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Outpatient Sistrunk Procedure Performed Without Drain Placement: Is it Feasible and Safe?

Dren Yerleştirilmeden Yapılan Günübirlik Sistrunk Prosedürü: Uygulanabilir ve Güvenli midir?

Canan Kocaoglu[1], Ilknur Kucukosmanoglu[2]

[1]Necmettin Erbakan University, Medical Faculty, Department of Pediatric Surgery, Konya, Türkiye
[2]University of Health Sciences, Konya City Hospital, Department of Pathology, Konya, Türkiye

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Sorumlu Yazar/Corresponding Author:
Canan Kocaoglu,
Necmettin Erbakan University, Medical Faculty, Department of Pediatric Surgery, Konya, Türkiye
e mail: drckocaoglu@hotmail.com

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ÖZET

Amaç: Dren yerleştirilmeden gerçekleştirilen günübirlik Sistrunk prosedürlerinin uygulanabilirliğini ve güvenliğini tartışmaktır.
Yöntemler: Tek bir cerrah tarafından Sistrunk ameliyatı yapılan hastaların hastane kayıtlarını, hasta demografisi, gerçekleştirilen operasyonlar ve komplikasyonlar açısından retrospektif olarak inceledik.
Bulgular: Toplam 49 hastanın 27'si (%55,1) erkek, 22'si (%44,9) kızdı. Tüm çalışma grubunun yaş ortalaması 6,3±3,7 yıl (min 13 ay - maks 17 yıl) idi. En sık görülen şikayet boynun orta bölgesinde şişlikti. Hastaların 42'sinde tiroglossal kanal kisti ve yedisinde tiroglossal kist fistülü vardı. Tüm tiroglossal kanal kisti olgularının %81,6'sının (n=40) infrahyoid, %12,2'sinin (n=6) suprahyoid ve %6,2'sinin (n=3) suprasternal bölgede yerleştiği belirlendi. Olgularımızın 15'i postoperatif yatış yapılarak takip edilirken, (min-maks: 16-24 saat), diğer 34 olgu operasyon sonrası aynı gün taburcu edildi (min-maks: 3-6 saat). Aynı gün taburcu edilen olguların ortalama hastanede kalış süresi 4,7±1,1 saat iken, hastaneye yatırılan olguların ortalama hastanede kalış süresi 18,8±4,3 saat olarak bulundu. Dren yerleştirilmeden Sistrunk prosedürü uygulanan hastalarda, sadece bir nüks dışında herhangi bir komplikasyon gözlenmedi.
Sonuç: Günübirlik Sistrunk prosedürü tiroglossal kanal kistlerinin rutin tedavisi için güvenli ve iyi tolere edilir. Hastaların ebeveynlerine iletişim bilgileri verilmeli ve olası komplikasyonlar hakkında özel talimatlar verilmelidir.

Anahtar Kelimeler: Dren yerleştirilmesi, günübirlik, komplikasyon, Sistrunk, tiroglossal kanal kistleri

ABSTRACT

Aim: To discuss the feasibility and safety of outpatient Sistrunk procedures without drain.
Methods: The hospital records, demographic characteristics, operations performed, and complications of patients who underwent Sistrunk surgery by a single surgeon were retrospectively reviewed.
Results: Of 49 patients who underwent the Sistrunk procedure between 2008 and 2023, 27 (55.1%) were boys, and 22 (44.9%) were girls. The average age was 6.3±3.7years in the study group (min:13months-max:17years). The most common complaint was swelling in the middle region of the neck. In the patient group, 42 had thyroglossal duct cysts (TDC) and seven had thyroglossal cyst fistulas. Of all TDC cases, 81.6%(n=40), 12.2%(n=6), and 6.2%(n=3) were determined to be localized in the infrahyoid, suprahyoid, and suprasternal regions, respectively. While 15 of our cases were followed up postoperatively (min-max:16-24hours), the other 34 patients were discharged on the same day after the operation (min-max:3-6hours). Whereas the mean hospital stay was 4.7±1.1hours for those discharged on the same day, the time was 18.8±4.3hours for those hospitalized. No complication was observed in the patients undergoing the Sistrunk procedure without drain placement, except for one recurrence.
Conclusion: The outpatient Sistrunk procedure is safe and well-tolerated for the routine treatment of TDCs. Contact information and specific instructions about the potential complications should also be given to the parents.

