

## CLINICAL, CYTOLOGICAL, AND RADIOLOGICAL DISCREPANCIES IN THE DIAGNOSIS OF CONGENITAL NECK CYSTS: A CASE SERIES

Bhagyashree Bhagyashree<sup>1</sup>, Ojasvi Ramesh<sup>2</sup>, Shubhani Singh<sup>3</sup>, Rituraj Rituraj<sup>4</sup>, Reena Gangwar<sup>5</sup>

Received : 10/05/2026  
Received in revised form : 29/06/2026  
Accepted : 15/07/2026

### Keywords:

Branchial cleft cyst, thyroglossal duct cyst, ultrasonography, fine needle aspiration cytology, diagnostic discrepancy.

### Corresponding Author:

Dr. Ojasvi Ramesh,  
Email: ojasvidoc@gmail.com

DOI: 10.47009/jamp.2026.8.4.84

Source of Support: Nil,  
Conflict of Interest: None declared

Int J Acad Med Pharm  
2026; 8 (4); 483-489



<sup>1</sup>Assistant Professor, Department of Pathology, Government Medical College, Haldwani, Uttarakhand, 263139, India.

<sup>2</sup>Assistant Professor, Department of Pathology, Government Medical College, Haldwani, Uttarakhand, 263139, India.

<sup>3</sup>Senior resident, Department of Pathology, VCSGGIMS & R, Srinagar, Uttarakhand, 246178 India.

<sup>4</sup>Assistant Professor, Department of Pathology, Government Medical College, Haldwani, Uttarakhand, 263139, India.

<sup>5</sup>MBBS, Junior Resident, Department of Pathology Government Medical College, Haldwani, Uttarakhand, 263139, India.

### ABSTRACT

**Background:** Congenital neck cysts, such as branchial cleft cysts and thyroglossal duct cysts, pose diagnostic challenges due to diverse clinical presentations and variability in the correlation between clinical, radiological and cytological findings. **Objective:** To emphasise the diagnostic discrepancy between clinical examination, ultrasonography and fine needle aspiration cytology (FNAC) in the evaluation of congenital neck cysts. **Materials and Methods:** We present three cases of congenital neck cysts with significant clinicoradiological and cytological discordance. Each case was subjected to clinical examination, ultrasonography and FNAC and further subjected to surgical excision and histopathological confirmation. **Results:** Case 1 shows the radiological failure to identify a clinically evident branchial cyst, while FNAC provided the right diagnosis. Case 2 showed a major discordance between clinical impression (branchial cyst) and radiological/cytological finding (thyroglossal duct cyst). Case 3 was a thyroglossal duct cyst with solid ultrasonographic appearance raising concern for malignancy which was contradicted by benign FNAC findings. Histopathology confirmed all three of these. **Conclusions:** Congenital neck cysts display common diagnostic discordance between clinical, radiological and cytological assessments. A multimodal diagnostic approach with an awareness of potential pitfalls is important for correct preoperative diagnosis and proper surgical planning.

## INTRODUCTION

Developmentally, congenital neck cysts stem arises from vestiges of the embryonic branchial apparatus and the thyroglossal duct. Thyroglossal duct cysts are the most common of these. About 20-30% of congenital neck masses are branchial cleft cysts.<sup>[1]</sup> A work-up for these cysts usually consists of clinical examination, ultrasound (USG), and fine needle aspiration cytology (FNAC). Significant discrepancies between the cited modalities have been increasingly reported.<sup>[2,3,4]</sup> Preoperative diagnosis aids in surgical planning and counselling of the patient. Although, ultrasound is the first imaging choice for superficial neck masses and can appear as either anechoic or pseudosolid,<sup>[5]</sup> FNAC reports a 56-62% sensitivity for detecting malignancy in thyroglossal duct cysts and a 23.5% false positive rate for branchial cysts.<sup>[6,7]</sup>

Malignant thyroglossal duct cysts and branchial cleft cysts are very rare and these diagnostic discrepancies can lead to adverse outcomes caused by unnecessary procedures. The cases we present will detail the nature of these discrepancies and their diagnostic implications.

