

# Branchial Cleft Cyst in Unusual Location: Vallecula

## Atipik Yerleşimli Brankiyal Kist Olgusu: Valleküla

 Said Sönmez<sup>1</sup>

 Mehmet Melih Çiçek<sup>2</sup>

<sup>1</sup>Özalp State Hospital, Department of Otorhinolaryngology, Van, Turkey

<sup>2</sup>Bahçelievler Memorial Hospital, Department of Otorhinolaryngology, Istanbul, Turkey

### ABSTRACT

The anomalies of the branchial apparatus, which are responsible for the development of the head and neck structures, usually appear as a mass, sinus, or fistula in the neck. Although it can occur anywhere between the clavicle and the tragus in the neck, it should be kept in mind that it can also appear in atypical localizations. Treatment of branchial cleft cysts, which usually become symptomatic after an upper respiratory infection, is excision. We present a case of branchial cyst in the vallecula, the area where no case sample has been previously presented.

Keywords: branchial cleft cyst, vallecula, lymphoepithelial cyst

### ÖZ

Baş ve boyun yapılarının gelişiminden sorumlu olan brankiyal aparatın anomalileri genellikle boyunda kitle, sinüs veya fistül şeklinde ortaya çıkarlar. Boyunda klavikula ile tragus arasında herhangi bir yerde ortaya çıkabilse de atipik yerleşimlerde de görülebileceği unutulmamalıdır. Genellikle üst solunum yolu enfeksiyonundan sonra semptomatik hale gelen brankiyal yarık kistlerinin tedavisi cerrahi eksizyondur. Daha önce vaka örneğinin sunulmadığı bir lokalizasyon olan vallekülada bir brankiyal yarık kisti olgusu sunuyoruz.

**Anahtar Kelimeler:** brankiyal yarık kisti, valleküla, lenfoepitelyal kist

Kabul Tarihi: 08.05.2021

Correspondence: Said Sönmez, Department of Otorhinolaryngology, Özalp State Hospital, Van, Turkey.

E-mail: dr.saidsonmez@gmail.com

Kocaeli Medical Journal published by Cetus Publishing. 



Kocaeli Medical Journal 2021 <https://kocaelimj.org>

This article is distributed under the terms of the Creative Commons Attribution-NonCommercial International License.

## INTRODUCTION

The branchial apparatus responsible for the development of the head and neck structures begins to develop in the fourth and fifth weeks of embryological life. Branchial cleft anomalies occur due to problems in the abnormal development or regression of the branchial apparatus containing the endoderm, mesoderm and ectoderm layers. Branchial cleft anomalies, known to be congenital, can remain asymptomatic for many years and may occur as cyst, sinus, fistula or cartilage residues (1). Generally, the incidence increases with the second decade.

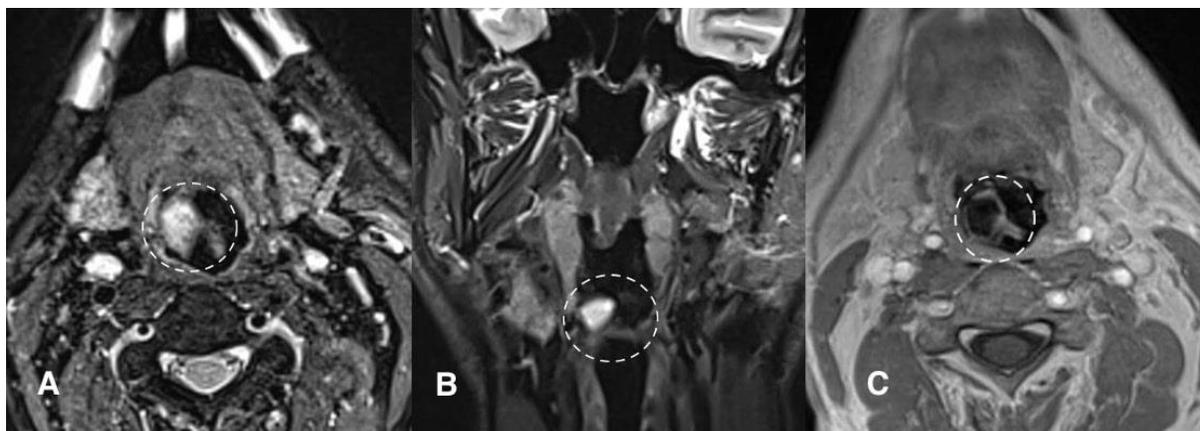
It is also called a lymphoepithelial cyst because it contains both epithelial and lymphoid cells. Branchial cysts may become infected and become symptomatic, especially after the upper respiratory tract due to the lymphoid tissue it contains (2). Second branchial cleft anomalies are the most common type and are often located at the junction of the sternocleidomastoid muscle in the upper anterior and lower 2-3 in the anterior neck (2). Branchial cleft anomalies, which can appear anywhere between the tragus and the clavicle, are the second most common cause of neck masses in childhood (3,4).

