

Thyroglossal Duct Cyst: Preoperative Imaging, Postoperative Pathology Results, and Revision Surgery Experiences

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ABSTRACT

Thyroglossal duct cyst is one of the most common congenital cystic lesions of the neck, resulting from the failure of the thyroglossal duct to close during the embryonic period. Discrepancies may occur between preoperative imaging findings and postoperative histopathological results. While a definitive diagnosis is made through histopathological examination, the Sistrunk procedure is widely used for treatment.

Retrospective data of 71 patients who underwent surgery with a preliminary diagnosis of TGDC between 2010 and 2023 were analyzed. Demographic characteristics, presenting complaints, preoperative imaging findings, pathology reports, and surgical outcomes were evaluated. Data were analyzed using SPSS (v25) software.

The mean age of the patients was 25.4 years, with 50.7% being female and 49.3% male. Among 41 patients who underwent preoperative imaging, thyroglossal duct cyst was diagnosed in 30 cases, but pathology results confirmed the diagnosis in only 11 cases. The overall concordance rate was 35.2%. The revision surgery rate was 4.2%, and pathology results in these cases did not support thyroglossal duct cyst.

The diagnostic accuracy of preoperative imaging methods is limited. Histopathological examination is critical for improving diagnostic accuracy and evaluating malignancy. A multidisciplinary approach can enhance diagnostic and treatment processes.

Histopathological examination is the gold standard in the diagnosis and treatment of thyroglossal duct cyst. A multidisciplinary approach can improve diagnostic accuracy and reduce postoperative complications.

Keywords: Thyroglossal duct cyst, histopathology, preoperative imaging, Sistrunk procedure, multidisciplinary approach

Introduction

Thyroglossal duct cyst (TGDC) is one of the most common congenital cystic lesions of the neck, arising from the incomplete closure of the thyroglossal duct during the embryonic period (1,2). During embryological development, the thyroid gland migrates from the base of the tongue to the anterior neck, forming the thyroglossal duct. Under normal circumstances, this duct closes before birth; however, failure of this process can result in the formation of cystic structures along the thyroglossal duct (3). TGDCs are typically located in the midline of the neck, below the hyoid bone, or near the base of the tongue and are often detected during childhood or early adulthood (4,5).

Discrepancies between preoperative imaging findings and postoperative histopathological results are frequently observed in the diagnosis and treatment of TGDC. Studies indicate that only 37% of patients diagnosed with TGDC based on preoperative imaging have their diagnosis confirmed by postoperative pathology results (6). This highlights the limited diagnostic accuracy of imaging methods and underscores the importance of histopathological examination for definitive diagnosis. The diagnostic accuracy of imaging techniques such as ultrasonography (USG) and magnetic resonance imaging (MRI) may decrease, particularly in cases of infected or complicated cysts (7). Additionally, TGDCs can be misdiagnosed as other neck masses, such as

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dermoid cysts, branchial cleft cysts, lymphadenopathy, or infected cystic lesions (8,9).

Histopathological examination is considered the gold standard for definitive diagnosis. Postoperative pathological evaluation not only confirms the diagnosis but also identifies the presence of malignancy, if any (3). Although rare, malignancies such as papillary thyroid carcinoma have been reported in TGDCs. Literature suggests that approximately 1% of TGDCs are associated with malignancy (10,11). Therefore, careful evaluation of postoperative pathology results is critical for improving diagnostic accuracy and detecting potential malignancies.

The Sistrunk procedure is the most commonly used surgical method for the treatment of TGDC. This procedure involves the removal of the cyst, the central portion of the hyoid bone, and the entire thyroglossal duct. The Sistrunk procedure is widely regarded as an effective method for significantly reducing recurrence rates (12). However, complications such as recurrence, infection, and fistula formation may still occur postoperatively. Although revision surgery is rare, studies report a revision rate of approximately 4.2% (8,13). Pathology results from revision surgeries often do not support a diagnosis of TGDC, further emphasizing the effectiveness of the primary surgery. Nevertheless, patients requiring revision surgery are reported to have higher complication rates (14).

