



## CASE REPORT

# Microscopic assisted excision of a rare posterior triangle branchial cyst

Brihaspati Sigdel<sup>1,2</sup>  | Bhima Neupane<sup>3</sup> | Sunita Ranabhat<sup>4</sup> | Amrit Pokhrel<sup>2</sup>  | Ameet K. Jha<sup>5</sup>

<sup>1</sup>Department of Otolaryngology & Head and Neck Surgery, Gandaki Medical College, Kathmandu, Nepal

<sup>2</sup>Metrocity Hospital, Pokhara, Nepal

<sup>3</sup>Department of Anatomy, Manipal College of Medical Sciences, Pokhara, Nepal

<sup>4</sup>Department of Pathology, Gandaki Medical College, Kathmandu, Nepal

<sup>5</sup>Department of Anatomy, College of Medicine, Texila American University, Sparendam, Guyana

## Correspondence

Brihaspati Sigdel, Department of Otolaryngology & Head and Neck Surgery, Gandaki Medical College Teaching Hospital, Pokhara, Nepal.  
Email: [brihassig1@gmail.com](mailto:brihassig1@gmail.com)

## Abstract

Branchial cyst is a painless mass commonly located in the anterior triangle of the neck. It is rarely found in the posterior triangle of the neck. A computed tomography scan of the neck is important to see the extent of the anomaly and its relationship with the major vessel.

## KEYWORDS

branchial cyst, microscope assisted excision, posterior triangle

## 1 | INTRODUCTION

The branchial cleft cyst (BC) is a soft swelling that develops from the incomplete obliteration of the second branchial cleft mucosa which remains dormant and grows later in life and forms the cyst.<sup>1</sup> They are usually found in the anterior triangle of the neck medial to the upper third of the sternocleidomastoid (SCM) muscle but is rarely reported in the posterior triangle of the neck.<sup>2</sup> It is a slow-growing, fluctuant soft swelling, congenital in nature that may present later in childhood or even in adults. It can be found in the line of the external ear, angle of the mandible, and upper lateral aspect of the neck consistent with the location of branchial apparatus. The typical location is at the anterior border of SCM at upper 1/3rd and lower 2/3rd but can occur at any level from the hyoid bone to

the suprasternal notch.<sup>3</sup> It is rare for the BC to manifest in locations such as in the lower third of the sternocleidomastoid muscle, in the posterior triangle, and on the right side. Here, we report on the case of a branchial cleft cyst situated in the posterior triangle of the neck possibly corresponding to its origin from the third branchial arch.

## 2 | CASE REPORT

A 22-year-old male patient presented to the Outpatient Department of otorhinolaryngology of Metrocity Hospital, Nepal, with chief complaints of painless swelling on the right side of the neck for past six months. The swelling was insidious in onset and gradually increased to the size of a cricket ball. The patient noticed the swelling accidentally when he was on a regular check-up for British army

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2022 The Authors. *Clinical Case Reports* published by John Wiley & Sons Ltd.

recruitment. The patient was healthy and well-nourished. Physical examination of the neck revealed an ovoid swelling with ill-defined margins which is soft, non-tender, compressible and located upper part of the posterior triangle. Skin over the mass was not fixed (Figure 1).

Ultrasonography showed a well-defined cystic lesion measuring  $5.6 \times 4.5 \times 1.4$  cm with multiple internal mobile echoes with no intralesional vascularity. USG-guided FNAC showed thick whitish secretion which on microscopic examination and showed sheets of anucleate keratinized squamous cells, mature squamous cells, and metaplastic cells. The background showed dense amorphous material and inflammatory cells consistent with the branchial cyst. On contrast-enhanced CT (CECT) examination, a well-defined, non-enhancing cystic mass



FIGURE 1 Branchial cleft cyst at the right side of neck (Red Arrow)

measuring  $5.5 \times 4.6 \times 1.5$  cm was noted in the neck at the level of the second cervical vertebrae to the lower level of fourth cervical vertebra with an elevation of the posterior part of the SCM muscle in the posterior triangle reaching up to the anterior border of trapezius posteriorly and superficial to scalene muscles (Figure 2).

The surgical excision was performed by horizontal incision at the junction of upper one-third and lower two-third of SCM muscle extending from the anterior border of SCM muscle to the anterior border of the trapezius. The skin with platysma was elevated as upper and lower flap followed by microscope-guided dissection. The great auricular nerve was preserved carefully while approaching the cyst via the posterior border of the right SCM muscle (Figure 3). The spinal accessory nerve was separated from the posterior wall of the cyst while excision. The excised cystic tissue was sent for histopathological diagnosis. The cyst wall was lined by stratified squamous epithelium with dense lymphocytic infiltrate at the underlying stroma and some foci of various size of lymphoid follicle with prominent germinal Centre and surrounding area with fibro collagenous tissue and few capillaries suggestive of branchial cyst (Figure 4) patient was discharged after five days after surgery and was followed up for next three months with no evidence of complication and recurrence.

