

# Parapharyngeal branchial cyst: A case report

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## ABSTRACT

Second branchial cleft cyst is the most common among branchial anomalies. It mainly, occurs on the lateral neck along the anterior border of sternocleidomastoid muscle; localization in the parapharyngeal space is very rare.

Observation: We present a case of a 20-years- old man presenting with a cystic submucosal painless mass located on the right lateral oropharyngeal wall, with a cervical component on the right submandibular region. Computed tomography and magnetic resonance imaging showed a 73X33mm well-delimited right cystic parapharyngeal mass, medial to the right carotid vessels narrowing the oropharyngeal lumen. Complete surgical excision was performed via submandibular approach. Histological examination was consistent with the diagnosis of branchial cyst. No recurrence was observed at 2 years follow up. In this article, we review the literature and discuss the radiological features of parapharyngeal cysts as well as the different surgical approach options.

**Keywords:** Second branchial cyst, Parapharyngeal space, Transmandibular approach.

## INTRODUCTION

Second branchial cleft cyst is the most common among branchial anomalies which are considered as developmental disorders. It develops from remnants of cervical sinus which appears temporarily during the development of the branchial apparatus. Branchial cysts could develop along the course of the second branchial embryologic tract, that extends from the supraclavicular to the oropharyngeal tonsillar fossa, passing between the internal and external carotid arteries superficially to cranial nerves IX and XII [1]. Most of these cysts occur on the lateral neck along with the anterior border of sternocleidomastoid muscle, and lie superficially to the common carotid artery and internal jugular vein [2]. Parapharyngeal space localization is very rare [3, 4]. Only 36 cases of parapharyngeal branchial cysts are reported in adults in the English literature [3].

In the present case, we describe the clinical features, radiological findings, and the surgical management of a parapharyngeal branchial cyst, and we review the literature on the different surgical approaches options.

## CASE REPORT

A 69-year-old woman was examined by a neurologist for A 20-year-old man presented with a 4 months history of dysphagia, rhinolalia, and snoring. Clinical examination revealed a cystic submucosal painless mass located on the right postero-lateral wall of the oropharynx, covered with normal mucosa, pushing the right tonsil anteriorly and the uvula on the left. This lesion was palpable on the right submandibular region. No further abnormalities were found in the head and neck region. On fibroscopy, the mass was not extended to the nasopharynx and the hypopharynx. Neurologic examination did not find any lower cranial nerve palsies.

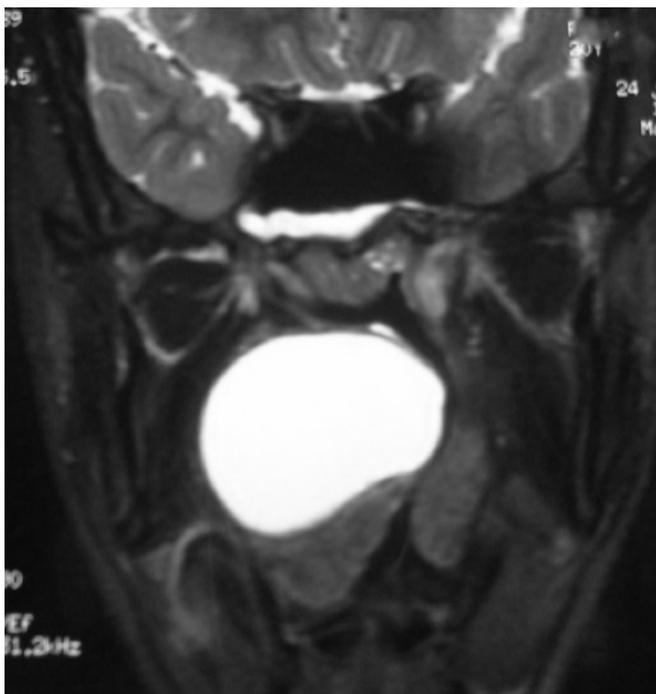
Head and neck computed tomography (CT) showed a 73X33mm well-delimited right cystic parapharyngeal mass,

medial to the right carotid vessels, narrowing the oropharyngeal lumen (figure1).