Adopting a multidisciplinary approach in the diagnosis and treatment of TGDC can enhance the success of diagnostic and therapeutic processes. Effective communication among otolaryngologists, radiologists, and pathologists can improve the accuracy of preoperative diagnosis and prevent unnecessary surgical interventions (13,14). Comparing preoperative imaging findings with histopathological results can help reduce diagnostic discrepancies. Another advantage of a multidisciplinary approach is its role in managing postoperative complications. For instance, infectious disease specialists may be consulted for the treatment of infected cysts, or oncologists may be involved in cases with suspected malignancy (9).

In this study, the retrospective data of 71 patients who underwent surgery with a preliminary diagnosis of TGDC between 2010 and 2023 were analyzed. The aim of the study was to evaluate the concordance between preoperative imaging findings and postoperative pathology results, analyze surgical outcomes, and discuss the need for revision surgery. Additionally, the challenges

encountered in the diagnosis and treatment of TGDC and the effectiveness of the methods used in this process were addressed.

Materials and Methods

This retrospective study evaluated a total of 71 patients who underwent surgery with a preliminary diagnosis of thyroglossal duct cyst (TGDC) at a tertiary healthcare center between 2010 and 2023. Data for the study were obtained from patient records, preoperative imaging reports, and postoperative pathology results. The parameters analyzed included demographic characteristics such as age and gender; presenting complaints such as neck swelling and pain; preoperative imaging methods, including ultrasonography (USG) and magnetic resonance imaging (MRI); pathology results, including diagnoses of TGDC, benign cystic formations, and other conditions; as well as surgical outcomes, including the assessment of surgical success and the need for revision surgery. Descriptive statistics were used in the analysis, and calculations were performed using SPSS software (version 25).

The data collection process was carried out in compliance with the Declaration of Helsinki. Approval for the study was granted by the Van Yüzüncü Yıl University Non-Interventional Ethics Committee on 18/10/2024 under the reference number 2024/11-22.

Results

This study analyzed the demographic characteristics, presenting complaints, preoperative imaging findings, postoperative pathology results, and surgical outcomes of 71 patients who underwent surgery with a preliminary diagnosis of TGDC.

The ages of the patients ranged from 3 to 66 years, with a mean age of 25.4 years. Regarding gender distribution, 49.3% of the patients were male (35 patients), and 50.7% were female (36 patients) (Figure 1). The most common presenting complaint was neck swelling, observed in 93% of the patients. Additionally, some patients reported other symptoms, such as throat pain and snoring.

In terms of preoperative imaging findings, imaging data were unavailable for 30 of the 71 patients. Among the 41 patients who underwent imaging, TGDC was diagnosed in 30 cases. However, postoperative pathology reports confirmed the diagnosis in only 11 of these cases. Overall,

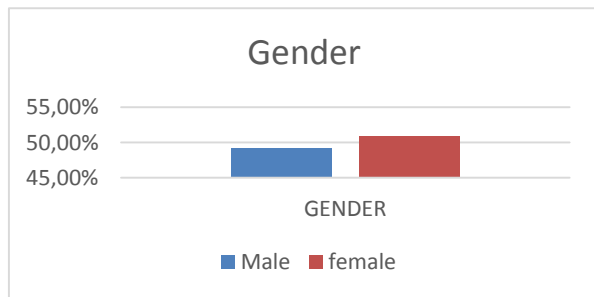


Fig. 1. Gender Ratios

preoperative and postoperative diagnostic concordance was observed in only 25 of the 71 patients. This finding highlights the limited diagnostic accuracy of preoperative imaging methods and underscores the critical role of histopathological examination for definitive diagnosis (Figure 2).