Ultrasanography and the clinical findings of the patient are considerably sufficient in diagnosis, but CT and MR are also helpful especially in differential diagnosis. Outside

the expected area, case examples were also presented in unusual localization such as the mediastinum, floor of the mouth and shoulder (5,6). However, in the literature, there was no case of branchial cyst in the vallecula like we present as a case report.

## CASE REPORT

A 53-year-old male patient was admitted to our hospital with a feeling of stuck in the throat and difficulty swallowing for 1 month. The patient had no hoarseness and respiratory distress. The patient's complaint started after upper respiratory tract infection 1 month ago. Oropharyngeal and rhinoscopic examination and neck palpation of the patient, whose complaint did not recede despite antibiotherapy, was normal. The patient never used alcohol or cigarettes. No signs of infection were found in the examinations. On laryngoscopy, vocal cords, epiglottis and piriform sinuses were normal, but 2 mass lesions, the largest of which was approximately 2 cm in size, without mucosal irregularity were seen in the vallecula on the right side. The cystic lesions with prominent hyperintense on T2 examination and hypointense on T1 examination, contrast enhancement and thin wall structure were observed on MR imaging. (Figure 1) The other lesion approximately 1 cm in size, seen on the examination could not be seen on MR.



**Figure 1: A) Hyperintense mass on T2 axial section B) Hyperintense mass on T2 coronal section C) Hypointense mass on T1 axial section**

Considering the age of the patient and the localization of the mass, vallecular epithelial cyst was considered as a preliminary diagnosis. Mucosal irregularity was not observed in direct laryngoscopy under general anesthesia. Both cysts were excised with clean borders without losing their integrity. (Figure 2) The pathology examination of the patient was reported as a branchial cyst as dense lymphatic cells in the cyst wall lined with a multi-layer flat epithelium. There was no recurrence or any other complaints during the one-year follow-up. Informed consent for publication was obtained from the patient.



**Figure 2: Completely excised vallecular cysts**

## DISCUSSION

The branchial apparatus includes the endoderm, mesoderm and ectoderm layers and is responsible for the development of the head and neck structures. In the embryological process, branchial apparatus anomalies occur due to disorders in the development and regression of the branchial arcs. The most common of these are branchial cleft anomalies. Although many theories have been put forward, the most widely accepted one is incomplete involution theory (7). Branchial cyst anomalies, which are considered to be congenital, frequently occur in the first and second decades.

Although branchial cleft anomalies occur mostly as a mass in the neck, they can also be seen as sinus mouth, fistula, and cartilage residues. They are usually asymptomatic and often become symptomatic after an upper respiratory infection. In addition, depending on the size of the mass, symptoms such as dysphagia, dyspnea and stidor may occur (2,8). Branchial arch anomalies are divided

into four according to the embryological structure they originate from. The most common is the “second branchial arch anomalies”, which constitutes 90-95% of all arch anomalies and occurs as a cystic mass at the rate of 88-90% (8). The second common is the first branchial arch anomalies with a rate of 1-10%. The first branchial arch anomalies are divided into two types according to its relation with facial nerve and parotid gland. The simpler Type 1 is often seen as a sinus or cyst in the preauricular region lateral to the facial nerve. Type 2 is located in the medial or lateral of the facial nerve and may occur anywhere through the parotid gland to the corner of the mandible (8). Third and fourth branchial arch anomalies are extremely rare. The third branchial arch anomaly is seen as the fistula opening to the piriform sinus apex passing through the thyrohyoid membrane, while the fourth branchial arch anomalies are associated with the thyroid gland. Both anomalies can be present with recurrent thyroiditis or thyroid abscess (1,2).

In the differential diagnosis, dermoid cyst, thyroglossal duct cyst, salivary gland infection, cystic hygroma, lymphangioma, carotid tumor, glomus jugulare tumors, teratoma, ectopic salivary gland tissue, external laryngocele and metastatic neck masses should be kept in mind (1). Thyroglossal duct cyst, which is the most common congenital mass in children;

differs in that it is at the midline and at the level of the hyoid bone and acts by swallowing and tongue movements (2). Dermoid cysts are mostly in the middle line and may contain mature teratoid tissues such as hair and cartilage (2,8). The second branchial cyst typically pushes the sternocleidomastoid muscle to the posterolateral, the carotid and jugular vein vessels to the posteromedial and the submandibular gland to the anterior (2,8). It may progress through the stylomandibular tunnel and extend to the parapharyngeal area (8).

