



Ansa cervicalis — without loop

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Satya Prasad VENUGOPAL ✦

Sree Bhanu MALLULA

Department of Anatomy, M.N.R. Medical College, Sangareddy, Andhra Pradesh, INDIA.



✦ Dr. Satya Prasad Venugopal, PhD, FAGE
Department of Anatomy
M.N.R. Medical College
Sangareddy, Medak District
Andhra Pradesh, INDIA.
☎ +91 8455 277055
✉ satyaprasad33@yahoo.co.in

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ABSTRACT

Ansa cervicalis which is an anastomosing loop formed by descendens hypoglossi and descendens cervicalis is known for its high degree of variation in its formation, course and branching. In the present case we report a variation in the course of descendens cervicalis which instead of lying anterolateral to the internal jugular vein lies medial to it and ends by supplying to superior belly of omohyoid without forming the loop with descendens hypoglossi. Also, before termination it gives branches to sternothyroid, sternohyoid and inferior belly of omohyoid. The descendens hypoglossi is normal in its origin but varies in its course by passing superficial to the common facial vein and terminates by supplying to the superior belly of omohyoid. © IJAV. 2010; 3: 153–155.

Key words [variant ansa] [variant descendens cervicalis] [ansa cervicalis]

Introduction

The ansa cervicalis is a nerve loop found in the carotid triangle lying anterolateral to the carotid sheath to supply the muscles of infrahyoid group except thyrohyoid. The descending branch (descendens hypoglossi or upper root of the ansa cervicalis) contains fibers from the first cervical spinal nerve. After giving a branch to the superior belly of omohyoid, it joins with the lower root of ansa cervicalis formed from the second and third cervical spinal nerves. The two roots form the ansa, from which branches supply the sternothyroid, sternohyoid and the inferior belly of omohyoid; another branch is said to descend anterior to the vessels in to the thorax to join the cardiac and phrenic nerves [1].

Reports regarding the variation in the origin, course and branching of the ansa cervicalis are many in the literature. Some of the variations reported so far are the vertical descent of ansa hypoglossi was found to be superficial to the external carotid artery in 72% and superficial to the internal carotid artery in 28%, the inferior root may lie anteromedially to the internal jugular vein as in 26% of the cases [2].

The vagus nerve contributes to the formation of superior root of ansa cervicalis, further also supplies to the sternohyoid, sternothyroid and superior belly of the omohyoid muscles [3].

Double innervation to the superior belly of omohyoid has also been reported [4].

The origin of superior root can be superior to the digastric muscle or the phrenic nerve may also receive a contribution from the descendens hypoglossi [5].

In the present case, the ansa cervicalis supplies the infrahyoid muscles without forming the loop. The branches to muscles are given directly by the roots. The inferior root of ansa lies medial to the internal jugular vein and gives branches to infra hyoid muscles and terminates by supplying to the superior belly of omohyoid instead of joining with the superior root. The superior root supplies only to the superior belly of omohyoid.

Case Report

During the routine dissection of middle aged male cadaver fixed in 10% formalin the following variation on the right side of the neck was observed. The descendens hypoglossi arising from first cervical spinal nerve was descending down between the internal jugular vein and external carotid artery and passing superficial to the union between the anterior division of retromandibular vein and facial vein which formed the common facial vein, after crossing the vein it lied anterior to the external carotid artery. Then it terminated by supplying to the superior belly of omohyoid. Thus the superior root presented triple relation to the artery in the present case, i.e., first lateral to artery and then crossing it superficially to lie finally on the medial side of the artery. The descendens cervicalis of ansa had the fibers from the second and the third cervical spinal nerves, descending down medially to the internal jugular vein to supply sternothyroid,

sternohyoid and inferior belly of omohyoid by giving twigs to each, and finally terminated by supplying to the superior belly of omohyoid without forming a loop with the descendens hypoglossi. Thus, the superior belly of omohyoid received two twigs one from superior root and one from inferior root (Figures 1, 2). The formation, course and branching pattern of ansa on the left side were as usual.

Discussion

In general, the ansa cervicalis is a loop formed by the union of superior root or descendens hypoglossi with fibers from first cervical spinal nerve and the inferior root or descendens cervicalis which is formed by the second and third cervical spinal nerves. In the present case, the formation of ansa on the left side of the neck was normal but on the right side the superior root lied superficial to common facial vein, and then it lied superficial to external carotid artery and terminated by supplying to superior belly of omohyoid. The inferior root of ansa cervicalis lied medial to internal jugular vein instead of anterolateral. It descended down by lying in between the external carotid artery and internal jugular vein to some distance and then branched to inferior belly of omohyoid, sternohyoid and sternohyoid and then terminated by

