

## Type III Second Branchial Cleft Cyst

Samir Vijay Choudhary, Sonali Prabhakar Khadakkar, Vivek Vishwas Harkare, Priti Rakesh Dhoke  
Kanchan Sandeep Dhote, Nudrat Parvez Kamal

### ABSTRACT

Cervical congenital cystic masses constitute an uncommon group of lesions usually diagnosed in infancy and childhood. Branchial cleft cysts are congenital lateral neck masses which manifest in the adolescents or in adulthood. They arise from the remnants of the branchial apparatus of embryonic life. Here, in this case, patient was presented with branchial cleft cyst at the age of 70 years. Computed tomography of neck showed well-circumscribed soft tissue mass extending from parotid region to lower cervical region with small ill-defined extension between internal and external carotid arteries which is pathognomonic of type III second branchial cleft cyst. Complete surgical excision was done. Histopathological examination confirmed the diagnosis of branchial cleft cyst.

**Keywords:** Branchial cleft, Branchial cyst, Branchial fistula.

**How to cite this article:** Choudhary SV, Khadakkar SP, Harkare VV, Dhoke PR, Dhote KS, Kamal NP. Type III Second Branchial Cleft Cyst. *Int J Head Neck Surg* 2012;3(2):112-114.

**Source of support:** Nil

**Conflict of interest:** None

### INTRODUCTION

Congenital branchial cleft cyst, sinus and fistula are the remnants of the branchial apparatus which fails to regress completely. Cystic remnants present commonly in the adolescence and adulthood whereas fistulas and sinuses are usually seen in infancy and early childhood. Second branchial cleft cysts are the most common form of the branchial anomalies and originate from the remnants of the cervical sinus of His and its duct during the differentiation of branchial apparatus. They are usually found at the junction of the lower and middle thirds of the anterior border of the sternocleidomastoid muscle as a cystic mass.

This reported case of second branchial cleft cyst in 70 years old male is rare. Type III second branchial cyst showing extension between internal and external carotid arteries is also a rare presentation.

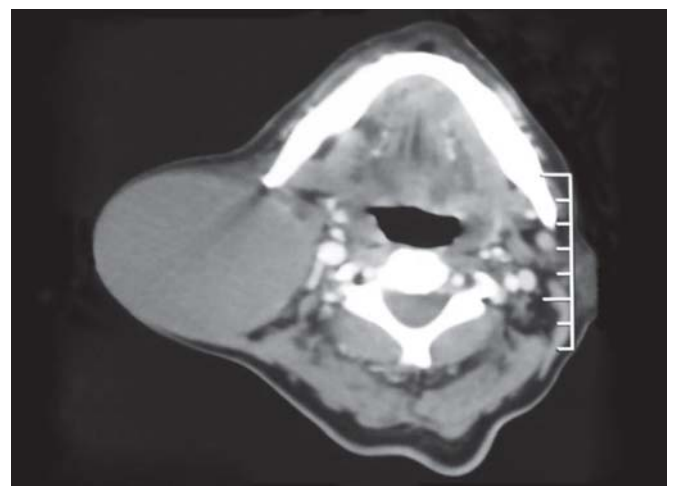
### CASE REPORT

A 70-year-old male had a swelling in the right lateral neck, which was noticed about 2 years back. The mass was painless, slowly enlarging and extending upward up to the lower jaw and downward till the supraclavicular region. Patient had no pressure symptoms. There was no history of change in size of swelling with episodes of upper respiratory tract infection. On local examination, there was a single