Key words: Drain placement, outpatient, complication, Sistrunk, thyroglossal duct cysts

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INTRODUCTION

Thyroglossal duct cyst (TDC) is one of the congenital neck masses commonly encountered in childhood. The most common complaint is swelling moving with swallowing in the middle region of the neck. Dysphagia, cervical lymphadenopathy, spontaneous drainage of infected cysts, and skin dimpling are among the less frequently encountered symptoms and signs. The treatment method generally preferred today is the Sistrunk procedure, involving the excision of the cervical cyst with the central portion of the hyoid bone, along with its tract (1). Short-term complications after the operation are local wound infection, edema, and hematoma (2). In addition to these complications, Rarely observed conditions include abscess that needs to be surgically drained, nerve paralysis, hypothyroidism, airway compromise, airway entrance, recurrence, and death (3).

Many pediatric surgeons feel uncomfortable due to the complications, such as post-operative bleeding, edema, and seroma, resulting in airway compromise after the Sistrunk procedure performed without drain placement (3,4). Thus, many pediatric surgeons prefer routine drain placement (2,5). However, drain placement causes an increase in the rates of hospital admissions and readmissions (6). However, there has recently been a general tendency to reduce the hospital stay time in many surgical procedures. In this context, this study aimed to discuss the feasibility and safety of the outpatient Sistrunk procedure performed without drain placement on the occasion of 49 children operated on by a single surgeon.

MATERIAL AND METHODS

The hospital records of those undergoing the Sistrunk procedure between the years of 2008 and 2023 were retrospectively reviewed regarding their clinical characteristics, operations performed, and complications. Patients at the age of 17 years or younger, undergoing the Sistrunk operation and diagnosed histopathologically with confirmed TDC and fistula were included in the study. On the other hand, the exclusion criteria included the following: older patients (over 17 years old), with histological diagnoses of dermoid and epidermoid cysts, and undertaking alternative operations including solitary cyst excision, marsupialization, or incision with drainage. Such characteristics of the patients as age, gender, clinical presentation, presence of pre- or post-operative infections, localization and size of cysts, imaging methods, procedures performed, developing complications, inpatient or outpatient status, and length of hospital stay were scanned and recorded.

Statistical Analysis

All analyses were performed using the Statistical Package for Social Sciences, version 22.0, (SPSS, IBM Corp. Chicago, IL, USA). The appropriateness of the variables to normal distribution rates was evaluated with visual histograms and probability graphics using analytic methods such as the Kolmogorov-Smirnov and Shapiro-Wilk tests. However, the descriptive analyses were shown using median and interquartile range (IQR) for abnormal variables and frequency tables for ordinal variables. The univariate analyses performed to identify variables that were associated with patients' outcomes were investigated using the t-test and the Mann-Whitney U test. A p-value of <0.05 was considered statistically significant.

RESULTS

The study consisted of 49 children undergoing the Sistrunk procedure without drain placement. Of 49 patients, 27 (55.1%) were boys, and 22 (44.9%) were girls. The average age of the study population was 6.3±3.7 years (min: 13 months-max: 17 years) (Table 1). The most common complaint (n=42, 85.7%) was a midline neck swelling moving with swallowing. Thyroglossal cyst fistulas were detected in seven patients (14.3%). All our cases were preoperatively examined through ultrasonography (USG) to assess the cystic formation and thyroid gland. While the thyroid glands were in the normal localization of 44 patients, they were not monitored in five patients. Thyroid scintigraphy was performed on these five patients, and the thyroid glands were confirmed to be normal. Magnetic resonance imaging (MRI) was performed in only two cases to confirm the diagnosis due to the atypical localization.

