CASE STUDY

High-Riding Innominate Artery in Neck Surgery

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Abstract We present two cases of innominate artery (IA) in a cervical position. In the first case, surgery was not performed because there was no indication. In the second, it was possible to obtain surgical images of the IA and its branches located in front of the laryngotracheal axis. A warning about the serious risk involved in cervical surgery in these cases is indicated.

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Arteria innominada aberrante alta en cirugía cervical

Resumen Presentamos 2 casos de posición cervical de la arteria innominada (AI). En el primer caso no se efectúa cirugía por no existir indicación, el segundo permite obtener imágenes quirúrgicas de la AI y sus ramas, situadas delante del eje laringotraqueal. Se alerta del grave riesgo de la cirugía cervical en estos casos.

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Introduction

The brachiocephalic arterial trunk or innominate artery (IA) is an artery of the mediastinum which supplies blood to the arm and the head and neck area. It only exists on the right side. The IA is the first branch of the aortic arch and originates at the level of the upper edge of the second right rib. It does not usually have branches, although, occasionally, it may provide the inferior thyroid artery or may issue a branch to the thymus and a bronchial branch. Its cranial end divides into the right common carotid and subclavian arteries. There is no IA on the left side of the body and the left carotid and subclavian arteries originate directly from the aortic arch.

The appearance of a notable pulse in the anterior neck region is an uncommon exploratory finding which indicates a vascular anomaly. If this is not diagnosed previously, laryngotracheal, thyroid, parathyroid and other surgeries may lead to fatal complications.1,2

Case Reports

Patient 1 was a 68-year-old woman with a right anterior cervical pulse who suffered multinodular goitre (MNG). Imaging studies (Doppler ultrasound, CT-angiography and

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MRI-angiography) (Fig. 1) established a ”probable IA in a cervical location”. So far, no surgical indication for MNG had been established. In the absence of surgical confirmation, imaging studies alone were not sufficient to firmly establish the presence of a cervical IA.

Patient 2 was a 55-year-old woman with a right, anterior, cervical pulse. Imaging studies revealed a cervical vascular anomaly. She underwent total thyroidectomy for papillary thyroid carcinoma. A large, arched vessel with inferior concavity, which crossed in front of the anterior trachea and cricoid, was observed during the surgical approach (Fig. 2a). This was, undoubtedly, a brachiocephalic trunk with an anomalous cervical location. This IA gave rise to the right carotid in a cranial direction and the right subclavian artery in a lateral direction (Fig. 2b).

Discussion

Ozlugedik et al.\(^3\) reported finding only 2 publications in the medical literature in English which described an IA ascending up to the cricoid. Faggioni et al.\(^4\) confirmed that a high bifurcation of the IA is very rare, with no more than 5 cases in the medical literature describing the location of this artery at the level of the thyroid gland.

An accurate knowledge of the vascular anatomy and all its variants is essential when planning cervical interventions. It is essential to obtain a prior diagnosis of high IA, since direct lesion of the IA during a tracheotomy\(^1,2\) or any other anterior cervical surgery could be immediately lethal. Moreover, tracheo-arterial fistula could appear belatedly and would also be fatal if not operated.

The developmental abnormalities which cause this malformation are unknown.\(^4\) The supra-aortic trunks originate from the aortic sac and from the 6 pairs of aortic arches corresponding to the 6 branchial arches, most of which become partially or completely obliterated near the eighth week of gestation. One possible explanation for a high location of the IA could be the persistence of a portion of the proximal segment of the right fourth arch (from which the IA is derived), resulting in an elongation of the IA and an upward shift of the origin of the subclavian artery. A high bifurcation of the IA may be associated with changes in the right recurrent nerve, which surrounds the right subclavian artery near its origin.

Other conditions which may cause pulses in the neck include loops of the carotid artery or vascular masses originating in the cervical vessels. Being minimally invasive techniques, CT-angiography and MRI-angiography have replaced conventional angiography for the evaluation of abnormalities in the cervical vessels.\(^5\) Both techniques are diagnostic, although 3D CT-angiography is more anatomical.\(^5\)
References