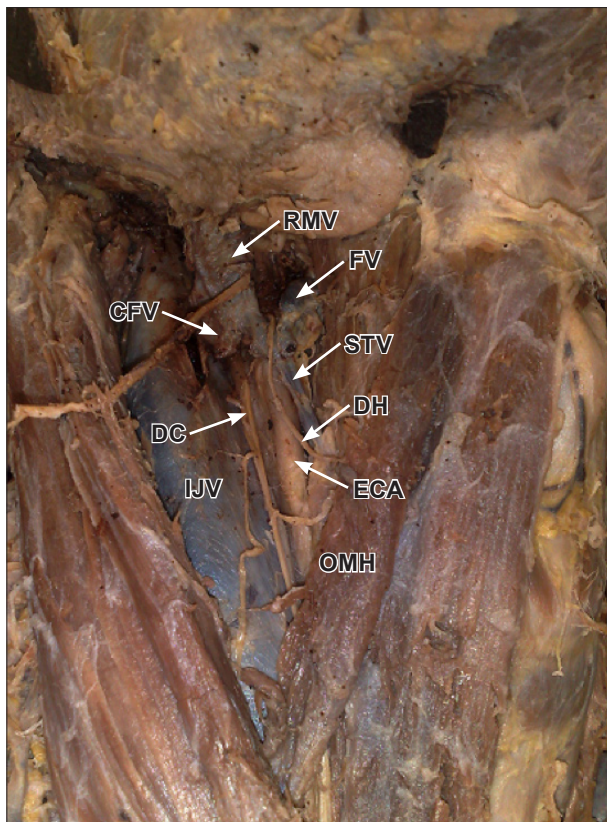


Figure 1. Photograph shows the *descendens hypoglossi* (DH) passing superficial to the junction between the *facial vein* (FV) and anterior division of *retromandibular vein* (RMV), opening of *superior thyroid vein* (STV). The *descendens cervicalis* (DC) lying medial to *internal jugular vein* (IJV). It also shows the *external carotid artery* (ECA), *common facial vein* (CFV) opening into IJV, and the *superior belly of omohyoid* (OMH).

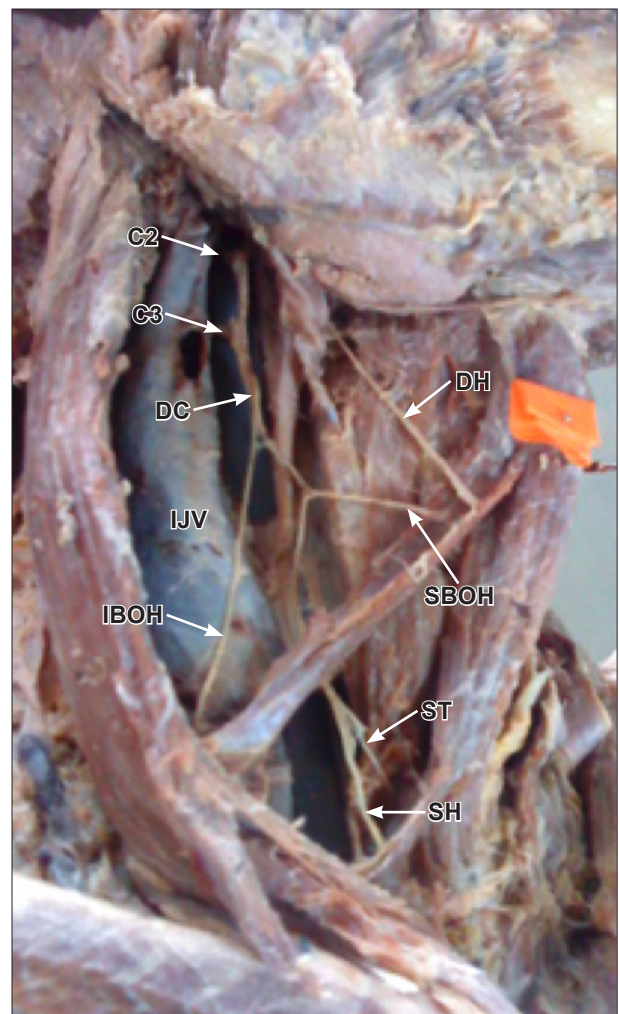


Figure 2. Photograph shows the *descendens cervicalis* (DC) giving branches to *inferior belly of omohyoid* (IBOH), *superior belly of omohyoid* (SBOH), *sternohyoid* (ST) and *sternohyoid* (SH). It also shows the *descendens hypoglossi* (DH) supplying to superior belly of omohyoid without loop formation. (C2: second cervical spinal nerve; C3: third cervical spinal nerve; IJV: internal jugular vein)

supplying to the superior belly of omohyoid without involving in the loop formation. The triple relation of superior root to external carotid artery without loop is a unique variation. The earlier reports indicate the presence of inferior root anteromedial to the internal jugular vein in 26% of cases. Also they mentioned that if inferior root is medial to the vein then the loop will be inside the carotid sheath [2]. Each typical myotome part of a somite divides into an epaxial and a hypaxial division. Each developing spinal nerve also divides and sends a branch to each division of the myotome. Myoblasts from the hypaxial divisions of the cervical myotomes form the infrahyoid muscles [6]. In due course of development the developing axons is regulated by expression of chemoattractants and chemorepellents in highly coordinated site specific fashion. Any alterations in signaling between mesenchymal cells and neuronal growth cones can lead to significant variations. Once

formed, any developmental differences would persist postnatally [7].

In the present case there is no loop formation, the probable reason for this may be due to changes in the signaling. The non-formation of the loop may be due to the failure of the fusion of the neuronal derivatives from first cervical nerve on one side, and second and third on the other side. This hypothesis can be substantiated by the presence of branch supplying the superior belly of omohyoid from the inferior root, which is in close approximation to the branch of superior root supplying the same muscle.

Knowledge of variation in the nerve supply to infrahyoid muscles will guide the surgeons in the preservation of neurovascular supply to strap muscles during harvesting the muscle flap for renovating vocal fold or

for laryngotracheal reconstruction [8]. The relation of the ansa or its roots to the great vessels of the neck, variation of the ansa and its roots are important in the thyroplasty, arytenoids adduction, Teflon injection [9].

To conclude, the present case should add to the existing knowledge of ansa cervicalis and it should help the surgeons in avoiding injury to the nerve and great vessels during various surgical procedures which involve the manipulation of ansa cervicalis as it is widely used in re-innervation of larynx because of its close proximity to the larynx [10].

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