## MATERIALS AND METHODS

This case series was conducted at Department of Pathology, Govt. Medical College, Haldwani. Three patients with congenital swellings of the neck were evaluated during the study period. All the patients were subjected to clinical examination, neck ultrasonography and FNAC followed by surgical excision. The resected specimens were routinely processed by paraffin-embedded technique and stained with haematoxylin and eosin. Histopathological examination was the final

diagnostic gold standard. Informed consent was obtained from all individual participants included in the study. Cases were selected on the basis of a significant discordance between clinical, radiological and cytological findings.

Case Presentations:

Case 1: A Clinically Apparent Branchial Cleft Cyst Not Identified on any Form of Imaging

A 14 year old male had a clinically apparent right submandibular swelling of 5x4 cm measuring. This was consistent with a branchial cleft cyst and was soft, transilluminant, fluctuant, non-tender, and mobile on exam. (**Figure 1**)

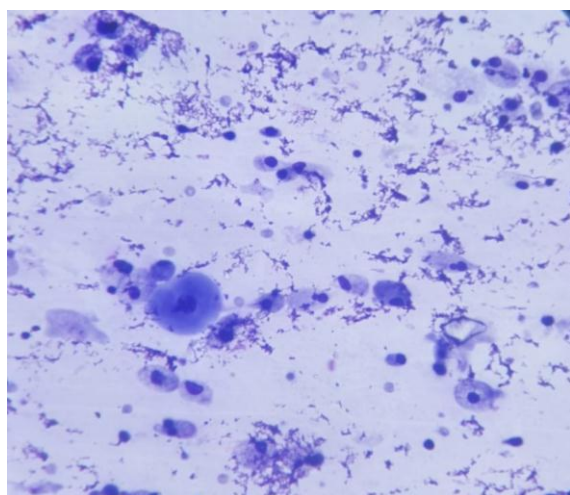


**Figure 1: 14-year-old male presented with a right submandibular swelling**

Radiological Findings: Showed only bilateral cervical lymphadenopathy and failed to detect the clinically apparent cystic lesion on ultrasonography.

Cytological Findings: FNAC done yielded jelly-like material.

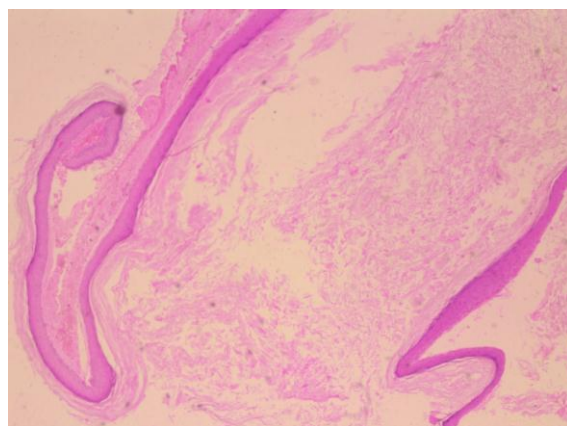
Cytosmear examination revealed paucicellular smear with anucleated squamous cells, foamy macrophages and amorphous debris, suggesting benign cystic lesion consistent with branchial cleft cyst. (**Figure 2**)



**Figure 2: Cytosmear with anucleated squamous cells, foamy macrophages, and amorphous debris(100X) PAP Stain.**

**Surgical Management and Outcome:** Based on clinical and cytological findings, surgical excision was performed and specimen was sent for histopathology.

**Histopathological examination** done confirmed diagnosis of branchial cleft cyst. (**Figure 3**)



**Figure 3: HPE showing keratin filled cyst lined by stratified squamous epithelium**

**Discrepancy Analysis:** This case demonstrates radiological failure to detect a clinically obvious cystic mass, while FNAC provided accurate diagnostic information.

The inability of ultrasonography to detect the lesion was likely due to the deep location of the cyst, along with some potential technical limitations encountered during the examination.

**Case 2: Major Clinical-Radiological-Cytological Discordance**

A 3-year-old female presented in a ENT OPD with a 2x2 cms swelling in the submental region. Based on location and physical examination, the clinical diagnosis of branchial cleft cyst was made. (**Figure 4**)



**Figure 4: 3-year-old female with a 2x2 cms swelling in the submental region.**

**Radiological Findings:** Ultrasonography done showed a large elongated cystic lesion located in between the suprathyroid and suprahyoid region, suggesting thyroglossal duct cyst rather than branchial cleft cyst.

