

Management of thyroglossal duct cysts: a 14-year single-center experience

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ABSTRACT

Aims: The aim of this study is twofold: firstly, to present the clinical features of thyroglossal duct cysts (TGDC) and our surgical experience; and secondly, to emphasize the importance of wide hyoid bone resection and a more thorough dissection, especially in the treatment of recurrence cases.

Methods: The present study constitutes a retrospective analysis of data about patients who underwent surgical intervention for TGDC in our clinic between the years January 2010 and April 2023. A comprehensive data set was collated for all patients, encompassing demographic characteristics, presenting complaints, the presence of fistula, preoperative imaging methods, intraoperative complications, duration of hospitalization, pathology results, and postoperative recurrence rates.

Results: The present study included a total of 51 patients. Of these patients, 26 (50.9%) were male and 25 (49.1%) were female. The mean age was calculated to be 7.8 ± 4.43 years. The mean duration of hospitalization was 35 ± 11 hours. Postoperative complications included the development of an abscess at the incision site in three patients (5.8%) and subcutaneous emphysema in one (1.9%) patient. Three (5.8%) were primary cases operated in our center, while four patients (7.8%) developed recurrence after Sistrunk procedure performed in an external center and were referred to our center.

Conclusion: In conclusion, the management of recurrent cases in TGDC surgery requires careful planning. Extended surgical procedures such as the modified Sistrunk procedure are highly successful in terms of both low recurrence rates and appropriate management of recurrence cases.

Keywords: Thyroglossal duct cyst, thyroglossal duct, recurrence, Sistrunk, modified Sistrunk

INTRODUCTION

The thyroglossal duct extends from the cecal foramen as an embryonic structure connecting the anterior two-thirds and posterior third of the tongue to the anatomical resting place of the thyroid gland. It normally undergoes involution after the 5th embryonic week; however, failure of this process may lead to the formation of a thyroglossal duct remnant or cyst (TGDC).¹ It represents the most prevalent form of congenital neck mass in children, with an estimated prevalence of approximately 7% within the general population.²

TGDC is not only an aesthetic problem, but also associated with serious complications, including severe infection, pain, swelling, local inflammation, malignancy, and fistula formation.^{3,4} The potential sites of cyst formation encompass all regions traversed by the thyroglossal duct, including the lingual, suprahyoid, thyrohyoid, and suprasternal areas. However, the most prevalent location is the midline region beneath the hyoid bone.^{5,6} The differential diagnosis of such

a cyst includes pathologies such as dermoid cyst, branchial cyst, hemangioma, and lymph node swelling.

The surgical procedure described by Walter Ellis Sistrunk in 1920 is currently accepted as the standard approach in the treatment of TGDC. The Sistrunk procedure involves the excision of the cyst, in addition to the central part of the hyoid bone and the tract extending to the foramen cecum.⁷ When performed according to the highest standards of surgical technique, the recurrence rate is less than 3% and recurrences are usually seen within the first year after surgery.⁸ Nevertheless, the probability of recurrence is known to increase in the event of inadequate bone resection or incomplete removal of the tractus.

The aim of this study is twofold: firstly, to present the clinical features of TDGC and our surgical experience; and secondly, to emphasize the importance of wide hyoid bone resection

and a more thorough dissection, especially in the treatment of recurrence cases. A further objective is to provide a discussion of our findings on the impact of this surgical approach on recurrence rates, with reference to the extant literature.

METHODS

Ethics

The study was approved by the Selçuk University Faculty of Medicine Ethics Committee (Date: 10.10.2023, Decision No: 2023/474) and was conducted by the Declaration of Helsinki. The present study constitutes a retrospective analysis of data about patients who underwent surgical intervention for TGDC in our clinic between the years January 2010 and April 2023. The study also included four patients who underwent the Sistrunk procedure in other centers but subsequently experienced recurrence and were referred to our center. The final analysis encompassed data from a total of 51 patients.

Patient Selection and Data Collection

A comprehensive data set was collated for all patients, encompassing demographic characteristics, presenting complaints, the presence of fistula, preoperative imaging methods, intraoperative complications, duration of hospitalization, pathology results, and postoperative recurrence rates. All patients underwent a modified Sistrunk procedure. Revision surgery, including extensive hyoid bone resection and more extensive dissection of the surrounding tissues, was performed in patients who had been operated on in outside centres and who developed recurrence.

Surgical Protocol

All surgical procedures were performed under general anesthesia in the supine position. The subplatysmal skin flap was excised through a transverse incision over the most prominent part of the mass. The cyst and surrounding tissues were then meticulously dissected down to the hyoid bone, and the infrahyoid muscles (mostly sternohyoid and thyrohyoid muscles) were also dissected. The central part of the hyoid bone was then resected, along with the intact tract. The suprahyoid muscles (geniohyoid and mylohyoid) were then separated from the hyoid bone, and the surrounding tissues were dissected up to the foramen cecum (Figure). In cases of recurrence, the surrounding tissues were meticulously removed to ensure complete eradication of the disease, due to the possibility of multiple tracts leading to recurrence or fistula formation.