### 3 | DISCUSSION

The exact origin of branchial cyst is unknown but different theories were proposed which include incomplete obliteration of branchial mucosa, persistent vestiges of the paracervical sinuses, thyropharyngeal duct theory, and cystic lymph node origin. Proctor described four types of

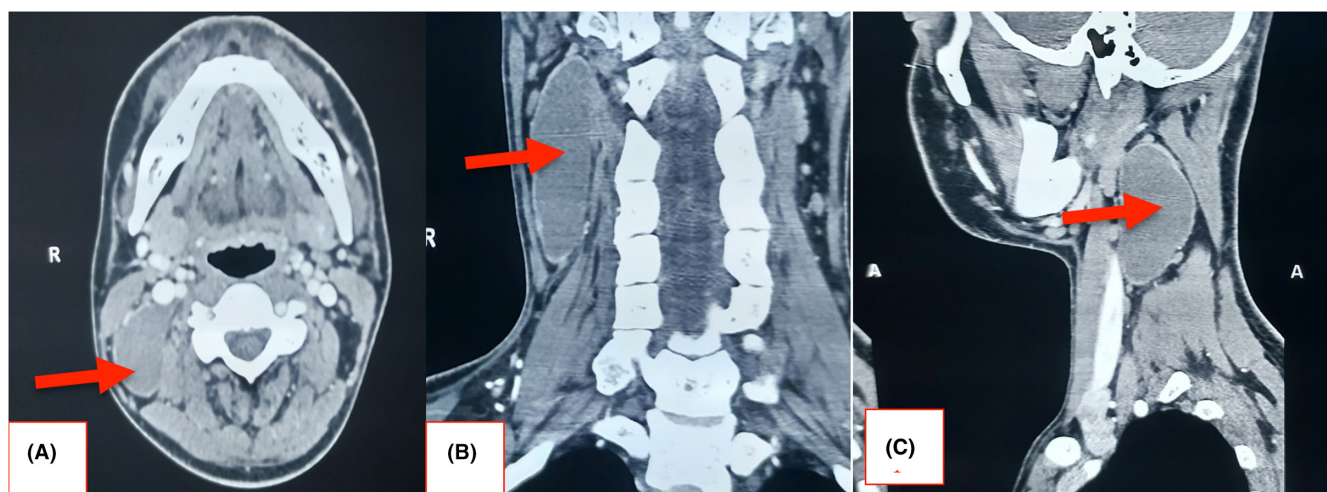
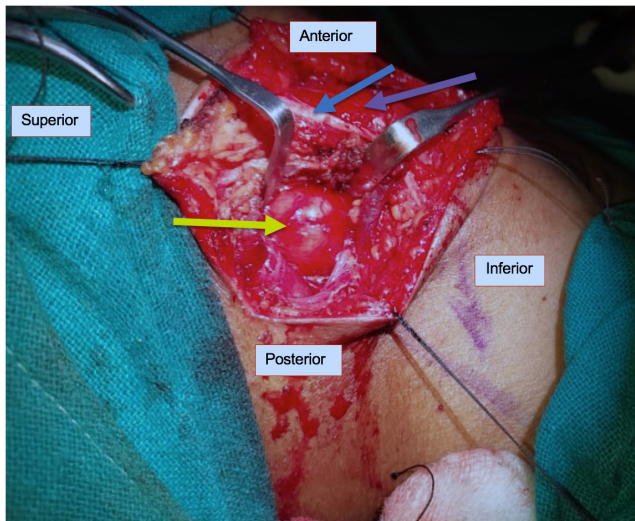
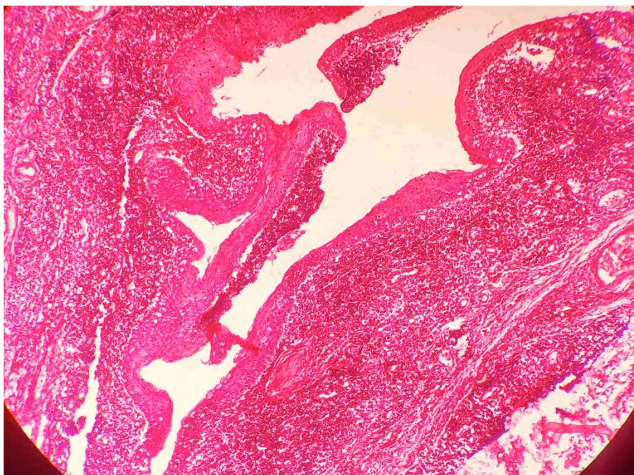