**Cytological Findings:** FNAC showed paucicellular smear with macrophages, squamous cells in a proteinaceous background along with scattered lymphocytes and diagnosis of thyroglossal duct cyst was given. (Figure 5)

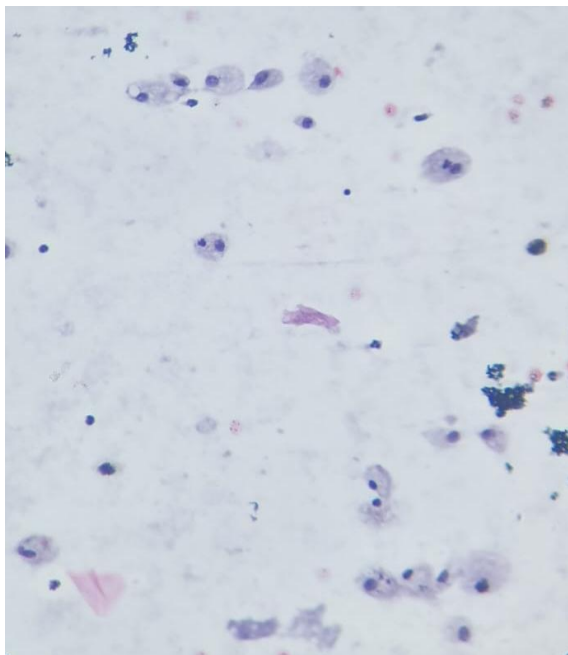


Figure 5: Cytosmear showing macrophages, squamous cells in a proteinaceous background along with scattered lymphocytes (100X) PAP Stain.

**Surgical Management and Outcome:** Sistrunk procedure was performed based on radiological and cytological findings and specimen was sent for histopathological examination where histopathology confirmed the diagnosis of thyroglossal duct cyst. (Figure 6)

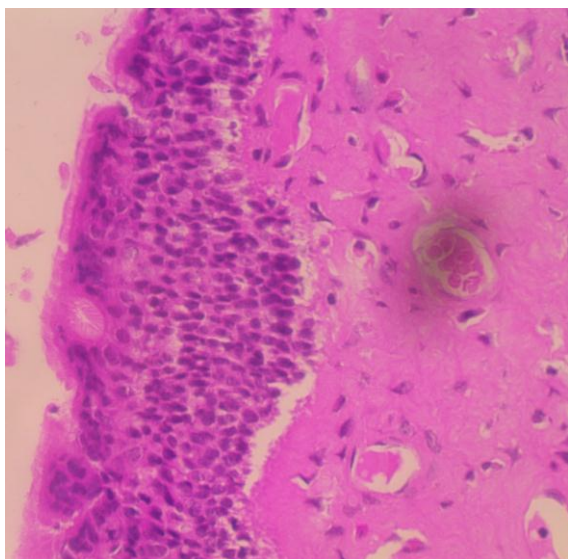


Figure 6: Pseudostratified ciliated epithelium in a thyroglossal cyst (400 X) H&E stain

**Discrepancy Analysis:** This case represents a major diagnostic discordance where clinical features

strongly suggested branchial cleft cyst, but both imaging and cytology indicated thyroglossal duct cyst. This unusual lateral presentation of the TGDC led to clinical misdiagnosis, highlighting the importance of imaging in atypical presentations along with FNAC.

### Case 3: Radiological Suspicion of Malignancy in Benign Thyroglossal Duct Cyst

A 65-year-old male presented with a midline neck swelling in an OPD measuring 6×4 cms, present since birth. On clinical examination, the swelling was firm, moved with deglutination and tongue protrusion and clinically diagnosis of thyroglossal duct cyst was made. (Figure 7)



**Radiological Findings:** Ultrasonography done showed a heterogeneous solid lesion with internal echoes and mild vascularity, raising suspicious for malignancy rather than suggesting a typical benign cystic lesion.

