A Dangerous Variant Causing Retropharyngeal Space Enlargement, Retropharyngeal Internal Carotid Artery: a case report

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Aberrant internal carotid artery is a rare situation which may cause retropharyngeal space enlargement. We present an 88-year-old male patient with dysphagia and parapharyngeal mass related to this rare variant diagnosed by multi-slice computed tomography (CT) with clear multi-planar images and CT angiography.

The retropharyngeal space is located at midline of posterior pharyngeal wall, that can be widened by different pathologic conditions including inflammatory processes (abscess, edema), neoplasms, trauma (hematoma, emphysema), and pseudomass (internal carotid artery transposition). Anatomical variants of the carotid artery have been reported with a large variability of pattern and degree. Among these variants, an anomalous retropharyngeal course of internal carotid artery can mimic parapharyngeal neoplasm and pose a risk of vascular injury during pharyngeal intervention such as biopsy or surgery.

CASE REPORT

An 88-year-old man visited our ENT department due to sore-throat for one week. He also complained of dysphagia for one month. The patient’s medical history was hypertension, without known coronary artery or cerebrovascular disease. On endoscopic examination, a pulsatile bulging mass with smooth surface and intact mucosa was noted over the right aspect of the posterior pharyngeal wall. Under the impression of right parapharyngeal tumor, contrast-enhancing multi-slice computed tomography (CT) (by Siemens SOMATOM Sensation 64) including axial and coronal images and maximum intensity projection (MIP) were obtained prior to biopsy. The nature of the mass was a right retropharyngeal internal carotid artery, which was confirmed by image study (Fig. 1, 2). In this case, CT exam prior to intervention offered a concise diagnosis therefore a clinical catastrophe can be avoided.

DISCUSSION

The retropharyngeal space located at midline of the posterior pharyngeal wall is limited by the
middle and deep layers of the deep cervical fascia fusing around the tracheal bifurcation, and extends from the skull base to the upper mediastinum, that contains fat and median and lateral (Rouvier) lymph nodes [1-5]. The retropharyngeal soft-tissue space is commonly an area of clinical interest, as this space is frequently affected by different pathologic conditions including inflammatory processes such as abscess, edema, and lymphatic fluid, benign or malignant neoplasms, traumatism such as hematoma and emphysema, and pseudomass [1-9]. For out case reported here, pseudomass is confirmed as retropharyngeal internal carotid artery which is a relatively rare cause of retropharyngeal soft-tissue mass [10].

Embryologically, the carotid artery originates from the third aortic arch and the dorsal aorta. Normally, the dorsal aortic root descends into the chest by the eighth week of development, thereby straightening the course of internal carotid artery [11]. However, it has been postulated that incomplete straightening of the carotid vessels enables the embryonic angulation to persistent, resulting in congenitally tortuous or aberrant internal carotid arteries in the retropharyngeal space. Anatomic descriptions of tortuous internal carotid artery in the otolaryngology literature range from mild kinking to complete circular loop formation [11, 12]. Congenitally tortuous courses may become more pronounced in the elders secondary to atherosclerosis and/or hypertension [11].

Medial dislocation of the internal carotid artery into retropharyngeal space at the level of the posterior pharynx is one of the more commonly described carotid anomalies in the medical literature [13], of which typical presentation on physical examination is a pulsating submucosal mass along the posterior pharyngeal wall. The mass is usually found in an asymptomatic patient during a routine head and neck examination [13]. Symptomatic patients may present with complaints of dysphagia, abnormal voice, or foreign body sensation in the posterior pharynx [13]. Occasionally, the anomaly is confused with an unilateral tonsillitis, peritonsillar abscess, or parapharyngeal neoplasm, and discovered only on closer inspection [14].

Displacement of the carotid artery into the retropharyngeal space carries a risk of major complications if such variant is not recognized before pharyngeal surgery. It is especially hazardous when the artery comes into contact with the tonsillar fossa or the posterior pharyngeal wall [13, 14]. Such particular condition may result in massive hemorrhage during tonsillectomy, uvulopalatopharyngoplasty, or incision and drainage of a peritonsillar abscess [13].

Imaging studies can well demonstrate and confirm the location of the carotid artery therefore

![Enhanced axial and coronal CT images](image.png)

**Figure 1.** Enhanced axial and coronal CT images (a and b) demonstrate medial-positioned tortuous right internal carotid artery (arrow) partially running across the median retropharyngeal space and resulting in focal pharyngeal wall bulging (arrowhead).
reduce the risk of the hemorrhagic complications associated with retropharyngeal carotid artery. Doppler ultrasonography, CT, and magnetic resonance (MR) imaging have all been recommended as imaging modalities of choice [13]. CT angiography and MR angiography provide noninvasive method to assess the course, caliber, and contour of the vessels [13, 15]. However, the advantage of contrast–enhancing multi-slice CT is to simultaneously offer CT angiography and clear multi-planar images which allow thorough visualization of this vascular anomaly and its anatomical relationship. Such information is important in pre-operative planning for extensive surgical dissection of the posterior pharynx.

**REFERENCES**

後咽部內頸動脈--一個造成後咽部腫大的危險變異：
病例報告

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內頸動脈異常路徑是一種引起後咽部腫大的罕見原因。我們報告一位以吞嚥困難及後咽部
腫塊為表現的八十八歲男性病例，以多排電腦斷層診斷為內頸動脈異常路徑，並同時提供清晰
的多重切面影像及血管攝影。