

Case Study

Variation in Subclavian Artery Branches- A Case Report

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Abstract:

Objectives: *To study the origin of subclavian artery and its branching pattern.*

Material and methods: *During routine cadaveric dissection for undergraduate medical students, a unilateral variation in the branching pattern of the left subclavian artery was noted on the left side of a 70 year old male cadaver.*

Result: *Left subclavian artery arises from the arch of aorta and immediately divides into medial branch and a lateral branch. Most of the branches are arises from the medial branch whereas vertebral artery originated from the lateral branch of the subclavian artery.*

Conclusion: *Surgeons must be aware of possible variations of the major arteries and be able to identify them. This is very important for appropriate invasive techniques in order to achieve desired objectives and to avoid major complications especially during vascular surgery.*

Keywords: *Subclavian artery, arch of aorta, variation*

Introduction

The right subclavian artery arises from the brachiocephalic trunk, the left from the aortic arch. For description, each is divided into a first part, from its origin to the medial border of scalenus anterior, a second part behind this muscle and a third part from the lateral margin of scalenus anterior to the outer border of the first rib, where the artery becomes the axillary artery. Each subclavian artery arches over the cervical pleura and pulmonary apex. Their first parts differ, whereas the second and third parts are almost identical.

The first part of the left subclavian artery springs from the aortic arch, behind the left common carotid, level with the disc between the third and fourth thoracic vertebrae. It ascends into the neck, and then arches laterally to the medial border of scalenus anterior.

The second part of the subclavian artery lies behind scalenus anterior; it is short and the highest part of the vessel.

The third part of the subclavian artery descends laterally from the lateral margin of scalenus anterior to the outer border of the first rib, where it becomes the axillary artery.

Vertebral Artery

The vertebral artery arises from the superoposterior aspect of the first part of the subclavian artery. It passes through the foramina in the transverse processes of all of the cervical vertebrae except the seventh, curves medially behind the lateral mass of the atlas and enters the cranium via the foramen magnum. At the lower pontine border it joins its fellow to form the basilar artery. Occasionally it may enter the cervical vertebral column via the fourth, fifth or seventh cervical vertebra

Internal Thoracic Artery

The internal thoracic artery arises inferiorly from the first part of the subclavian artery, c.2 cm above the sternal end of the clavicle, opposite the root of the thyrocervical trunk.

Thyrocervical Trunk

The thyrocervical trunk is a short wide artery which arises from the front of the first part of the subclavian artery near the medial border of scalenus anterior, and divides almost at once into the inferior thyroid, suprascapular and superficial cervical arteries.

Inferior thyroid artery

The inferior thyroid artery loops upwards anterior to the medial border of the scalenus anterior, turns medially just below the sixth cervical transverse process, then descends on longuscolli to the lower border of the thyroid gland. It passes anterior to the vertebral vessels and posterior to the carotid sheath and its contents (and usually the sympathetic trunk, whose middle cervical ganglion frequently adjoins the vessel). On the left, near its origin, the artery is crossed anteriorly by the thoracic duct as the latter curves inferolaterally to its termination. Relations between the terminal branches of the artery and recurrent laryngeal nerve are very variable and of considerable surgical importance. The artery usually passes behind the nerve as it nears the gland. However, very close to the gland, the right nerve is equally likely to be anterior, posterior or amongst, the branches of the artery, and the left nerve is usually posterior. The artery is not accompanied by the inferior thyroid vein.

Suprascapular artery

The suprascapular artery descends laterally across scalenus anterior and the phrenic nerve, posterior to the internal jugular vein and sternocleidomastoid. It then crosses anterior to the subclavian artery and brachial plexus, posterior to, and parallel with, the clavicle, subclavius and the inferior belly of omohyoid, to reach the superior scapular border.

Superficial cervical artery

The superficial cervical artery is given off at a higher level than the suprascapular artery. It crosses anterior to the phrenic nerve, scalenus anterior and the brachial plexus and is covered by the internal jugular vein, sternocleidomastoid and platysma. It crosses the floor of the posterior triangle to reach the anterior margin of levator scapulae, and ascends deep to the anterior part of the trapezius, which it supplies, together with the adjoining muscles and the cervical lymph nodes. It anastomoses with the superficial ramus of the descending branch of the occipital artery. About a third of the superficial cervical and dorsal scapular arteries arise in common from the thyrocervical trunk, with a superficial (superficial cervical artery) and a deep (dorsal scapular artery) branch. The latter passes laterally anterior to the brachial plexus and then posterior to levator scapulae.

Costocervical Trunk

On the right, this short vessel arises posteriorly from the second part of the subclavian artery, and, on the left, from its first part. It arches back above the cervical pleura to the neck of the first rib, where it divides into superior intercostal and deep cervical branches.