**Cytological Findings:** FNAC done revealed paucicellular smear with foamy histiocytes, lymphocytes, cholesterol crystals, binucleate squamous cells and thyroid follicle consistent with clinical diagnosis of benign thyroglossal duct cyst with no evidence of malignancy. (Figure 8)

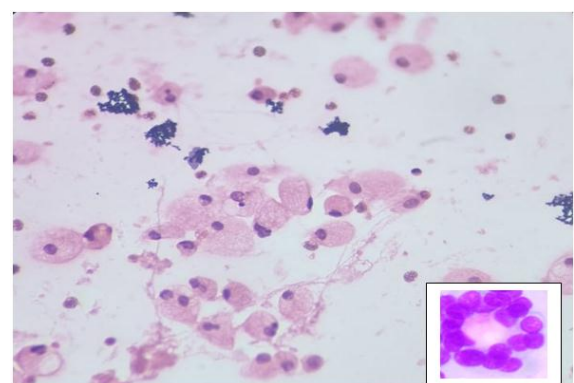
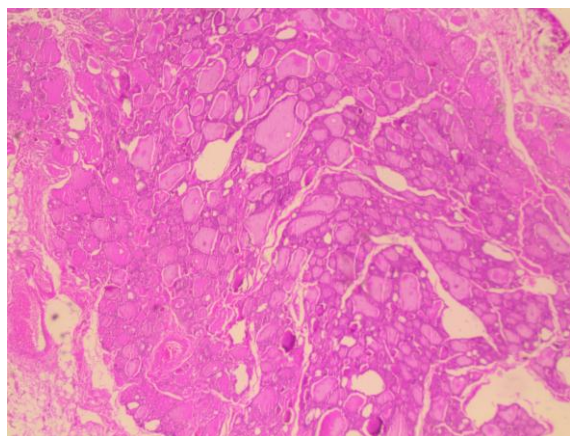


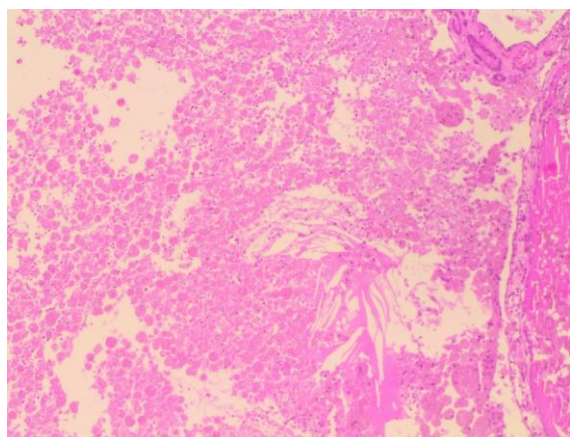
Figure 8: Smear show foamy histiocytes and lymphocytes. Inset showing thyroid follicle (100X) PAP stain.

**Surgical Management and Outcome:** Sistrunk procedure was performed and **Histopathological**

**examination** confirmed benign thyroglossal duct cyst with no malignant transformation. (Figure 9,10)



**Figure 9: Thyroglossal duct cyst: Thyroid follicles of varying size ranging from microfollicle to macrofollicle (400X) H&E**



**Figure 10: Thyroglossal duct cyst: Section shows cholesterol cleft and foamy macrophages (400X) H&E**

**Discrepancy Analysis:** This case demonstrates significant radiological-cytological discordance, where ultrasonography suggested a solid, potentially malignant lesion, while FNAC correctly identified benign cystic pathology. The solid appearance on ultrasound can be due to inspissated cyst contents, inflammation, or cholesterol deposits, mimicking malignancy.

## DISCUSSION

### Diagnostic Challenges in Congenital Neck Cysts

We present three new patterns of diagnostic discrepancy for congenital neck cyst: Failure to identify the lesions on imaging despite clinical visibility, discrepancy among clinical, radiologic and cytologic assessment of the lesions and incorrect suspicion of malignancy on imaging. These patterns demonstrate that diagnosing congenital neck masses is inherently difficult and shows the limitations of a given modality.

### Limitations of Ultrasound in the Assessment of Neck Cysts

Ultrasound is considered the first line imaging modality for evaluating superficial neck masses.<sup>[8]</sup> However, the first case, as well as the existing literature, shows that this is not always the case. Case 1 demonstrates a case where ultrasound failed to identify a clinically apparent 5x4 cm cystic mass and suggested cervical lymphadenopathy. This is a critical ultrasound failure and demonstrates a case in which the management plan could have been adversely affected if an FNAC was not performed.

