Case Report
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A rare anatomical variant of ansa cervicalis: case report

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Absract

A rare variant of ansa cervicalis was discovered during dissection of the neck in a male cadaver. The superior root of the Ansa cervicalis was formed by the C1 ventral ramus. It accompanied with the vagus nerve in place of the hypoglossal nerve and descended into the carotid sheath with it. Moreover the C1 ventral ramus formed from the sheath and joined the inferior root from C2 and C3 ventral rami.

Keywords: Ansa cervicalis, vagus nerve, anatomical variation.

Introduction

Generally, defined in this respect: the Ansa cervicalis which innervates the infrahyoid muscles is formed by joining of two superior and inferior roots from ventral rami of the cervical nerves. The superior root, from the ventral ramus of first cervical spinal nerve, leaves the hypoglossal nerve and descends anteriorly to or in the carotid sheath, and then, joined by the inferior root of the ansa from the second and third cervical spinal nerves (Fig1.a) [1,2]. Various groups have reported ansa cervicalis variations which can be useful for operating the neck region. Khaki et al (2006) demonstrated a variant of the spinal accessory nerve plexus that contributed to the formation of the ansa cervicalis. The inferior root of the ansa cervicalis was formed by the joining of two rootlets from spinal accessory nerve and the cervical plexus to the sternocleidomastoid muscle [3]. In one case out of 400 dissections (200 cadavers), Rath and Anand (1994) discovered unilateral absence of the ansa cervicalis on the right side where it was replaced by the vagocervical complex. This complex was formed by the vagus nerve with the C1 and C2 ventral rami from the cervical plexus, giving off a descending branch to supply the infrahyoid muscles of the neck [4]. Like Rath and Anand, Abu-Hijleh (2005) also reported a case with bilateral absence of the ansa cervicalis which was replaced by a vagocervical plexus [5]. Verma et al (2005) showed a rare finding in a cadaver in which the vagus nerve fused with the hypoglossal nerve immediately after its exit from the skull on the left side. The vagus nerve supplied branches to the infrahyoid muscles and also contributed to the formation of the superior root of the ansa cervicalis. But the C1 nerve joined the hypoglossal nerve as usual [6].

Although many variations have previously been reported on the branching pattern of the ansa cervicalis loop; this report describes a case with a new ansa cervicalis organization, unique to its own pattern.

Case report

We detected a rare case of an ansa cervicalis encountered upon routine dissection on the

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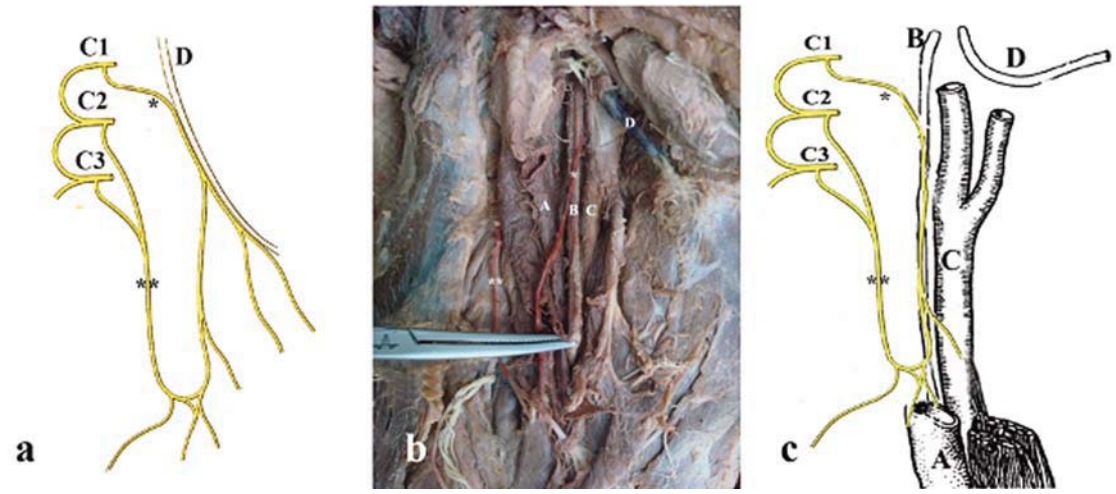

Fig. 1: a) A schematic of the normal Ansa cervicalis by joining of two superior and inferior roots from ventral rami of the cervical nerves [2]. b) Photograph and c) schematic of the dissected right side of the neck. The ansa cervical loop (red) and hypogossal nerve (blue) are shown with different colors. It shows the C1 ventral ramus fused with the vagus nerve replacing the hypoglossal nerve at this location, and descending into the carotid sheath with it.

Symbols; A: Jugular vein, B: vagus nerve, C: common carotid artery, D: hypogossal nerve, *: superior root and **: inferior root of Ansa cervica

right side of an adult male cadaver (in one case out of 200 dissections). The left side was normal. In this case, after dissection of neck the structures in the carotid and muscular triangle regions, and their arrangements were recorded and photographed (Fig1.b, c).

As is shown in the Fig. 1, the superior root of the ansa cervicalis was formed by C1 but accompanied with the vagus nerve where the hypoglossal nerve ought to have been and descends into the intra-carotid sheath. Then, it was exited the carotid sheath and joined by the inferior root from C2 and C3, as usual. The inferior root united with the superior root and formed a loop in front of the internal jugular vein, before the omohyoid muscle. The infrahyoid muscles were supplied by branches from the loop of the ansa cervicalis and thyrohyoid and geniohyoid muscles were also innervated by C1 ventral ramus.

Discussion

In the present case, the C1 ventral rami and vagus nerve were within the carotid sheath. This observation is not in agreement with that reported by previous investigators [4-6], and therefore accounts as a new ansa cervical variation.

Developmentally, the fourth and sixth pharyngeal arches are innervated by the superior laryngeal and recurrent laryngeal branches of the vagus nerve (cranial nerve X). In addition to muscles arising from the fourth and sixth arches, some of occipital somites shift dorsally to form the intrinsic laryngeal musculature. The occipital myotomes are extended ventrally and shift cranially and form the intrinsic and extrinsic musculature of the tongue. These are innervated by hypoglossal nerve (cranial nerve XII). The cervical somites form the strap muscles of the neck, including the scalene and infrahyoid muscles which innervated by the ventral ramus of the spinal nerve [7]. The proximity between the cervical and the occipital myotomes could probably explain the embryological basis for this variation.

Clinically, the anatomical variations in the ansa cervicalis may be important for surgeons for operating in the neck region [6], including laryngeal reinnervation [8], or re-animation of

the face after facial nerve palsy [9]. Inadvertent injury can result to phonation disability in professional voice users, e. g. singers, actors and broadcasters. In case of infrahyoid muscles palsy, patients have no serious voice problems in their normal speech but the pitch of their voice, and also prosody in their singing are lost dramatically. Since the C1 ventral ramus is within the carotid sheath itself, it seems no problems or complications would occur in C3-C4 discopathy surgery. The awareness and knowledge of anatomical variations is important for surgical operation in the neck region, hence reported variation could be useful for operation.

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