Dorsal scapular artery

The dorsal scapular artery arises from the third, or less often the second, part of the subclavian artery. It gives off a small branch (which sometimes arises directly from the subclavian artery), to scalenus anterior. It passes laterally through the brachial plexus in front of scalenusmedius and then deep to levator scapulae to the superior scapular angle.

About a third of the superficial cervical and dorsal scapular arteries arise in common from the thyrocervical trunk as a transverse cervical artery, with a superficial (superficial cervical artery) and a deep (dorsal scapular artery) branch; the latter passes laterally anterior to the brachial plexus and then posterior to levator scapulae¹.

Case Report

During routine cadaveric dissection an unusual branching pattern of the subclavian artery was noted on the left side. The left subclavian artery arose from the arch of aorta and gives rise to medial branch and a lateral branch. Most of the branches of subclavian artery arise from the medial branch and at the outer border of the first rib, the lateral branch continues as the axillary artery.

The findings in this case were:

1. Internal thoracic artery took origin from the medial branch of the subclavian artery. The artery enters the thorax behind the sterno clavicular joint at the level of the sixth intercostal space divides into musculophrenic and superior epigastric arteries.
2. Inferior thyroid artery originated from the medial branch of the subclavian artery and ascends in front of the medial border of the scalenus anterior muscle. Close to the lower pole of the lateral lobe of the thyroid gland, the artery presents the variable relations with the recurrent laryngeal nerves. On reaching the lower pole of the gland, the artery divides into terminal branches.
3. Superficial cervical artery arises from the medial branch of the subclavian artery, passes laterally and upward in front of the scalenus anterior muscle and appears in the posterior triangle in front of the trunks of the brachial plexus.
4. Suprascapular artery originated from the medial branch of the subclavian artery and passes laterally across the phrenic nerve and cords of the brachial plexus. The artery runs behind the clavicle, appears in the suprascapular fossa usually above the supra scapular ligament
5. Dorsal scapular artery arises from the medial branch of the subclavian artery and passes between the upper and middle trunks of the brachial plexus. It then passes deep to the levator scapula.
6. Vertebral artery arose from the lateral branch of the subclavian artery and it passes through the foramina in the transverse processes of all of the cervical vertebrae except the seventh, curves medially behind the lateral mass of the atlas and enters the cranium via the foramen magnum.

Discussion

Different authors have described the variations in the branching pattern of the subclavian artery.

Yucel et al. reported that the origin of left vertebral artery was from the aortic arch. Thyrocervical trunk is absent and its branches arise from the other arteries, for example the transverse cervical artery arises from the subclavian artery and the supra scapular artery arises from the internal thoracic artery.

Rajani et al. studied 200 specimens of the subclavian artery and according to them all the branches of the subclavian artery arose as an individual branch, absence of thyrocervical trunk and costocervical trunk, the transverse cervical artery was replaced by the superficial cervical and dorsal scapular artery.

Faghani M et al. reported that no thyrocervical trunk was found on the right side, the two branches which are normally originate from the thyrocervical trunk had a different origin. The inferior thyroidal artery and vertebral artery arose directly from the first part of the subclavian artery and the transverse cervical, suprascapular and internal thoracic arteries

arose from the common trunk. This variation provides a short route from the posterior scapular anastomoses.

In the present case the observations reveals that there was an absence of thyrocervical trunk and separate origins of branches of thyrocervical trunk arose from the medial branch of the subclavian artery.

According to zahedSafikhani^{et al.} Right subclavian artery and vertebral artery originated from the arch of aorta. Variations of thyrocervical trunk and internal thoracic artery are uncommon.

Faysal A. Saadeh^{et al.} Case report describes an unusual range of anatomical variations of the course of the left subclavian artery, the origin, and the absence of some of its branches and the concomitant abnormal course of phrenic nerve.

Jahanshahi Mehrdad^{et al.} found a common trunk that gives the ascending cervical, transverse, suprascapular and dorsal scapular arteries. Inferior thyroid artery was absent.

Knowledge of these variations may be very useful to the surgeons involved in the cervical and thoracic sympathectomies, vascular surgeries, and cardiac catheterization procedures.