In two patients, a sign of infection was detected during the preoperative period. The patients were given antibiotic treatment over two weeks and then operated on. The Sistrunk procedure without the drain placement was performed in all patients. Of all TDC cases, 81.6% (n=40), 12.2% (n=6), and 6.2% (n=3) were determined to be localized in the infrahyoid, suprahyoid, and suprasternal regions, respectively. While 15 of our cases were followed up postoperatively (range from 16 to 24 hours), the other 34 patients were discharged on the same day after the operation (range from 3 to 6 hours). Whereas the mean hospital stay was 4.7±1.1 hours for those discharged postoperatively on the same day, the time was 18.8±4.3 hours for those hospitalized. No major complications were observed in the perioperative period. Only two patients had cyst ruptures during the surgery.

When the patients were grouped as inpatients and outpatients, there was no significant difference in age distribution; however, a significant difference was found in the sizes of the cysts (Table 2). When the patients aged ≤5 years were compared to those aged >5 years, no significant difference was found in in the sizes of the cysts (Table 3).

All cases were operated on by the same surgeon. None of the outpatients operated on were readmitted because of any

Table 1. Some clinical features of children undergoing the Sistrunk procedure

Clinical features		**n (%)**
Gender	Male	27 (55.1)
	Female	22 (44.9)
Age (years)*		6.3±3.7
Clinical Presentation	Swelling in the middle region of the neck	42 (85.7)
	Tyroglossal cyst fistulas	7 (14.3)
Location of Cysts	Infrahyoid	40 (81.6)
	Suprahyoid	6 (12.2)
	Suprasternal	3 (6.2)
Imaging Methods	USG	49 (100)
	Thyroid scan	5 (10.2)
	MRI	2 (4.1)
	Multiple modalities	7 (14.3)
Infection	Preoperative	2 (4.1)
	Postoperative	None
In- or outpatient surgery	Inpatient	15 (30.6)
	Outpatient	34 (69.4)
Complication		1 (2.04)
Hospitalization Time (hours)*	Inpatient	18.8±4.3
	Outpatient	4.7±1.1

*This result was given as mean±standard deviation (SD). MRI: Magnetic resonance imaging, USG: Ultrasonography

Table 2. Characteristics classified according to inpatient and outpatient status

	Inpatient	**Outpatient**	**p**
n	15	34	
Age (months) mean±SD	81.8±43.7	76.6±46.4	0.717[a]
Size of Cysts (mm) mean±SD	13.2±3.6	16.5±4.6	0.002[b]
Thyroglossal Fistula (preop)	-	7	
Intraoperative Cyst Rupture	-	2	
Postoperative Wound Infection	-	1	
Recurrent Case	-	1	

[a]Independent samples t-test, and [b]Mann–Whitney U test.

Table 3. Classified characteristics according to age category

	≤5 years	**>5 years**	**p**
n	20	29	
Age (months) mean±SD	37.7±14.3	106.1±37.2	
Size of Cysts (mm) mean±SD	14.3±4.3	16.4±4.6	0.199[a]
Thyroglossal Fistula (preop)	1	6	
Intraoperative Cyst Rupture	1	1	
Postoperative Wound Infection	-	1	
Recurrent Case	-	1	

[a]Mann–Whitney U test

emergency status. The diagnosis of all patients had been confirmed histopathologically; the mean follow-up time was calculated as 26.5 months (ranging from 12 to 48 months), and no recurrence was observed, except for only one case (2.04%). The only patient with recurrence was a 12-year-old patient with a cyst size of 21 mm, and this patient was one of seven patients with a thyroglossal fistula. Only one patient developed a postoperative wound infection, which resolved with antibiotic treatment. Additionally, these patients with recurrence and wound infection were older than 5 years and in the outpatient group. The recurrence was detected in the second year of the follow-up in one patient, and the extended Sistrunk procedure was applied to this patient. Another patient with a previous history of surgical neck operation (the simple cyst excision) in another local clinic was admitted to our clinic with complaints of fistula and recurrence, The patient

subsequently underwent an extended Sistrunk procedure. In both patients, no recurrence was observed during the follow-up.