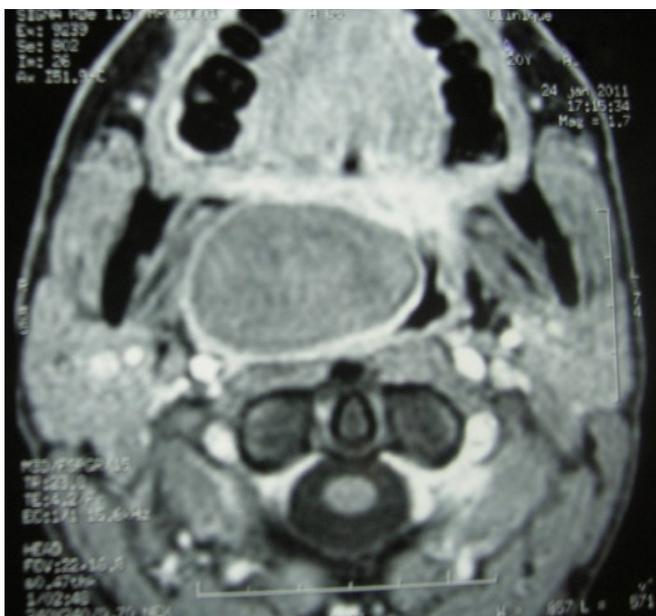


**Figure 1 :** Axial CT image : Parapharyngeal 73X33mm sized cystic mass medial to the carotid vessels

On magnetic resonance imaging (MRI), the content of the cyst was isointense on T1-weighted images, hyperintense on T2-weighted images (figure 2). There was margined contrast-enhancement on contrast-enhanced T1-weighted images (figure 3).

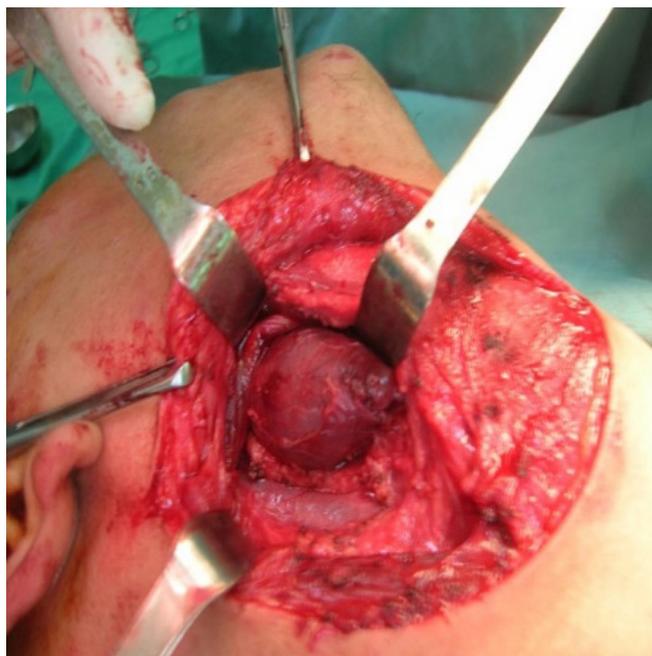


**Figure 2 :** T2- weighed coronal MR image : well-delimited cystic mass, in the right lateropharyngeal space narrowing the oropharyngeal lumen



**Figure 3 :** T1-weighed post gadolinium axial MR image: marginated enhancement of the cystic wall

Surgical excision was performed under general anesthesia via transcervical submandibular approach. Exposure and dissection of the carotid and the jugular vessels, the hypoglossal and lingual nerve were done. The cyst was a well capsulated cyst, located medially to the stylohyoid muscle and the superior constrictor muscle (figure 4).