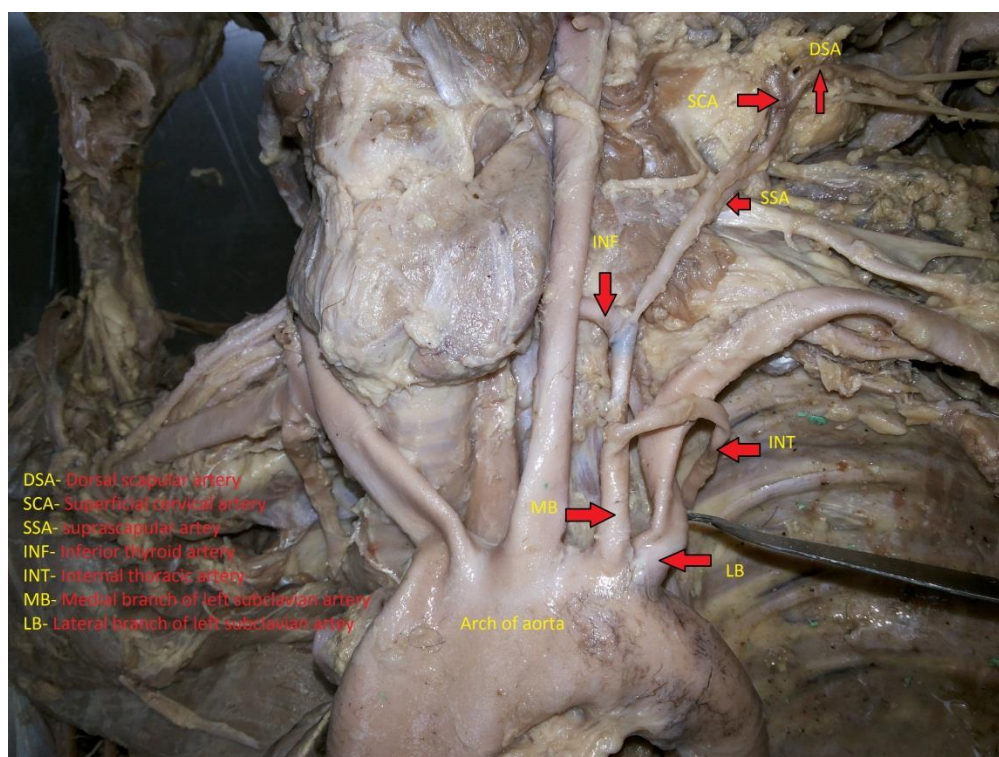


Fig 1:

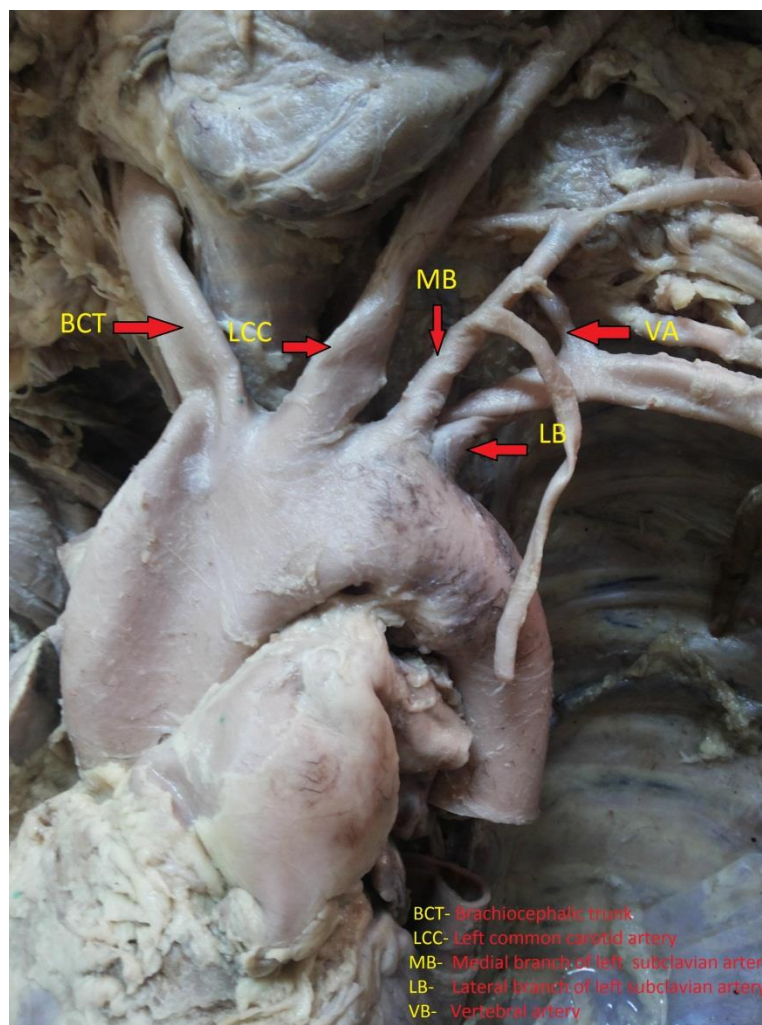


Fig 2:

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