A Lateral Approach to the Cervical Spine: Technique and Indications*

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The lateral surgical approach to the cervical spine is a relatively recent development. Küttnert in 1917 described a technique for exposing the vertebral artery between the transverse processes. In his paper he mentioned that Helferich had suggested removal of the anterior rim of the foramen transversarium, but no further details of this technique were given until Henry's precise description of the exposure of the second portion of the vertebral artery. This procedure was also used by Elkin and Harris for traumatic vertebral arteriovenous fistulae.

We had occasion to perform this operation for a spontaneous vertebral arteriovenous fistula, following Henry's procedure. The vertebral artery was lifted from its bed by means of tapes applied above and below the lesion, and the abnormal communications could be occluded while the artery remained patent. As we viewed the operative exposure, it occurred to us that this procedure provided excellent access to the lateral aspects of the cervical vertebral bodies, the intervertebral foramina, and the portion of the anterior rami of the brachial plexus lying in the neural grooves of the transverse processes.

Since then, we have used this approach (Figs. 1–3) on a small number of patients who had lateral bony spurs compressing the vertebral artery, arthritic spurs compressing cervical nerve roots, lateral rupture of a cervical disc, or damage to the upper portion of the brachial plexus near the transverse processes. All operations were performed under the control of an x-ray image intensifier and a television monitor to facilitate identification of the level of the lesion.

Lateral Spondylotic Spurs Compressing the Vertebral Artery

These deformities have been discussed recently by Bakay and Leslie, who removed most of the lateral spurs using the Cloward technique.

Hardin, et al., were the first to describe relief of lateral spur compression of the vertebral artery by exploring the artery in its canal and removing the spur with a bone curette. No further details of the operative technique were given. Jackson operated on a similar patient reported by Gortvai. Recently, Hardin reported on 15 patients in whom osteophytic compression of the vertebral arteries was treated by removal of the anterior and posterior roots of the involved transverse processes. No mention was made of the removal of the spurs.

It is still an open question whether this type of decompression is sufficient, since rotation of the head with the chin to the opposite side, producing traction on the artery, may result in its displacement toward the lateral spurs. We have chosen to remove these spurs after exposure of the artery in its canal; excision of a disc or making holes in the vertebral bodies thus become unnecessary.

Operative Technique. Our operation has been a modification of Henry's technique. Henry placed the patient with the chin turned away from the vessel. In cases of spondylotic compression this position may lead to occlusion of the vertebral artery; therefore, we placed the head in a midposition. In this position, moreover, it is easier to approach the transverse processes between the sternomastoid muscle and the larger vessels on one side and the pharynx and larynx on the other, instead of retracting the sternomastoid muscle medially. The attachments of the longus colli, and if necessary of the longus capitis muscles, to the anterior tubercles of the transverse processes above and below the level of the lateral spur are sectioned (Fig. 3 A); these muscles are retracted medially, with care taken not to injure the cervical sympathetic chain.

Next, the anterior roots of these transverse processes as well as the costotransverse lamellae are removed, thus allowing lateral

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displacement of the vertebral artery (Figs. 1 A and 3 B). This resection must be performed carefully to avoid damage to the anterior roots of the brachial plexus. After slight lateral retraction of the vertebral artery, the lateral spurs are removed piecemeal by a rongeur. Even in the presence of radicular branches, the vertebral artery can be safely retracted a few millimeters laterally.

**Hypertrophic Changes of Luschka’s Joints Producing Narrowing of the Intervertebral Foramen**

The same operative technique allows a ready access to the intervertebral foramina, which are easily found by following the course of the exposed anterior rami of the brachial plexus medially (Fig. 3 B). The osteophytes can be removed by means of a guarded drill or small osteotomes (Fig. 1 B). Disc excision is not necessary unless the disc space is opened. The advantage of this method compared to posterior foramenectomy is that the posterior articulations remain intact. Its advantage over an anterolateral approach is the visualization of the cervical nerve roots and the consequent reduction in the risk of damage to them.

The lateral approach also allows removal of transverse ridges after excision of the uncinate process and the intervertebral disc; the transverse ridge is then removed proceeding from the intervertebral foramen inward. Better visualization of nerve roots is again an important advantage.22

When exposing the anterior rami we confirmed Kirgis’ observation that many fibers of the anterior scalene muscle appear to originate from the sheaths of these nerves.10 Kirgis stressed the possible significance of this relationship in the production of the scalenus anticus syndrome. We divided the muscular attachments to the exposed anterior rami. Venous bleeding was arrested by stripping the venous plexus from the artery in the exposed area, occluding its lateral branches, and applying surgicel on both ends of the exposed

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**Fig. 1. Bony resections used in lateral approach to the cervical spine (dark lines).**

A. Resection of anterior root of the transverse process and costotransverse lamella allows lateral retraction of the vertebral artery and removal of lateral compressing spurs. B. Same resection as in A but in addition removal of the lateral portion of the uncinate process for access to posterior spurs or a lateral ruptured disc. C. Oblique view of transverse process. The anterior ramus lying in the neural groove is bounded anteriorly by the anterior tubercle, posteriorly by the posterior tubercle, and at the base by the costotransverse lamella. D. Resection of the transverse process in proximal lesions of the superior rami of the brachial plexus. E. Bracket indicates improved access to anterior rami for performing neurolysis or nerve suture.