There is an extensive literature documenting the variability in the ultrasound appearance of branchial cleft cysts. Ahuja et al. Reported that second branchial cleft cysts in adults show four differing sonographic patterns: anechoic (41%), homogeneously hypoechoic with internal debris (23.5%), pseudosolid (12%), and heterogeneous (23.5%).<sup>[5]</sup> This is contrary to the existing teaching that branchial cysts are simple anechoic cysts. Furthermore, a “atypical” echographic appearance has been documented in 30.9% of lateral neck cysts, characterized by irregular margins, contour defects, and minimal posterior enhancement.<sup>[9]</sup>

In Case 3, a solid, heterogeneous, and vascular ultrasonographic lesion suspicious for malignancy was proven by histopathology to be a benign thyroglossal duct cyst. The solid, heterogeneous lesion appearance, along with the presence of vascularity and internal echogenicity, on ultrasound may mimic a thyroid malignancy.<sup>[11]</sup> These findings are consistent with the literature indicating that thyroglossal duct cysts may show a pseudosolid appearance due to the presence of concentrated inflammatory debris, cholesterol, or other materials.<sup>[10]</sup>

Several factors explain the limitations of neck cyst evaluation by ultrasonography. A deep location in comparison to the location of the sternocleidomastoid muscle, as seen in Case 1, may impair visualization.<sup>[12]</sup> The characteristics of the cyst wall may be altered due to inflammatory changes, resulting in misinterpretation.<sup>[13]</sup> In addition, significant influences to the diagnostic accuracy may be due to the quality of technique and level of experience exhibited by the operator.<sup>[2]</sup>

### Role and Limitations of Fine Needle Aspiration Cytology

FNAC is an integral component of the preoperative assessment of neck masses, although the accuracy of FNAC is highly variable. In our series, FNAC accurately diagnosed Cases 1 and 3, however in Case 2, FNAC confirmed the diagnosis and did not change the assessment of the case from the clinical and radiological perspectives.

The literature describes FNAC sensitivity for malignancy in thyroglossal duct cysts to be 56-62% with a positive predictive value of 69%.<sup>[6]</sup> Due to small and marginally located neoplasms and hypocellularity, false negatives are common.<sup>[6]</sup> In branchial cleft cysts, FNAC is associated with a false

positive rate of 23.5%, and in an inflamed cyst, cellular and nuclear pleomorphism may be confused for a well differentiated squamous cell carcinoma, leading to a misdiagnosis.<sup>[7,13]</sup>

### **The Nature of Cystic Lesions and Limitations of FNAC**

Cystic lesions create specific problems for diagnostic methods such as Fine Needle Aspiration Cytology (FNAC). Large cystic lesions contain a small volume of cellular material which lowers the diagnostic yield, even when the FNAC is successful.<sup>[15]</sup> FNAC is less likely to be successful for large cystic lesions that contain small tumors.<sup>[14]</sup> Ultrasound will aid FNAC in that it can help guide the needle to the solid (and larger) portions of the lesion, but the radiologist must first identify the solid portions as suspicious.<sup>[17]</sup>

However, FNAC is helpful in distinguishing between benign cystic lesions and cystic metastases of squamous cell carcinoma.<sup>[14,18]</sup> In examining the specimens and looking for the aforementioned differentiators, the presence of three specific characteristics noted in the pathology cites benign cystic pathology.<sup>[19]</sup>

### **Clinical Examination and Atypical Presentations**

The atypical presentation of disturbing Case 2, as outlined, relies on the evidence provided by imaging and cytology in aiding the diagnosis of cysts of the thyroglossal duct when the clinically lateral presentation is strongly suggestive of a branchial cleft cyst. Cysts of the thyroglossal duct are noted to place midline but may be lateral, and they may be positioned anywhere along the pathway of the developing thyroid as it descends to its final position.<sup>[20,21]</sup>

In the case of our Patient 2, a lateral presentation led to a misdiagnosis. This further illustrates why imaging is essential in all suspected congenital neck cysts, regardless of the typicality of the clinical presentation.

Age of presentation also plays a role in diagnostic considerations. Case 3 presented at 65 years of age which is unusual for a congenital lesion. Thyroglossal duct cysts may be seen at any age, but presentation in the elderly is uncommon and may indicate malignant change.<sup>[22]</sup> But, as noted in our case, benign thyroglossal duct cysts can be asymptomatic for decades before clinical presentation.

