPORT

A man of 56 was admitted to hospital complaining of pain in the neck, weakness of the right limbs, dizziness while standing, and attacks of dropping to the ground.

When he was 10 years of age a mass of tuberculous glands were excised from the right side of his neck. In 1940, when aged 33, the roof caved in on him while he was engaged in fire-fighting during an air raid. He suffered from pain in the neck and shoulders for two months. When aged 41 the pain in his neck returned and he began to experience short attacks of dizziness and occasional loss of consciousness, associated with extension of the neck and turning of the head to either side. He was given a long cervical support to wear. He managed to drive a motorized invalid chair, but had to be careful, because even the slight degree of neck movement permitted by the cervical support could induce a feeling of impending loss of consciousness. About 10 months before his admission the periods of dizziness became so frequent that he could not get to work. His cervical spine was manipulated without anaesthesia at

another hospital. After this procedure even sitting up in bed made him feel dizzy.

On examination tenderness was found over the lower cervical spines. Movements of the neck were limited in all directions. Extension of the neck and rotation of the head to either side, especially to the right, induced a feeling of impending loss of consciousness. There was no nystagmus. He had a slight right hemiparesis, more marked in the leg. The blood-pressure was 150/90 and there were no clinical signs of generalized vascular disease.

*Investigations.*—X-ray examination of the cervical spine showed fairly advanced degenerative changes involving the lower three cervical vertebrae (Special Plate, Fig. 1). Positive contrast myelography demonstrated a partial extradural block at the level of the C 5–6 disk.

The resting electroencephalogram was normal, but turning the head to the left produced abnormal right fronto-temporal theta activity and a few delta waves. Aortic-arch angiography through the right axillary artery showed that the right vertebral artery was absent and the left thicker than normal. It narrowed at the level of C 5–6 and, to a lesser extent, at C 6–7. Rotation of the head increased the obstruction at C 5–6 (Special Plate, Fig. 2).

To facilitate recognition of the correct level at operation 0.2 ml. of 1% methylene blue solution was injected into the C 5–6 intervertebral disk under x-ray control with a technique similar to that described by Cloward (1958).

*Operation.*—A left-sided incision was made anterior to the sternomastoid. The carotid sheath and its contents were retracted laterally. The longus cervicis muscle was stripped from the bodies and left transverse processes of C 5 and C 6. The approach is similar to that described by Smith and Robinson (1958) and Cloward (1958). With a dental drill, the upper left quadrant of the body of C 6 and the anterior root of its transverse process were removed. The vertebral foramen and the foramen transversarium were opened. The artery was kinked severely at the upper margin of the C 6 vertebra. A bony spur and a fibro-cartilaginous mass, almost certainly displaced disk material, were removed from the foramen transversarium. The artery was straightened, although a crease remained in its adventitia where compression had been the most severe. This may have represented the position of an atheromatous plaque or merely some local fibrosis. After decompression the artery was quite free and pulsating well.

*Post-operative Course.*—After operation the patient was immediately able to turn his head with impunity. We allowed him up a week later without any form of cervical support. Post-operative tomograms have shown the defect in the sixth cervical vertebra well. The anterior root of the transverse process and the adjacent part of the vertebral body are missing (Special Plate, Fig. 3).

When last seen, five months after his operation, his right hemiparesis had much improved. Rotation and lateral flexion of the neck were performed fully with ease, but extension was still a little painful and limited. He had not lost consciousness nor has he fallen since the operation.

## DISCUSSION

The patient was restored from complete invalidism to an independent existence. There are, however, a number of unusual features which must be considered before treatment of this nature is advised for similar cases.

The absence of a patent vertebral artery on one side increased the likelihood of ischaemic symptoms produced by compression of the other vertebral artery. The finding of only one patent vertebral artery may have been due to a congenital anomaly or perhaps to the previous cervical operation for tuberculous adenitis.

There was a history of injury to the neck, and the cervical spondylosis may have at least partly been caused by this rather than by a purely degenerative process.

No signs of generalized vascular disease were found in the patient. As Hutchinson and Yates (1956) pointed out, a large proportion of cases affected by cervical spondylosis also have atheroma. In such cases obstruction of the vessels is partly intraluminal and external decompression alone may not achieve the same good result.

Even if only one such case is on record, it demonstrates that severe symptoms of vertebro-basilar insufficiency can be caused by extraluminal obstruction of the vertebral artery and the condition can be treated by decompression in a suitable case.

The operation described was performed by Mr. Harvey Jackson. I wish to thank him and the medical committee of the National Hospital for Nervous Diseases, Queen Square, for permission to publish this paper.

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