DISCUSSION

Surgeons feel uncomfortable because of complications, such as postoperative bleeding, edema, and seroma, after the Sistrunk procedure performed without drain placement. Thus, many surgeons prefer placing a drain as a routine procedure (2,5) although the drain placement leads to an increase in hospitalization and readmission (6). However, many surgical procedures have seen a general trend in recent years to decrease readmissions and hospital stays. Based on the literature, there are several reports recommending that the Sistrunk procedure can be performed in an outpatient situation (3,5,6). Several surgeons are reluctant to perform the Sistrunk procedure because of concerns about postoperative complications, such as hematoma, edema, and seroma, resulting in airway compromise. While we discharged our outpatients undergoing the Sistrunk procedure in the morning after a 3-to-6-hour follow-up on the same day, the inpatients undergoing the same procedure were discharged in the afternoon after 16 to 24 hours on the following day. None of the outpatient patients were readmitted because of any emergency status. None of our patients had bleeding, edema, or seroma after the Sistrunk procedure. Meticulous hemostasis during the operation and a light pressure dressing are sufficient for this.

USG is the most informative method in the diagnosis of TDC. Through USG, it can be confirmed whether the thyroid gland is normal can be confirmed, and the removal of ectopic thyroid tissue, which is the only thyroid gland of patients, can be prevented. Thus, all our cases were preoperatively exposed to a USG investigation. For this reason, we recommend the concomittant USG investigation of the thyroid gland. Computerized tomography or MRI may be required in selected cases with diagnostic difficulties (5,7). In our study, there were two cases exposed to MRI out of our routine clinical practice. The complaint of these patients were the swelling at the level of the incisura jugularis. MRI was needed and performed due to the atypical localization of the cyst in these patients. Because the findings after the MRI confirmed TDC, the Sistrunk procedure was decided for the two patient. As an imaging modality, our preference was MRI since it provides better imaging of soft tissues and avoidance of exposing to radiation. The procedure performed for these patients revealed the extension of the ductus to the tongue base; so, we had to perform another incision at the level of the hyoid. Although routine thyroid scintigraphy is unnecessary in general, we recommend thyroid scintigraphy as a routine practice if the thyroid gland cannot be visualized. In our five patients, no thyroid glands were visualized; therefore, thyroid scintigraphy was performed on these patients, and normal thyroid glands were confirmed (8).

Among short-term complications seen after the Sistrunk operation are local wound infection, edema, and hematoma (2,9). Although rare, complications include abscess requiring surgical drainage, nerve paralysis, hypothyroidism, airway compromise, entry into the airway, and death are reported in the literature (3,10). In a study performed by Geller et al., the complications reported were post-operative infection, recurrence of cyst, undesirable scar, fistula, and laryngeal edema at the rates of 10.9%, 6.6%, 5.8%, 2.9%, and 0.7%, respectively (5). None of those as mentioned above complications were witnessed in our series, except for one case where the recurrence was observed and another case having a postoperative wound infection. This condition may have arisen from the small sample size in our study. In addition, our cases had no significant medical problems leading to perioperative complications.

Recurrence is often a frustrating challenge for surgeons. In our case series, a recurrence was observed in only one patient (2.04%) and improved by reoperation via the extended Sistrunk procedure. In the literature, recurrence rates have been reported on a large scale, ranging from 0% to 12.1% (11). Incomplete removal of the duct results in the recurrence of the cyst. Currently, the most common risk factors are age, multiple ductal branches, and infection of the cyst (12-14). Geller et al. suggested the lack of routine resection of tissue in the suprahyoid space as another cause of recurrence (5). Recurrence rate increases as age decreases. In their study, Marianowsky et al. reported the recurrence rate was 8.3% in the older age group and 50% in patients younger than one year (13). On the other hand, Wang et al. found that the recurrence rate did not increase in younger patients undergoing surgery (15). In our patients, the mean age was found to be 6.3 years, while the recurrence rate was 2.04%. Our recurrence rate may have been low since there were only three patients younger than two and 29 patients older than five. As noted by Patel et al., after the Sistrunk procedure recurrence may result from a branching pattern of the ductulus in the infrahyoid section of TDC. (16). The residues and branches of the ductus neglected during the surgery are likely to lead to recurrence.