Figure. Thyroglossal duct cyst surgery (Modified Sistrunk Procedure)

Statistical Analysis

Ultrasonographic imaging was performed in all patients. Magnetic resonance imaging and scintigraphy were also utilized when necessary. Complications, pathology results, hospitalization times, and recurrence rates were meticulously documented in all surgical procedures. The study population included a total of seven recurrence cases, of which three occurred among patients who underwent primary surgical procedures at our center and four among patients referred from external centers. The latter group underwent more extensive surgical procedures, and no recurrences were observed during the long-term follow-up period.

This study utilized descriptive statistical methods. Continuous variables were expressed as mean±standard deviation, while categorical variables were presented as numbers and percentages. All data were analyzed using Microsoft Excel.

RESULTS

The present study included a total of 51 patients. Demographic and clinical data of the patients are given in Table. Of these patients, 26 (50.9%) were male and 25 (49.1%) were female. The mean age was calculated to be 7.8±4.43 years. All patients underwent diagnostic ultrasonography; one patient (1.9%) additionally underwent magnetic resonance imaging, and one patient (1.9%) underwent scintigraphy. At the presentation, a cutaneous fistula was present in five patients (9.8%).

Table. Demographic and clinical data of patients

Parameter	Value
Number of patients	51
Gender (male/female)	26 (50.9%)/25 (49.1%)
Mean age (years)	7.8±4.43
Cutaneous fistula at presentation	5 (9.8%)
Ultrasonography performed	51 (100%)
Additional imaging (MRI/scintigraphy)	1 (1.9%)/1 (1.9%)
Our recurrent cases	3 (6.3%)
Mean follow-up period (months)	18
Mean duration of hospitalization (hours)	35±11
Postoperative complications (abscess/emphysema)	3 (5.8%)/1 (1.9%)
Malignancy/ectopic thyroid in pathology	None
MRI: Magnetic resonance imaging	

Seven patients (13.7%) underwent surgical procedures due to recurrence. Of these, three (6.3%) were primary cases operated in our center, while four patients (7.8%) developed recurrence after Sistrunk procedure performed in an external center and were referred to our center. The seven cases of recurrence underwent extensive hyoid bone resection and more extensive dissection. No recurrence was observed during a mean follow-up period of 18 months.

The mean duration of hospitalization was 35±11 hours. Postoperative complications included the development of an abscess at the incision site in three patients (5.8%) and subcutaneous emphysema in one (1.9%) patient. The patients who were operated in our clinic and reoperated due to recurrence were these three patients who developed abscesses after surgery. Both complications were treated with conservative



methods, yielding successful outcomes. Subsequent pathology reports revealed no malignancy or ectopic thyroid tissue in any patient.

DISCUSSION

This study presents a retrospective analysis of 51 patients who underwent surgery for TGDC. We evaluated the effectiveness of wide surgical dissection in the management of recurrent cases. The findings of this study indicate that the modified Sistrunk procedure has effectively reduced the incidence of recurrence. However, inadequate surgical interventions were identified as a contributing factor to recurrence, underscoring the necessity for a more comprehensive array of surgical approaches in the management of these patients.

The recurrence rate of patients who underwent primary surgery at our center was 5.8%, which is consistent with the recurrence rates reported in the literature. The recurrence rates reported in the literature vary between 3% and 10%, and this difference is generally attributed to the adequacy of surgical techniques and the extent of tissues removed during the operation.^{8,9} Inadequate bone resection or incomplete removal of the tract are considered the primary causes of recurrence, along with the presence of multiple tracts or residual cysts.^{9,10}

In the treatment of recurrence cases, a wide hyoid bone resection and more extensive dissection of the surrounding tissues were employed, yielding successful outcomes in all recurrence cases. The present study corroborates the efficacy of this method in preventing recurrence, thereby supporting the conclusions of analogous studies documented in the extant literature. For instance, Perkins et al.¹¹ reported that extended surgery led to a significant reduction in recurrence rates and yielded superior long-term outcomes in recurrent cases. It is also noteworthy that the risk of recurrence is markedly elevated in cases involving minimal resection when surgical margins are deemed inadequate.¹⁰

Strategies recommended to reduce the risk of recurrence include bone resection beyond the central part of the hyoid bone and extensive removal of surrounding tissues.⁹ In the present study, the implementation of surgical techniques by these principles resulted in no recurrence during the follow-up period. Furthermore, early revision surgery in recurrent cases plays a critical role in minimizing the risk of recurrence.

The present study employs a retrospective design, and the data are based on a single center. Conducting a prospective evaluation of recurrence cases in a larger population could offer more robust evidence regarding the efficacy of extended surgery. Standardization of pathology reports would facilitate more detailed analysis of tissues removed during surgery.

A surgical approach that included extensive hyoid bone resection and removal of surrounding tissues proved to be effective in the management of recurrent cases in this study. This finding underscores the necessity of expanding the scope of the Sistrunk procedure to encompass both primary and recurrent cases. Future studies should investigate the feasibility of this method in other centers and in larger populations and evaluate long-term outcomes.

CONCLUSION

In conclusion, the management of recurrent cases in thyroglossal duct cyst surgery requires careful planning. The employment of extended surgical approaches has emerged as a highly effective strategy to reduce the incidence of recurrence and enhance long-term outcomes.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was approved by the Selçuk University Faculty of Medicine Ethics Committee (Date: 10.10.2023, Decision No: 2023/474).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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