Histopathologically, branchial cleft cysts contain viscous, cloudy, yellow-green-brown liquid containing cholesterol crystals. The wall of cyst is covered with a squamous or columnar non-keratinized epithelium that covers a full or incomplete lymphoid tissue strip corresponding to the lymphatic tissues (2,8).

Ultrasonography is one of the first methods to be used in the diagnosis of branchial cysts. In ultrasonography, which has advantages such as low cost, easily accessible and free of ionizing radiation, we present as hypo-anechoic, compressing surrounding tissues, compressible smooth limited masses (9). Ultrasonography and the patient's clinic alone are sufficient for diagnosis, especially in cysts that have appeared as a mass in the neck. They are typically seen on CT as well-circumscribed, homogeneous thin-walled masses (5,9).

The wall thickness may increase after infection and signs of inflammation may be seen in the surrounding tissue. MR imaging is preferred to exclude differential diagnoses and to determine the extent of the mass. Cyst appears between hypointense and mild hyperintense on T1-weighted images and hyperintense on T2-weighted images (8).

Preoperative fluoroscopic fistulography or CT fistulography using barium also helps in defining a fistula or sinus anatomy. Flexible nasolaryngoscopy, an intraoperative laryngoscopy or esophageoscopy may be useful to see the fistula mouth, especially in the 3rd and 4th branchial cyst anomalies. Drinking barium and performing laryngoscopy together has been reported to increase the detection of preoperative piriform sinus fistula to 100% (8,9). Although branchial cleft cysts are benign masses, carcinomas are rarely seen. Although squamous cell carcinoma is the most common malignancy, cases of ectopic thyroid tissue-induced papillary carcinoma have also been reported in the literature (4). Treatment of branchial cleft anomalies is total excision of the cyst with the tract of the fistula, so that the entire epithelial tissue is removed (9). Therefore, fluoroscopic fistulography or CT fistulography showing the possible fistula tract is useful in reducing surgical complications and recurrences (8,10). On the other hands Derks LS et al. suggest endoscopic cauterization as the treatment of for third and fourth branchial

arc anomalies because of the lower morbidity rate (10).

## CONCLUSION

Although branchial cleft cysts occur mainly on the lateral side of the neck, in any area between the clavicle and the tragus, it may also occur in atypical localization. We suggest that branchial cleft cysts should also be considered in the differential diagnosis of the masses seen in the vallecula.

## Competing Interests

The authors declare that they have no competing interests.

## Disclosure Statement

The authors have no potential conflict of interest.

## Authors' Contribution

All authors contributed equally to this manuscript. All authors have read and approved the final manuscript.

## REFERENCES

1. Al Sukhun J., El Naggat M. Unusual Presentation of a Large Multilocular Second Branchial Cleft Cyst. *J Craniofac Surg* 2019;**30**(6):1772–3.
2. Panchbhai AS., Choudhary MS. Branchial cleft cyst at an unusual location: A rare case with a brief review. *Dentomaxillofac Radiol* 2012;**41**(8):696–702.
3. Goff CJ., Allred C., Glade RS. Current management of congenital branchial cleft cysts, sinuses, and fistulae. *Curr Opin Otolaryngol*

Head Neck Surg 2012;**20**(6):533–9.

4. Guldred LA., Philipsen BB., Siim C. Branchial cleft anomalies: accuracy of pre-operative diagnosis, clinical presentation and management. J Laryngol Otol 2012;**126**(6):598–604.
5. Vemula R., Greco G. An unusual presentation of presentation of a branchial cleft cyst. J Craniofac Surg 2012;**23**(3):e270–2.
6. Lewis C., Lewis M., Vaughan R. Branchial Cyst: a case of unusual retrosternal extension into the anterior mediastinum. Internet J Thorac Cardiovasc Surg 2007;**9**(1).
7. Golledge J., Ellis H. The aetiology of lateral cervical (branchial) cysts: past and present theories. J Laryngol Otol 1994;**108**(8):653–9.
8. Schroeder Jr JW., Mohyuddin N., Maddalozzo J. Branchial anomalies in the pediatric population. Otolaryngol Head Neck Surg 2007;**137**(2):289–95.
9. Mitroi M., Dumitrescu D., Simionescu C., Popescu C., Mogoantă C., Cioroianu L., et al. Management of second branchial cleft anomalies. Rom J Morphol Embryol 2008;**49**(1):69–74.
10. Derks LSM., Veenstra HJ., Oomen KPQ., Speleman L., Stegeman I. Surgery versus endoscopic cauterization in patients with third or fourth branchial pouch sinuses: a systematic review. Laryngoscope 2016;**126** (1):212–7.