Regarding surgical outcomes, 68 of the 71 patients were successfully treated with primary surgery, while three patients required revision surgery. None of the pathology results from the revision surgeries supported a diagnosis of TGDC, and the revision surgery rate was calculated as 4.2% (Figure 3). Patients who required revision surgery were found to have higher complication rates, emphasizing the importance of a multidisciplinary approach in managing these cases.

Discussion

Thyroglossal duct cyst (TGDC) is one of the most common congenital cystic lesions of the neck, resulting from the incomplete closure of the thyroglossal duct during embryological development (1). However, discrepancies between preoperative imaging findings and postoperative histopathological results in the diagnosis and treatment of TGDC are noteworthy (15,16). These discrepancies highlight the limitations of diagnostic methods and the necessity of a multidisciplinary approach (17).

Imaging techniques such as ultrasonography (USG) and magnetic resonance imaging (MRI) are widely used in the diagnosis of TGDC. USG is often preferred due to its non-invasive nature, accessibility, and low cost. However, its diagnostic accuracy is limited, particularly in cases of infected or complicated cysts. MRI, on the other hand, is favored for its superior soft tissue resolution. Despite this, the current study found that only 37% of patients diagnosed with TGDC based on preoperative imaging had their diagnosis confirmed by postoperative pathology results.

This finding raises questions about the diagnostic accuracy of imaging methods (16).

The limitations of imaging techniques are particularly significant in differential diagnosis. TGDC can be misdiagnosed as other neck masses, such as dermoid cysts, branchial cleft cysts, lymphadenopathy, or infected cystic lesions. Therefore, relying solely on imaging for preoperative diagnosis is insufficient. Instead, clinical findings and multidisciplinary evaluations should be used to confirm the diagnosis (15).

Definitive diagnosis of TGDC is established through histopathological examination performed after surgery. In this study, the discordance rate between preoperative diagnosis and postoperative pathology results was found to be 63%. This underscores the critical role of histopathological examination in the diagnostic process. Differential diagnoses, including benign cystic formations, dermoid cysts, and branchial cleft cysts, must be carefully considered (18).

Histopathological examination not only confirms the diagnosis but also provides an opportunity to evaluate the presence of malignancy. Although rare, malignancies such as papillary thyroid carcinoma have been reported in TGDC. Literature indicates that approximately 1% of TGDC cases are associated with malignancy (19). Therefore, careful evaluation of postoperative pathology results is essential for improving diagnostic accuracy and identifying potential malignancies.

The Sistrunk procedure is the most commonly used surgical method for TGDC treatment. This procedure involves the removal of the cyst, the central portion of the hyoid bone, and the entire thyroglossal duct. However, complications such as recurrence, infection, and fistula formation may still occur postoperatively. In this study, the revision surgery rate was reported as 4.2%. Pathology results from revision surgeries did not support a diagnosis of TGDC, further emphasizing the effectiveness of primary surgery. Nonetheless, our study lacks particular data on seroma, infection, and wound-related complications, which limits a more thorough assessment of the occurrence and management of these disorders.

Patients requiring revision surgery are reported to have higher complication rates. Factors such as infected cysts or incomplete surgical excision increase the risk of recurrence. Therefore, complete removal of the thyroglossal duct during surgery and careful evaluation of postoperative