### **Diagnostic Discrepancies and Clinical Implications**

Findings in our cases reveal some principles in clinical practice. In Case 1, poor reliance on the existing imaging would have led to an opportunity for a diagnosis being missed and an avoidable delay in treatment. It shows that negative or non-diagnostic imaging should not contradict a strong clinical suspicion, and an FNAC should be performed if a clinical cystic lesion is suspected.<sup>[23]</sup>

In Case 2, the dissonance in the clinical view versus the imaging and cytology findings resulted in a change in the surgical approach. Recognizing a thyroglossal duct cyst as opposed to a branchial cleft

cyst warrants a Sistrunk procedure versus a simple cyst excision, as failure to remove the central portion of the hyoid bone leads to a recurring rate of 50%.<sup>[24]</sup> Case 3 illustrates the concerns and the risk of over-treatment associated with false-positive findings in the imaging modality if they are solid and raised with blood flow. The diagnosis may lead to an unnecessary resection of a lesion or over treatment. The reassuring FNAC findings in this case prevented over treatment and confirmed the negative imaging findings.

### **Multimodal Diagnostic Approach**

Based on our findings, a single imaging modality is insufficient to confirm a diagnosis in congenital neck cysts. A multimodal approach integrating clinical findings, imaging, and cytology is the most secure diagnostic pathway.<sup>[25,26]</sup> Discrepancies that exist between the various imaging modalities should rely on clinical expertise and the appropriate clinical context.

In cases of equivocal or discordant findings on ultrasonography, advanced imaging with computed tomography or magnetic resonance imaging may be indicated.<sup>[27]</sup> CT and MRI offer better anatomical detail, better delineation of deep structures and better characterisation of solid versus cystic components.<sup>[28]</sup> However, these modalities are also limited in distinguishing benign from malignant cystic lesions and may not solve all diagnostic dilemmas.<sup>[29]</sup>

The measurement of thyroglobulin in FNAC aspirate fluid has been proposed as an adjunct to distinguish thyroglossal duct cysts and ectopic thyroid tissue from branchial cleft cysts, although it cannot discriminate between benign and malignant lesions.<sup>[30]</sup> Similarly, HPV DNA analysis on FNAC specimens can be useful in the diagnosis of cystic metastases of oropharyngeal squamous cell carcinoma which is an important differential in adults.<sup>[31]</sup>

### **Recommendations for Clinical Practice**

From our experiences and review of the available literature, we suggest the following for the diagnostic evaluation for congenital neck cysts:

1. Location, size, consistency and mobility of the mass should be documented. It should also be documented how the mass relates to swallowing and/or tongue protrusion, as well as the presence and/or absence of any associated findings such as lymphadenopathy.
2. Be aware of possible limitations and the variable sonographic appearances of neck cysts when using ultrasounds as the first line imaging modality. A negative or inconclusive ultrasound should not lower your concern for a neck cyst.
3. We recommend using ultrasound to guide FNAC for cystic neck mass to target any solid components, if present. Imaging and clinical findings should be used to interpret cytology.
4. Further imaging may be necessary when ultrasound is inconclusive or if neck cysts with malignancy concern contains solid components, or if there is need to clarify deep extensions of

neck cysts and/or relationship to critical neck structures, or if detailed imaging is needed for surgical planning.

5. If there are discrepancies in diagnosis, a review of clinical findings by a team of clinicians, radiologists and cytopathologists may be necessary, to reach a diagnosis.
6. Surgical excision remains the gold standard for definitive diagnosis. Based on the best probable diagnosis, appropriate techniques for thyroglossal duct cysts should be Sistrunk technique and complete excision for branchial cleft cysts.

## CONCLUSION

Diagnosing congenital neck cysts can be complicated due to inconsistencies between clinical, radiological, and cytological assessments. In our series, we outline three general types of contradictions. The first is the failure to identify a lesion on imaging that is clinically visible. The second is the gross inconsistency in the localization of the lesion. The third is the false-positive suspicion of malignancy. The cases presented demonstrate the necessity for a broad-based diagnostic practice. It is critical to implement different diagnostic practices as reliance on a single modality is impractical. Key to obtaining an accurate diagnosis is the integration of clinical findings along with ultrasound imaging and cyst aspiration. Of the greatest importance is the clinical assessment along with the involvement of other specialists for the accurate determination of the diagnostic criteria and the surgical interventions that would be of the greatest benefit to the patient.

### Author Contributions (CRediT Taxonomy)

**Bhagyashree:** Conceptualization, Methodology, Data Curation, Formal Analysis, Writing – Original Draft, Writing – Review & Editing.