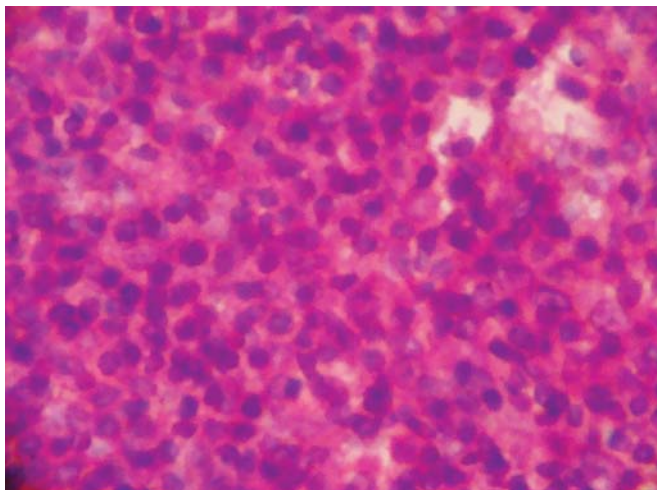
mass of size 8 × 6 cm in right lateral neck along the sternocleidomastoid muscle extending superiorly to parotid region and inferiorly up to the junction of upper two-third to lower one-third of sternocleidomastoid muscle. The mass was nontender, cystic. The remaining head and neck examination in view of malignancy was unremarkable.

Ultrasonography of neck revealed, a sharply marginated, thin walled, ovoid centrally anechoic mass extending to parotid region and carotid space displacing internal jugular vein. At contrast computed tomography (CT) of neck, large oval well-circumscribed nonenhancing soft tissue mass was seen in the right cervical region measuring 9.4 × 7.4 × 6.6 cm extending from parotid region superiorly up to lower jugular region inferiorly. Its medial extension was into carotid space compressing internal jugular vein (Fig. 1). Small ill-defined soft tissue extension was seen between internal and external carotid arteries. Fine-needle aspiration cytology was inconclusive.

Surgical excision of the cyst was done without rupture after partial cystic fluid aspiration to facilitate its complete excision. Histopathologic study revealed a squamous epithelium-lined cyst with lymphoid infiltration, consistent with branchial cleft cyst (Fig. 2). Patient was discharged without any complications and there was no evidence of recurrence in follow-up for 1 year. Looking at the site of the cyst, its extension between internal and external carotid artery on CT scan and histopathological confirmation, we came to the final diagnosis of type III second branchial cleft cyst.



**Fig. 1:** CT scan neck showing large cyst compressing internal jugular vein



**Fig. 2:** Branchial cyst wall showing subepithelial lymphoid tissue aggregation

## DISCUSSION

Developmental anomalies arising from the branchial apparatus can present as different morphologic patterns of cyst, sinus or fistula. By the end of the 4th week of embryonic life, the branchial arches (derived from neural crest) and mesenchyme (derived from the lateral mesoderm) are easily recognizable. The second, third and fourth branchial clefts get enclosed under second arch called as the cervical sinus of His. There has been considerable controversy regarding the four theories of origin of branchial anomalies.<sup>1</sup> Most authorities believe that they arise from incomplete obliteration of cervical sinus of His or from buried epithelial cell rests.<sup>2</sup>

The vast majority (95%) of branchial cleft anomalies arise from the second cleft.<sup>3</sup> At least three-fourth of these anomalies are cysts which typically occur between 10 and 40 years of age, in contrast to fistulas or sinuses, which manifest most commonly during the first decade of life.<sup>4</sup> Sixty percent cysts are found in males and 40% in females.<sup>1</sup> About 2% are bilateral; two-third are found on left and one-third on the right side of neck.<sup>1</sup> Bailey<sup>5</sup> has classified second branchial cleft cysts into four types. Bailey type I cyst is the most superficial and lies along the anterior surface of the sternocleidomastoid muscle; just deep to the platysma muscle. The type II cyst is the most common and found in the 'classic' location for these cysts; along the anterior surface of the sternocleidomastoid muscle, lateral to the carotid space and posterior to the submandibular gland. A type III cyst extends medially between bifurcation of the internal and external carotid arteries. It is seen as a 'tail' or 'beak sign' on CT. The type IV cyst lies in the pharyngeal mucosal space and is lined by columnar epithelium.<sup>5</sup>

Second branchial cleft cyst can occur anywhere along a line from the oropharyngeal tonsillar fossa to the supraclavicular region of the neck. Size of the cyst ranges from 1 to 10 cm in diameter. It is usually painless, fluctuant mass, enlarges slowly and may become painful and tender if secondarily infected.<sup>4</sup> Pressure symptoms are seen in 7% of cases.<sup>1</sup> On palpation, 70% are cystic and 30% are solid.<sup>1</sup> Sudden appearance or enlargement is often associated with upper respiratory tract infection or trauma.

