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Direct Origin of the Artery of the Cervical Enlargement from the Left Subclavian Artery

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Summary: An anatomic variation is described in which the principal radiculomedullary artery to the cervical spinal cord, the artery of the cervical enlargement, arises directly from the left subclavian artery. This anomaly is important clinically because it may be necessary to catheterize this vessel selectively during spinal arteriography, and also because unintentional injection of this vessel can be associated with complications.

Index terms: Arteries, abnormalities and anomalies; Arteries, anatomy; Arteries, spinal

The principal arterial supply to the anterior spinal artery in the cervical spinal cord is from anterior spinal branches of the vertebral arteries and from radiculomedullary branches of the vertebral artery and costocervical trunk (1-5). There is considerable variation in the precise origin of these branches (4-6). The thyrocervical trunk has been reported to supply branches to the spinal cord as well, via the ascending cervical artery (5), but an extensive series of thyrocervical trunk arteriograms suggest that this is rarely the case (7).

The largest radiculomedullary branch to the cord in the region of C5-C6 has been termed the artery of the cervical enlargement (ACE) by Lazorthes (8). This report describes an anatomic variation in which this vessel arises directly from the left subclavian artery (LSA).

Case Report

A 49-year-old woman underwent parathyroid arteriography to locate a parathyroid adenoma following an unsuccessful surgical exploration. Arteriography of the right and left thyrocervical trunks and internal mammary arteries is a standard part of this procedure. The right thyrocervical trunk and internal mammary artery were catheterized and imaged in routine fashion. On the left, the internal mammary artery was examined and was unremarkable.

The catheter was then introduced into a vessel believed to be the left inferior thyroid artery. On fluoroscopy, injection of contrast material into this vessel showed that it had a superior and medial course, similar to the ascending portion of the characteristic loop of the inferior thyroid artery.

Digital subtraction arteriography (DSA) of this vessel was performed with a gentle hand injection of contrast material. DSA images were monitored during the injection, and it was immediately obvious that the anterior spinal artery was opacified (Fig. 1). The catheter was pulled down and out of the vessel approximately 1.5 seconds after the beginning of the injection. The patient had no neurologic symptoms. A left subclavian arteriogram was performed, followed by catheterization and arteriography of the left thyrocervical trunk (Figs. 2 and 3). The costocervical trunk was clearly visible on both of these arteriograms, and it was clear that the catheter had not been in either the thyrocervical trunk or the costocervical trunk or in a branch of either trunk. There were no neurologic sequelae as a result of the procedure.

Discussion

Spinal arteriography requires adequate demonstration of the anterior spinal artery in the area of interest. When the cervical portion of the spinal cord is studied, it is common to catheterize selectively both vertebral arteries and both costocervical trunks. Normally, this is sufficient. However, there is enormous variation in the anatomy of the branches of the subclavian artery (9). When an anatomic variant is present, such as the one described here, additional vessels may need to be examined. A subclavian artery arteriogram may
 Knowledge of this variation is also important in order to avoid a complication. The anomalous artery of cervical enlargement in this patient has no other branches besides those to the anterior spinal artery, and a forceful, wedged, or prolonged injection could produce severe damage to help to suggest other possible sites of origin of radiculomedullary branches.

**Fig. 1.** Selective arteriogram of anomalous artery of the cervical enlargement.

A, Early in the injection, the artery is visualized throughout its course (short arrows), and there is filling of the anterior spinal artery both superior and inferior to the point of anastomosis with the artery of the cervical enlargement (long arrows). Note that the artery of the cervical enlargement has no branches.

B, One second later in the injection, there is reflux into the left subclavian artery, outlining the superior aspect of the arterial lumen (long arrow). There is also opacification of the costocervical trunk (short arrows). The anterior spinal artery is well seen.

**Fig. 2.** Selective arteriogram of the left thyrocervical trunk.

A, The loop of the inferior thyroid artery is well seen (long arrow), as is the vascular blush of the left lobe of the thyroid gland (short arrows). There is no filling of the anterior spinal artery.

B, A later image from the same study shows reflux into the left subclavian artery, with opacification of the left costocervical trunk (short arrows) and the inferior thyroid vein (long arrows). There is no filling of the anterior spinal artery, and the anomalous artery of cervical enlargement is not identified.
the spinal cord. This case serves as a useful reminder that selective arteriography of the proximal branches of the subclavian artery must always be performed with extreme caution.

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References


Fig. 3. Left subclavian arteriogram demonstrates both the anomalous artery of cervical enlargement (long arrows) and the inferior thyroid artery (short arrows). The anterior spinal artery is opacified (open arrows).