Case Report

Aberrant Internal Carotid Artery Presenting as a Pulsatile Oropharyngeal Mass

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Abstract

The cervical segment of the internal carotid artery (ICA) runs straight to the skull base without branching. Variations in ICA course are usually asymptomatic, being found incidentally in radiologic studies. However, a submucosal pharyngeal wall mass may cause massive bleeding during pharyngeal surgical procedures, drainage of abscess and/or diagnostic biopsy. We report the case of a 71 year-old male patient who presented with pharyngeal globus and mild dysphagia. A left pulsatile submucosal mass at the oropharynx level was evident, which was found to be caused by an extracranial kinking of the internal carotid artery.

INTRODUCTION

The cervical segment of the internal carotid artery (ACI) runs a straight course, posterolateral to the lateral pharyngeal wall, up to the skull base without branching [1-3]. Variations in parapharyngeal course of the ICA have been found in 10% to 40% of the population [3]. Angulations of the common carotid artery usually occurs in the right side, whereas there is no preferential side for internal carotid arteries [4,5]. The etiology of ICA abnormalities remains controversial [3]. Congenital vascular anomalies and acquired factors, including aging and vascular risk factors, have been proposed [2,3].

ICA anatomical variations include tortuosity, kinking and coiling [6]. An aberrant ICA can be found submucosally at pharyngeal wall causing lateropharyngeal or retropharyngeal soft tissue widening [7]. These anomalies may cause a dangerous massive bleeding during pharyngeal procedures such as tonsillectomy, adenoidectomy, uvulopalatopharyngoplasty, transoral tumor resection, drainage of abscess and deep biopsies [1,3,6,8]. Moreover, they should be considered in the differential diagnosis of tumorous mass or abscess. We report a case of a 70 year-old male patient suffering from difficulties in swallowing associated with an aberrant ICA protruding submucosally at the left lateral wall of the oropharynx.

CASE PRESENTATION

A 70-year-old man was referred to our department with a history of throat foreign body sensation in his throat for 2 years and mild dysphagia for the last 6 months. His past medical history included diabetes mellitus, hypertension and had regular medications prescribed to these conditions. A left vestibular schwannoma was diagnosed years ago. He was a heavy smoker of 20 cigarettes a day for 40 years.

On physical examination, a submucosal and discretely pulsatile soft mass on the left posterior wall of the oropharynx, with normal overlying mucosa, was noted (Figure 1). Transnasal fiberoptic laryngoscopy confirmed a pulsatile mass extending along the posterior and lateral wall of the oropharynx.

Figure 1 Transnasal fiberoptic laryngoscopy view showing a left-sided pulsating mass (arrow) on the posterior wall of the oropharynx.

Abbreviations

ACI: Internal Carotid Artery; CT: Computed Tomography

Keywords

• Internal carotid artery
• Tortuosity
• Oropharyngeal mass
• Pulsatile
Computed tomography (CT) scan revealed the presence of a kinked internal carotid artery, located in the left paramedian retropharyngeal space, displacing anteriorly and medially the posterolateral wall of the oropharynx (Figure 2).

The ICA anatomical variation was documented in his medical records, the patient was informed about the diagnoses and possible injuries during oropharyngeal procedures. No specific treatment was offered. The patient has been followed up for four years without progression of his symptoms.

**DISCUSSION**

ICA arises at C3 – C4 level from common carotid artery bifurcation and runs vertically and straight in the posterolateral pharyngeal wall [1]. Distance from ICA to tonsillar fossa increases with age, reaching 25mm in adults [1]. An overall incidence of variations in ICA cervical course of 10% to 40% has been reported [1,2,6]. However, some angiographic studies, points out a higher incidence of such variations, in up to 62% of patients [3,9]. A pronounced aberrant parapharyngeal carotid artery, within 1cm or less from the pharyngeal mucosa, may be found in 1% to 5% of the population [10,11].

Weibel and Fields introduced an anatomical classification to parapharyngeal ICA variations [6]. The course of the cervical portion of the ICA has been classified into straight (curvature < 15º), tortuosity (-S or -C shaped elongation with a deviation greater than 15º and lower than 60º), kinking (a deviation between 90º and 145º) and coiling (a looped course of 360º) [3,6]. Paulsen et al., in an anatomical study of 282 cadaver specimen, found a moderate ICA anomalies (tortuous or moderately kinked course) in 26.2% and a high-grade anomalies (pronounced kinking or coiling) in 6% [3]. These variants increase the risk of injury during routine pharyngeal procedures [12]. This classification aimed to study the role of this anomalies in cerebrovascular insufficiency but it is insufficient to estimate the potential risk for ICA injury [10]. A low grade submucosal tortuosity can be more relevant to pharyngeal surgical procedures than a high grade coiling laterally-placed [10].

Pfeiffer et al., proposed a classification system, to assess the potential risk of iatrogenic or accident-caused ICA injury, based on distance of the artery to the pharyngeal wall and the pharyngeal level [1]. The authors consider the naso- and oropharynx to be the most increased risk levels due to the higher number of procedures performed without preoperative imaging [1].

Congenital and acquired causes have been proposed to explain cervical ICA aberrating course [13].

Embryologically, ICA is derived from the third branchial arch artery and dorsal aorta, which form a loop at the junctional point [1,5]. In the embryo, the ICAs are normally kinked or coiled [8]. ICA elongates and straightens, at the eighth week of development, as the fetal heart and great vessels descend into the mediastinum [1,2,5]. A failure in this process causes redundancy of the ICA and results in the persistence of a kinked or looped artery [8,14]. This etiology is supported by the findings of coiling and pronounced kinking in young patients and by the often bilaterality of ICA course variations [3,10]. The most common site of ICA coiling in the adult is at the level of the tonsillar fossa, which corresponds to the anteromedia! bend of the embryonic vessel [1]. Therefore, the term “dangerous loop” of the ICA has been coined [7].

However, some authors suggested an acquired etiology due to higher incidence of aberrant ICA with aging [15]. Peripheral vascular disease, including atherosclerosis and fibromuscular dysplasia, as well as senile degenerative loss of vessel wall elasticity promotes arterial wall weakness and contribute to anomalies in ICA course [5,8,13]. Both congenital and acquired causes can coexist. An embryological redundancy facilitates the appearance of kinking over the time due to aging and vascular risk factors [8]. Barbera et al., found replacement of elastic and muscular components by loose areolar tissue at tunica media of ICA with kinking and coiling [16].

Most authors agree that extreme anatomical variants (coiling and high-grade kinking) have an embryological origin, based on their identification in young children, while moderate variants (tortuosity and kinking) are mainly identified at advanced ages and may be promoted by degenerative changes associated with vascular factors (atherosclerosis or fibromuscular dysplasia) [1,8,16].

In most cases, aberrant ICA are asymptomatic (up to 80%)

**Figure 2** CT scan of the neck before (A) and after contrast administration (B)(C).
(A)(B) Axial section at oropharynx level showing the anomalous medial position of the internal carotid artery in left paramedian retropharyngeal position along with arterosclerotic changes. (C) Coronal plane reconstruction showing a left tortuous internal carotid artery.
REFERENCES