The differential diagnosis of second branchial cyst includes, inflammatory and neoplastic lymphadenopathy, thyroid nodule, parotid tumors, carotid body tumors, cystic hygroma, neurofibroma and lipoma as well as other far less common entities.<sup>6</sup> Pathologically, the cysts are usually thin walled and unilocular, lined by squamous or columnar epithelium and occasional granulation tissue or ectopic salivary tissue.<sup>6</sup> More than 90% have subepithelial lymphoid tissue.<sup>1</sup> Ultrasonography, CT of neck, magnetic resonance imaging of the neck allows accurate preoperative planning.

In principle, clinical manifestation—no matter at what age—should be taken as an indication for elective excision before complications mainly of an inflammatory nature supervene.<sup>7</sup>

The patient in this reported case of second branchial cyst presented at 70 years which is very delayed and unusual presentation. It was Bailey Type III second branchial cyst with a pathognomonic feature of extension between internal and external carotid arteries. This is a rare type of second branchial cyst. Surgical excision was done and histopathological study confirmed the diagnosis.

## CONCLUSION

Branchial cysts are usually diagnosed in adolescence and adulthood. But the diagnosis may be delayed till old age as in our case (70 years). Clinical manifestations combined with knowledge of the embryology and spatial anatomy of the head and neck often provide clues for a correct diagnosis and appropriate management.

## REFERENCES

1. Maran AGD, Buchanan DR. Branchial cysts, sinuses and fistulae. *Clin Otolaryngol* 1978;3:72-92.
2. Benson MT, Dalen K, Mancuso AA, Kerr HH, Cacciarelli AA, Mafee MF. Congenital anomalies of the branchial apparatus: Embryology and pathologic anatomy. *Radio Graphics* 1992;12: 942-60.
3. Vogl T. Hypopharynx, larynx, thyroid and parathyroid. In: Strak D, Bradley W (Eds). *Magnetic resonance imaging* (2nd ed). St Louis, MO: Mosby-Yearbook 1992;1184-1243.
4. Som P, Sacher M, Lanzieri C, et al. Parenchymal cysts of the lower neck. *Radiology* 1985;157:399-406.

5. Bailey H. Branchial cysts and other essays on surgical subjects in the faciocervical region. London, England: Lewis 1929.
6. Deane SA, Telander RL. Surgery of thyroglossal duct and branchial cleft anomalies. Am J Surg 1978;136:348-53.
7. Puri P, Hollwarth M. Paediatric Surgery. Spinger Surgery Atlas Series 2006;8-12.

## ABOUT THE AUTHORS

### Samir Vijay Choudhary (Corresponding Author)

Lecturer, Department of ENT, NKP Salve Institute of Medical Sciences and Research Centre, Nagpur, Maharashtra, India  
e-mail: samirchoudhary45@yahoo.com

### Sonali Prabhakar Khadakkar

Assistant Lecturer, Department of ENT, NKPSIMS and LMH, Nagpur Maharashtra, India

### Vivek Vishwas Harkare

Professor and Head, Department of ENT, NKPSIMS and LMH Nagpur, Maharashtra, India

### Priti Rakesh Dhoke

Assistant Professor, Department of ENT, NKPSIMS and LMH Nagpur, Maharashtra, India

### Kanchan Sandeep Dhote

Assistant Lecturer, Department of ENT, NKPSIMS and LMH, Nagpur Maharashtra, India

### Nudrat Parvez Kamal

Junior Resident, Department of ENT, NKPSIMS and LMH, Nagpur Maharashtra, India