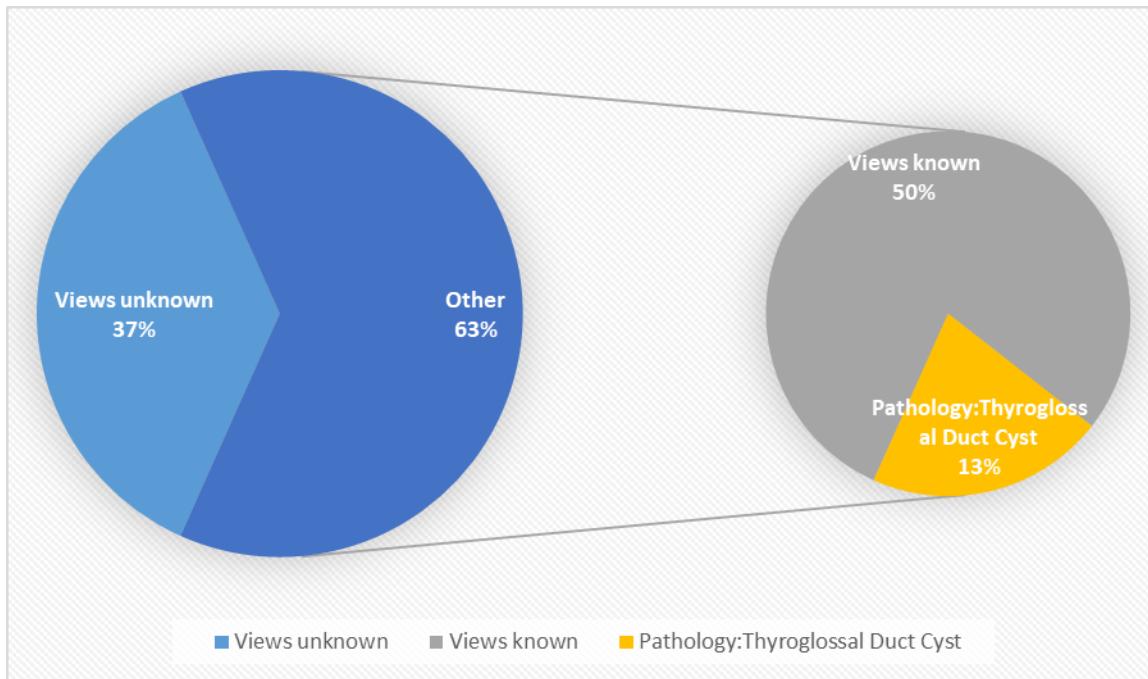


Fig. 2. Imaging and Pathology Results

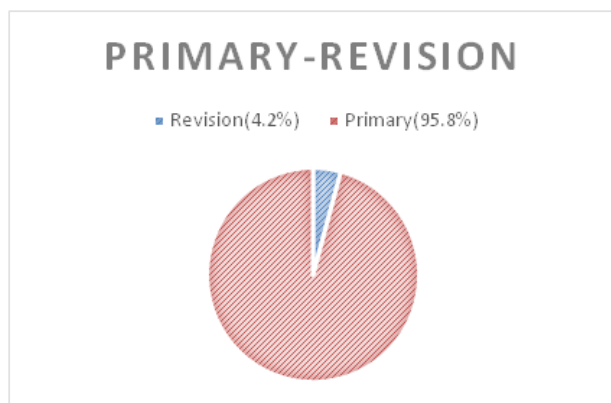


Fig. 3. Primary and Revision Surgery Rates

pathology results are crucial (20). Furthermore, the appropriate execution of the Sistrunk method markedly diminishes both the recurrence rate and the likelihood of complications (21).

Adopting a multidisciplinary approach in the diagnosis and treatment of TGDC can enhance the success of diagnostic and therapeutic processes. Effective communication among otolaryngologists, radiologists, and pathologists can improve the accuracy of preoperative diagnosis and prevent unnecessary surgical interventions. Comparing preoperative imaging findings with histopathological results can help reduce diagnostic discrepancies (22).

Another advantage of a multidisciplinary approach is its role in managing postoperative complications. For instance, infectious disease specialists may be consulted for the treatment of

infected cysts, or oncologists may be involved in cases with suspected malignancy. Such an approach can improve patient outcomes and reduce the need for revision surgery (23).

The limitations of preoperative imaging methods and the critical role of histopathological examination in the diagnosis and treatment of TGDC are evident. To improve the diagnostic accuracy of imaging techniques, a multidisciplinary approach should be adopted, and advanced imaging methods should be utilized when necessary. Furthermore, careful evaluation of postoperative pathology results can enhance diagnostic precision and prevent unnecessary revision surgeries. Effective communication among otolaryngologists, radiologists, and pathologists during this process can significantly improve patient outcomes.

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