It is hypothesized that recurrent infection episodes could increase the probability of recurrence and complicate future surgical procedures by promoting scarring and obscuring tissue planes. Simon et al. reported recurrence rates of 20% in cases with preoperative infections and 4% in those without infections (14). In their study, Pastore et al. reported that the recurrence rate was 7.3%, and that of seven patients operated on due to recurrence, preoperative infection was observed in five patients, while postoperative infection developed in

two patients (12). Only two of our cases had preoperative cystic infection. Those cases were operated on after two weeks of antibiotherapy, recurrence occurred in the second year of the follow-up, and an extended Sistrunk procedure was performed. It can be speculated that the recurrence in our case was due to a preoperative infection. The only patient with recurrence was a 12-year-old patient with a cyst size of 21 mm, and this patient was one of seven patients with a thyroglossal fistula. The presence of a fistula was also considered to be a cause of recurrence. In another study, Hong et al. revealed that there was no significant difference in terms of complications in the cases with drain placement compared to those with no drain placement after the Sistrunk procedure (3). As consistent with their findings, no complication was encountered in our cases, except for the recurrence seen only in one patient although no drain was placed in any of our cases. Hong et al. suggested that drain placement in routine clinical practice after the Sistrunk procedure is unnecessary. We also support the opinion recommended by Hong et al.

Sometimes, TDC and dermoid cysts cannot be distinguished in the preoperative period. In such situations, several surgeons prefer performing a simple cystectomy in place of the Sistrunk procedure, assuming that the mass is a dermoid cyst rather than TDC. Our case, which underwent a simple cystectomy previously in another local hospital, had also been operated on based on this thought. Unfortunately, the patient had to be reoperated on due to the recurrence. We believe that it is conceivable to perform the Sistrunk procedure in place of cystectomy. Eleven of our patients received pathological diagnoses of epidermoid cysts and dermoid cysts, and we did not include these patients in our study group.

In the study performed by Pastore et al., the mean hospital stay time was reported as 4.3 days in patients undergoing the primary Sistrunk procedure (12). In our series, however, the mean hospital stay time was 4.7 hours in outpatient cases, while it was 18.8 hours in those hospitalized. We consider that the Sistrunk procedure performed without drain placement in an outpatient setting gave us an opportunity for shorter-term follow-up.

Our study has limitations such as its retrospective and single-center design and due to including a small number of populations. We consider that randomized trials comparing the procedure with and without drain placement should be performed; however, both TDC and the complications arising from the Sistrunk procedure are rarely encountered entities. Thus, comprehensive studies performed with large populations are difficult. The outcomes of our study may not be generalizable to the other regions and populations. However, the fact that all Sistrunk procedures were performed by a single surgeon can be added as an advantage of our study.

CONCLUSIONS

TDC should be kept in mind in the differential diagnosis of patients presenting with neck swelling. The Sistrunk procedure seems to be the most appropriate method at present. We assert that drain placement is not mandatory, as long as there are no compulsive conditions, such as an immune deficiency or any coagulopathy. We consider that meticulous hemostasis during the operation is more significant than the drain placement. In addition, the outpatient Sistrunk procedure is safe and well-tolerated in the routine treatment of TDC. Contact information and specific instructions about potential complications should be given to the parents or relatives of the patients. However, postoperative admission should be considered if the parents feel uncomfortable with the discharge or live in remote regions.

Etik Kurul: The study was approved by the local ethics committee of the organization (Registration number and date: 2017/1124 and 15.12.2017).

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Sorumlu Yazar: Canan Kocaoglu, Necmettin Erbakan University, Medical Faculty, Department of Pediatric Surgery, Konya, Türkiye
e-mail: drckocaoglu@hotmail.com

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