**Ojasvi Ramesh:** Data Curation, Investigation, Writing – Review & Editing.

**Shubhani Singh:** Data Curation, Investigation, Writing – Review & Editing, Supervision.

**Rituraj:** Conceptualization, Supervision, Project Administration, Writing – Review & Editing.

### Declarations

**Ethics Approval:** The study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Ethics Committee.

**Consent to Participate:** Patient consent was waived by the IEC given the retrospective, anonymised nature of the study.

**Competing Interests:** The authors declare no competing interests.

**Funding:** No funding was received for this study.

**Data Availability:** Data are available from the corresponding author on reasonable request.

## REFERENCES

1. A. Bagchi, A. Hira, A. Bhatia, and A. Chaturvedi, "Branchial cleft cysts: a pictorial review," *Polish Journal of Radiology*, vol. 83, pp. 204-209, 2018.
2. C. R. Kieliszak, S. Patel, A. Patel, and M. Stechly, "Importance of ultrasound in work-up of a cystic neck mass," *Journal of Medical Ultrasonics*, vol. 42, no. 3, pp. 409-412, 2015.
3. C. R. Kumar, S. Jain, and R. Garg, "A second branchial cyst, masquerading as lipoma, a mistaken diagnosis supported by radiology and fine needle aspiration cytology: case report," *International Surgery Journal*, vol. 3, no. 3, pp. 1729-1732, 2016.
4. M. Jamil, A. Debnam, M. Patel, and S. Zaidi, "A Misleading Neck Mass: Branchial Cleft Cyst Mimicking Anaplastic Thyroid Carcinoma," *JCEM Case Reports*, vol. 3, no. 1, 2025.
5. A. T. Ahuja, D. Frasca, and K. T. Wong, "Second Branchial Cleft Cysts: Variability of Sonographic Appearances in Adult Cases," *American Journal of Neuroradiology*, vol. 21, no. 2, pp. 315-319, 2000.
6. M. A. Bifari, A. Almalki, and A. Alshehri, "Follicular thyroid carcinoma within a thyroglossal duct cyst in adult," *Annals of Saudi Medicine*, vol. 38, no. 4, pp. 305-308, 2018.
7. E. Alimoğlu, M. Önerci, and T. Kaya, "Second branchial cleft anomalies: analysis of our clinical experience in 10 years," *Turkish Archives of Otorhinolaryngology*, vol. 58, no. 2, pp. 85-90, 2020.
8. J. Valentino, M. Boggess, and L. Ellis, "Branchial cleft cyst," *Journal of Ultrasound*, vol. 16, no. 3, pp. 121-124, 2013.
9. V. I. Na, V. A. Kubyshkin, and A. V. Gavrilov, "Cysts and cystoid formations of the neck: significance and possibilities of radiodiagnosis," *VestnikKhirurgiiImeni I. I. Grekova*, vol. 162, no. 5, pp. 48-52, 2003.
10. Y. H. Lee, J. Y. Baek, and E. J. Lee, "Sonographic detection of intrathyroidal branchial cleft cyst: a case report," *Korean Journal of Radiology*, vol. 7, no. 2, pp. 149-152, 2006.
11. A. Choukry, M. Archane, and A. Hachimi, "Synchronous Papillary Carcinoma in Thyroglossal Duct Cyst and Thyroid Gland Associated to Untreated Midline Cervical Cleft: A Case Report," *Journal of Case Reports and Studies*, vol. 7, no. 1, 2019.
12. P. B. Chirukandath, R. Nair, and S. Kumar, "A Serendipitous Histopathological Revelation: An Intriguing Case Report of a Cystic Schwannoma of the Lateral Neck," *Cureus*, vol. 17, no. 1, 2025.
13. M. Songu, H. Ozer, and E. Ozkul, "Branchial cleft cyst presenting as metastatic squamous carcinoma in fine needle aspirates: report of three cases," *Journal of Medical Updates*, vol. 3, no. 1, pp. 31-35, 2013.
14. Burgess KL, Hartwick RWJ, Bedard YC. Metastatic squamous carcinoma presenting as a neck cyst. Differential diagnosis from inflamed branchial cysts. *Acta Cytol*.1993;37(4):494-498.
15. J. Paz-Ibarra, M. Quispe, and C. Paredes, "Papillary thyroid carcinoma in thyroglossal duct cyst: a Peruvian case series," *Endocrinology, Diabetes & Metabolism Case Reports*, 2026.
16. D. M. Hartl, F. Chami, and J. Lebouleux, "There is a high rate of tumor multifocality and lymph-node metastases in papillary thyroid cancers that arise in a thyroglossal duct cyst, including a relatively high rate of 'skip' metastases," *Thyroid*, vol. 19, no. 4, pp. 327-333, 2009.
17. W. Hung, S. Chen, and T. Lin, "3 Cases of Papillary Thyroid Carcinoma within Thyroglossal Duct Cyst – 1 Pediatric and 2 Adult Patient's," *Journal of Endocrinology and Thyroid Research*, vol. 1, no. 3, 2017.
18. A. J. M. Balm, F. J. P. Hoebers, and I. B. Tan, "Diagnosis and treatment of a neck node swelling suspicious for a malignancy: an algorithmic approach," *International Journal of Surgical Oncology*, vol. 2010, 2010.
19. S. Saha, S. Saha, and M. Rahman, "Primary papillary carcinoma in thyroglossal cyst," *Bangladesh Journal of Otorhinolaryngology*, vol. 17, no. 2, pp. 139-142, 2011.
20. A. Shifrin, J. Xenachis, and M. Fay, "A thyroglossal duct cyst presenting as a thyroid nodule in the lateral neck," *Thyroid*, vol. 18, no. 2, pp. 219-221, 2008.

