

# Third Branchial Cleft Cyst with *Mycobacterium* Infection

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## Keywords

branchial cleft cyst, third branchial cleft cyst, *Mycobacterium*

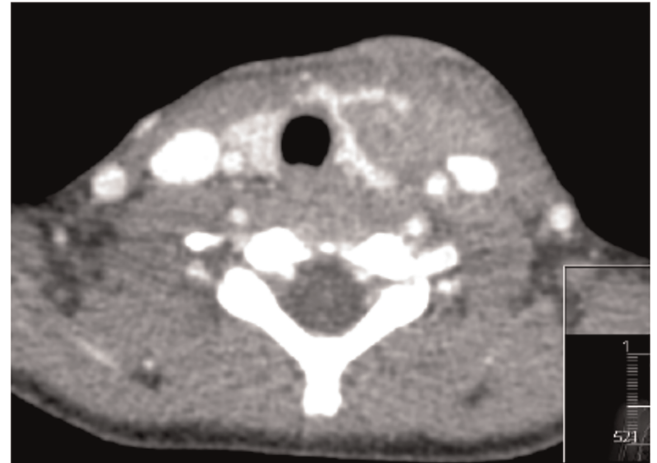
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Branchial cleft anomalies result from developmental changes of the branchial apparatus.<sup>1</sup> Third branchial cleft anomalies are rare entities, with a prevalence of 2% to 8%.<sup>2</sup> The most common presentation is a left-sided recurrent neck abscess or suppurative thyroiditis. Diagnosis is established by barium swallow and computed tomography. Acute infection is commonly treated with a course of antibiotics, as well as incision and drainage. Definitive treatment options include excision of the surgical sinus tract with or without hemithyroidectomy or endoscopic cauterization of the sinus tract in the pyriform sinus.<sup>3</sup> There is limited research on the microbiology of these infections. We report a case of a third branchial cleft cyst with mycobacterial superinfection. There are no reports in the literature of a third branchial cleft cyst with mycobacterial superinfection. Unusual organisms, including *Mycobacterium*, may need to be considered to avoid recurrence. The study was approved by the SUNY Downstate Institutional Review Board.

## Case Report

A 4-year-old girl from Jamaica was seen for evaluation of recurrent left neck abscesses that were treated with several courses of antibiotics. Physical examination revealed a 4-cm firm, tender left thyroid mass with overlying erythema and induration. Neck computed tomography scan demonstrated a 3.9-cm poorly defined, partially cystic left thyroid mass (**Figure 1**). Barium esophagram revealed a fistulous tract arising from the left pyriform sinus to the left neck with accumulation of contrast in the left thyroid cyst.

The patient was initially treated with needle aspiration of the abscess as well as antibiotics. Once the acute infection



**Figure 1.** Computed tomography neck with contrast.

Heterogeneous enhancing lesion in the left lower neck associated with the left lobe of the thyroid gland, with extension laterally anterior to the carotid sheath and deep to the sternocleidomastoid muscle, measuring 3.9 × 3.4 cm.

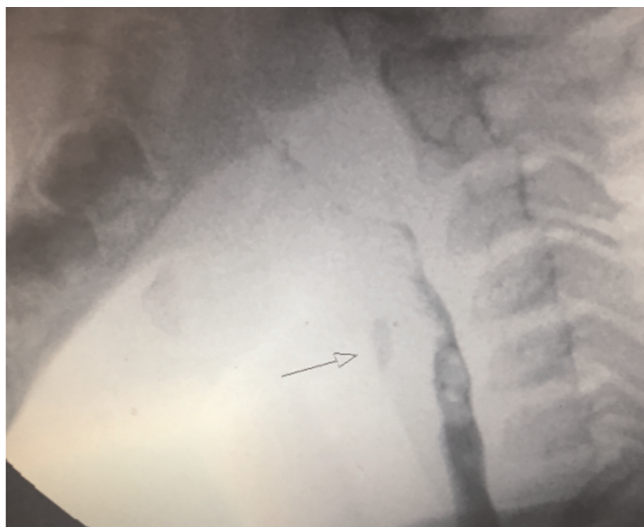
resolved, the patient underwent direct laryngoscopy, excision of the branchial cleft cyst, and left hemithyroidectomy. The fistulous tract was identified and ligated. The final pathology report revealed a left thyroid mass consistent with a branchial cleft cyst with granulomatous inflammation and cultures with no growth. Three weeks following surgery, the patient presented with recurrence of a fistulous tract (**Figure 2**). The patient underwent incision and drainage of the neck abscess. The cultures from the initial hospitalization speciated *Mycobacterium fortuitum*. The patient improved with ciprofloxacin, trimethoprim-sulfamethoxazole, isoniazid, and pyrazinamide for 6 months with pediatric infectious disease

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**Figure 2.** Recurrent fistulous tract arising from the left pyriform sinus. Multiple swallows with progressive accumulation of contrast suggestive of persistent left pyriform sinus fistula.

consultation and local wound measures. There was no recurrence at 1-year follow-up.

## Discussion

Third branchial cleft anomalies should be considered for patients with recurrent neck abscesses or suppurative thyroiditis. Nicoucar et al<sup>3</sup> systematically reviewed the treatment options for third branchial cleft anomalies. They found a recurrence rate of 94% if treated with incision and drainage alone, 15% when treated with primary excision and hemithyroidectomy, and 18% for endoscopic procedures. Obtaining proper cultures to identify the offending pathogens is imperative during treatment. Pahlavan et al<sup>4</sup> examined the microbiology of 11 patients with third and fourth branchial cleft cysts. The specimens were cultured at the initial incision and drainage. *Eikenella corrodens* was the most common organism (60%); 56% of the isolated organisms were anaerobic; and all organisms except *Staphylococcus aureus* were oral cavity flora.

Branchial cleft anomalies can be expected to grow bacteria found in the oral cavity, due to the aberrant developmental connection between the oral cavity and neck. *M fortuitum* is a

nontuberculous mycobacteria that is ubiquitous in the environment and mainly causes infections of the skin, lungs, lymph nodes, and joints often after trauma or surgery.<sup>5</sup> *Mycobacterium* infections are known to cause fistulous tracts and recurrent infections. Treatment with antibiotics is culture directed, and surgical therapy is often required for cases of lymphadenitis. There are no prior reports of *M fortuitum* in a branchial cleft anomaly. Our study emphasizes the importance of obtaining cultures when treating branchial cleft anomalies.

## Conclusion

Third branchial cleft anomalies are rare entities and commonly present as recurrent neck abscesses. Treatment of superimposed infections is critical while surgical planning and preoperative workup are underway.

## Author Contributions

**George S. Ferzli**, wrote paper, reviewed literature, final approval; **Punam Thakkar**, reviewed paper, data analysis, final approval; **Nira A. Goldstein**, reviewed paper, drafting, final approval; **Natalya Chernichenko**, reviewed paper, reviewed literature, drafting, final approval.

## Disclosures

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