**Figure 4 :** Intraoperative aspect of the cyst

Complete excision of the cyst without rupture of the pharyngeal mucosa was achieved; there was no evidence of a tract. The patient did not present any postoperative complication. Histopathological examination revealed a squamous epithelial-lined cyst with lymphoid infiltrate which was consistent with the diagnosis of a branchial cleft cyst. No recurrence was observed at 2 years follow up.

### DISCUSSION

Parapharyngeal branchial cyst could arise from the pharyngeal portion of the embryologic tract, or could develop from remnants of endodermal pharyngeal pouch [2]. Clinical symptoms depend on the size, and the location of the cyst. Parapharyngeal cysts are usually asymptomatic, however symptoms such as hearing loss with aural fullness, and lower cranial nerve palsies could appear due to Eustachian tube, or cranial nerves IX, X XII compression [1, 5]. Also, large cysts obstruct the pharynx and cause dyspnea, dysphagia or snoring. On examination, they appear as a soft submucosal lateral pharyngeal mass, behind the tonsillar fossa; extended lesions could have a cervical component, which was the case of our patient.

The occurrence of cystic masses in the parapharyngeal space suggest many diagnoses including : cystic schwannomas, mucous retention cysts, minor salivary gland tumors and branchial cysts [6].

Radiological evaluation, including CT scan with contrast and MRI with gadolinium provide useful information prior to surgery, particularly relationship of the mass with the surrounding structures and its precise anatomical location [7]. It can differentiate deep lobe parotid tumors from primary parapharyngeal space tumors. On MRI there is a fat plane between the normal parotid gland and the mass arising within the parapharyngeal space.

Prestyloid tumors are minor salivary gland neoplasms that



displace the carotid sheath postero-laterally, they usually show heterogeneous, intermediate signal intensity on T1-weighted images and intermediate-to-high signal intensity on T2-weighted images [8]. Complete cystic change is very rare in such tumors.

Poststyloid tumors, most frequently schwannomas, displace the internal carotid artery antero-medially [9]. Cystic degeneration could occur in these tumors, the remainder solid portion shows a good enhancement on imaging.

On MRI, depending on the content, branchial cyst usually appear as a well-defined mass, sharply outlined, with fluid-containing features, hypo intense on T1 images and hyper intense on T2 ones, with enhancement of the wall after injection of contrast material if the mass is infected [1]. Diagnosis is confirmed after histopathological examination. Different therapeutic modalities are reported for the management of parapharyngeal branchial cysts, some of them are conservative such as: marsupialization, repeated aspiration, and injection of sclerosing agents. These methods are associated with a high rate of recurrence [8]. Therefore, complete and safe removal of these cysts are better performed via transcervical or transoral approaches. While some authors consider that transoral approach presents a greater risk of hemorrhage, cranial nerve damage, and a high recurrence rate [9, 11]; others indicate this approach in cases of small cysts less than 1,5 cm in size, not reaching

the skull base or the great cervical vessels, in patients with adequate oral exposure [10].

Transcervical submandibular approach that we performed in our patient, seems to be in our opinion the technique of choice. It allows complete exposure and dissection of cranial nerves (lingual, hypoglossal and superior laryngeal nerves), the carotid and jugular vessels, as well as the excision of the cyst under visual control of these structures, thus reducing the risk of uncontrolled hemorrhage and cranial nerve injuries.

## CONCLUSION

Clinical assessment of parapharyngeal cysts, should consider second branchial cleft anomalies as a potential diagnosis, even though this location is unusual for such lesion. MRI imaging evaluates, accurately, parapharyngeal space masses. It can distinguish prestyloid and poststyloid lesions, which is useful to determine the nature of the lesion and to plan the appropriate surgical approach. Since parapharyngeal branchial cysts are benign lesions, it is important to consider the surgical procedure that allows safe and complete removal of the cyst.

**Competing interests:** The authors declare no conflicts of interest.

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