21. D. Deka, R. Sharma, and P. Singh, "Unusual Branchial Cleft Cyst at Parapharyngeal Space: Case Report and a Review of Literature," *Indian Journal of Otolaryngology and Head & Neck Surgery*, vol. 75, pp. 2847-2850, 2023.
22. N. Baisakhiya, "Giant thyroglossal cyst in an elderly patient," *Indian Journal of Otolaryngology and Head & Neck Surgery*, vol. 63, no. 1, pp. 93-94, 2011.
23. D. Slater, A. Rice, and J. Fernando, "Role of fine needle aspiration cytology in the preoperative investigation of branchial cysts," *ANZ Journal of Surgery*, vol. 82, no. 1-2, pp. 42-45, 2012.
24. A. Sood, V. Sharma, and R. Kumar, "Papillary Carcinoma of the Thyroglossal Duct Cyst: A Case Report and Review of Literature," *International Journal of Phonosurgery and Laryngology*, vol. 3, no. 2, pp. 85-88, 2013.
25. N. Papadogeorgakis, D. Petsinis, and V. Alexandridis, "Branchial cleft cysts in adults. Diagnostic procedures and treatment in a series of 18 cases," *Oral and Maxillofacial Surgery*, vol. 13, no. 2, pp. 79-85, 2009.
26. R. Colino, M. Santos, and J. Pereira, "Early Diagnosis of Papillary Carcinoma in a Thyroglossal Duct Cyst: A Multidisciplinary Approach and the Crucial Role of Fine-Needle Aspiration Cytology," *Cureus*, vol. 16, no. 10, 2024.
27. A. A et al., "Unusual presentations of branchial cysts," *Journal of Otolaryngology and Head & Neck Surgery*, vol. 8, no. 2, pp. 110-114, 2019.
28. C. Gadepalli, S. Rao, and M. Kumar, "Third Pharyngeal Pouch Remnant Presenting As A Neck Cyst," *The Internet Journal of Anesthesiology*, vol. 10, no. 2, 2006.
29. J. Yi, S. Kim, and H. Park, "Branchial Cleft Cyst Mimicking Malignant Thyroid Neoplasm Concurrent with Medullary and Papillary Thyroid Carcinoma: a Case Report," *International Journal of Thyroidology*, vol. 14, no. 1, pp. 37-42, 2021.
30. J. K. Kushwaha, S. Gupta, and R. Singh, "Papillary carcinoma of thyroid arising from ectopic thyroid tissue inside branchial cleft cyst: a rare case," *Case Reports*, 2012.
31. E. Jörtsö, M. Hagström, and C. Lindholm, "Fine needle aspiration cytology including the analysis of human papilloma virus (HPV) DNA enhances the diagnostic workup of solitary cystic neck lesions," *Head & Neck Pathology*, vol. 14, pp. 982-989, 2020.