FIGURE 2 Contrast Enhance Computerized Tomography (CECT) Scan of Neck (A) Axial view (B) Coronal view (C) Sagittal view showing isointense well-circumscribed mass mostly present at the posterior triangle and beneath sternocleidomastoid muscle reaching up to Trapezius muscle posteriorly



**FIGURE 3** shows an intraoperative picture showing a branchial cyst at the right posterior triangle (blue arrow), Great auricular nerve (blue arrow) and right sternocleidomastoid muscle (violet arrow)



**FIGURE 4** The histopathological finding showed the cyst wall was lined by stratified squamous epithelium and dense lymphocytic infiltrate at the underlying stroma

the branchial cysts: type I—deep to the platysma, anterior to the SCM muscle, type II—abutting the internal carotid artery, and adherent to the internal jugular vein (most common), type III—extending between the internal and external carotid arteries, and type IV—abutting the pharyngeal wall and potentially extending superiorly to the skull base.<sup>4</sup> However, the posterior triangle is an unusual location.<sup>5</sup> The preoperative diagnosis of branchial cleft cyst is made by a combination of history, physical examination, ultrasound, CT scan, and FNAC.

BC predominantly occurs in the anterior triangle of the neck. However, in our case, it was in the posterior triangle. USG reveals the cystic nature of the swelling; however, it cannot reveal the extent and depth of the cystic mass. So, it

is necessary to do a further investigation with a Contrast-enhanced CT of the neck that shows the detailed anatomy and relation of the cyst with the surrounding structure. BC consists of straw or brownish-colored turbid fluid consisting of cholesterol crystals and squamous epithelial cells on FNAC.<sup>1</sup> It was lined predominantly by stratified squamous epithelium resting on a complete or incomplete band of lymphoid tissue. But sometimes BCs can be lined by pseudostratified, columnar ciliated epithelium as well.

The clinical and radiological features of the cyst in our case were very confusing with the normally occurring BC due to its location, but the FNAC confirms the diagnosis.

Treatment of a branchial cleft cyst includes surgical excision. We did on magnification by using microscope to separate cyst and preserve spinal accessory nerve. Most young boys want to join either Nepalese, Indian, or British army. He was refused to select due to the same neck swelling. Movement of hand is crucial in such job.

## 4 | CONCLUSION

The branchial cyst originates from the branchial clefts or lymphoid tissues. Mostly, it is located at the anterior triangle and rarely present at the posterior triangle. Ultrasonography, CT scans help to locate and see an extension of the cyst. FNAC differentiated it from other lesions. Microscopic, assisted cyst excision is recommended as early identification and preserve spinal accessory nerve especially in young individuals who wish to be recruited in defense or other professions.

## AUTHOR CONTRIBUTIONS

BS conceptualized the study. BS, BN, SR, AP, and AJ involved in design, literature review, and writing and approving the final manuscript.

## ACKNOWLEDGMENTS

None.

## CONFLICT OF INTEREST

None.

## DATA AVAILABILITY STATEMENT

Data are available on request from the authors.

## ETHICAL APPROVAL

None.

## CONSENT

Written informed consent was obtained from both the patient and his parents for publication of this case report and any accompanying images.

## PATIENT CONSENT STATEMENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

## ORCID

Brihaspati Sigdel  <https://orcid.org/0000-0002-8546-6699>

Amrit Pokhrel  <https://orcid.org/0000-0001-5602-0869>

## REFERENCES

1. 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. doi:10.1259/dmfr/59515421
2. Bagchi A, Hira P, Mittal K, Priyamvara A, Dey AK. Branchial cleft cysts: a pictorial review. *Pol J Radiol.* 2018;11(83):e204-e209. doi:10.5114/pjr.2018.76278
3. Adams A, Mankad K, Offiah C. Branchial cleft anomalies: a pictorial review of embryological development and spectrum of imaging findings. *Insights Imaging.* 2016;7(1):69-76. doi:10.1007/s13244-015-0454-5
4. Magdy EA, Fadali GA, Seif-Elnasr M, Fathalla MF. Unusual isolated parapharyngeal second branchial cleft cyst: a case report and literature review. *Case Rep Otolaryngol.* 2020;2020:8814071. doi:10.1155/2020/8814071
5. Vital D, Huber GF, Pézier TF, Rössle M, Probst R, Widmer GM. Epithelial cyst in the posterior triangle of the neck: atypical branchial cyst or cystic lymph node metastasis? *Case Rep Otolaryngol.* 2014;2014:912347. doi:10.1155/2014/912347

**How to cite this article:** Sigdel B, Neupane B, Ranabhat S, Pokhrel A, Jha AK. Microscopic assisted excision of a rare posterior triangle branchial cyst. *Clin Case Rep.* 2022;10:e06034. doi: [10.1002/ccr3.6034](https://doi.org/10.1002/ccr3.6034)