

# An Overview of 22 Thyroglossal Cysts Managed in KVG Medical College

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## ABSTRACT

**Background/objectives:** Successful treatment of a thyroglossal duct cyst requires surgical extirpation of the cyst with its tract through the tongue base. Incomplete removal results in cyst recurrence, which is the most significant common complications of surgery. The Sistrunk's procedure increases the chances of complete removal of all affected tissue.

**Design:** KVG Medical College, Department of ENT, Head and Neck Surgery.

**Intervention:** A total of 22 cases of thyroglossal cysts (primary and secondary) operated were included in our study.

**Result:** Recurrence was seen in two out of the 22 cases operated after one year of follow-up, and all the recurrences were seen in the secondary cysts.

**Conclusions:** Sistrunk's operation is the treatment of choice for primary thyroglossal cysts. Secondary cysts should be treated with removal of core of tongue base muscle and foramen cecum mucosa along with hyoid and scarred cyst excision.

**Keywords:** Thyroglossal cyst, Sistrunk's operation, Hyoid bone, Tongue base muscles.

## INTRODUCTION

Successful treatment of a thyroglossal duct cyst requires surgical extirpation of the complete tract of the cyst from the neck swelling to the foramen cecum.<sup>1</sup> Incomplete removal results in cyst recurrence, which is the most significant and common complication of surgery.<sup>1</sup> The Sistrunk procedure increases the chances of complete removal of all the affected tissue.<sup>1</sup> This procedure involves removal of the duct cyst embryonic pathway, which occurs via cyst excision in continuity with the thyroglossal duct and the central part of the hyoid bone.<sup>2,3</sup> The thyroid gland anlage forms in the region of the foramen cecum and descends through the neck in close proximity to the developing hyoid bone until it rests in the lower anterior neck.<sup>2,3</sup> Using this procedure, based on embryological principles, Sistrunk reduced cyst recurrence from 40 to 5%.<sup>2,3</sup> In practice, excision of this pathway remains challenging because the duct is ill-defined between the hyoid bone and the tongue base.<sup>2,3</sup>

Some have proposed that this area actually represents a pseudocyst.<sup>4,5</sup> Infected inflamed cysts cannot be excised in total and only incision and drainage can be done, which inevitably leads on to recurrence.<sup>6</sup> Accurate diagnosis and management depends on the skill of the surgeon which is very important in reducing recurrence.<sup>7,8</sup>

Recurrent cyst can be treated in various ways including repeat Sistrunk operation, wide central neck and tongue base dissection.<sup>9</sup> The goal of these procedures is complete

excision of the thyroglossal duct from the thyroid gland to the tongue base, superior and posterior to the hyoid bone.<sup>9</sup> These methods include *en bloc* tissue removal from this region to encompass the variable thyroglossal duct tract.<sup>9</sup>

The thyroglossal duct cyst is a commonly seen developmental abnormality which arises in some 7% of the population.<sup>10</sup> It is the most common type of developmental cyst encountered in the neck region.<sup>10</sup> It results from a failure in obliterating the embryogenic duct produced during thyroid migration.<sup>10</sup> Cysts are most often diagnosed in the pediatric age group and a lesser number of patients in the third decade at the time of diagnosis.<sup>10</sup> A cyst may develop from the secretory residual epithelium.<sup>10</sup>

## MATERIALS AND METHODS

A retrospective study of 22 cases of thyroglossal cysts was done in KVG Medical College between January 2007 and September 2010.

A total of 22 cases of thyroglossal cysts managed in our department during the 45 months period, were studied. Four cases of newly diagnosed (Figs 1 and 2) thyroglossal cysts (primary) and 18 cases of recurrent thyroglossal cysts (secondary) were included in the study. Secondary (recurrent) thyroglossal cysts are defined as pathologic diagnosis in a patient who required more than one procedure for cyst removal (Fig. 3).

In our study, 18 were females and four were males. The youngest was 7-year-old boy (primary cyst) and the oldest



**Fig. 1:** Thyroglossal cyst in a 7-year-old boy



**Fig. 2:** Thyroglossal cyst puckering with protrusion of the tongue



**Fig. 3:** Recurrent thyroglossal cyst with scars of previous incision and drainage



**Fig. 4:** Contrast X-ray showing the fistula

was 36-year-old woman (secondary). A detailed history and clinical examination with the photographs were recorded.

All the relevant history was taken in the form of duration of cyst, type of cyst, clinical features, location, type of initial treatment given, surgical setting, age of recurrence and the number of surgeries done on the cyst. FNAC was done in all cases, even in secondary cases to confirm the diagnosis. T<sub>3</sub>, T<sub>4</sub>, TSH was done in all cases and thyroid scintigraphy with I-131 scan was done in few cases. X-ray lateral view of neck, X-ray chest and ultrasound of the neck are shown in Figures 4 and 5.

## RESULTS

The study group consisted of 18 females (81.81%) and four males (18.18%) with mean age 21.68 years (7-36 years). The history of the disease varied from 5 month to 3 years.



**Fig. 5:** Contrast lateral X-ray of neck showing the tract

**Table 1:** Age and sex distribution of patients

S. No.	Age	Sex	Duration of cyst	Type of cyst	No. of surgeries done before	Type of surgery done	Complications	Follow-up	Recurrence after surgery
1	7	M	1 y	Suprahyoid	0	2	Nil	6 m	No
2	9	F	1 y	Prehyoid	0	2	Nil	8 m	No
3	9	M	2 y	Prehyoid	0	2	Nil	2 y	No
4	11	F	1 y	Prehyoid	0	2	Nil	1 y	No
5	18	F	2 y	Suprasternal	1	6	Nil	2 y	No
6	22	F	2 y	Prehyoid	1	6	Nil	6 m	No
7	36	F	4 y	Suprasternal	3	6	Nil	6 m	No
8	31	F	2 y	Suprahyoid	2	6	Nil	10 m	Yes
9	29	F	2 y	Suprahyoid	2	6	Nil	1 y	No
10	32	F	6 y	Suprasternal	3	6	Nil	3 m	No
11	35	F	2 y	Prehyoid	2	6	Nil	1 y	No
12	36	F	3 y	Suprasternal	1	6	Nil	2 y	No
13	17	M	1 y	Prehyoid	1	6	Nil	1 y	No
14	35	F	3 y	Prehyoid	2	6	Nil	8 m	No
15	15	F	2 y	Prehyoid	1	6	Nil	5 m	No
16	17	F	2 y	Suprasternal	1	6	Nil	7 m	No
17	21	F	2 y	Prehyoid	1	6	Nil	8 m	Yes
18	26	F	2 y	Prehyoid	1	6	Nil	4 m	No
19	20	M	2 y	Suprahyoid	1	6	Nil	5 m	No
20	32	F	1 y	Prehyoid	2	6	Nil	11 m	No
21	17	F	1 y	Prehyoid	1	6	Nil	3 y	No
22	18	F	2 y	Suprasternal	1	6	Nil	8 m	No

m: months; y: years

All the 22 patients had cysts situated in the midline. None of the patient in the series had laterally situated cyst (Table 1).

The level of the cysts in the neck was as follows: Four in the suprahyoid region (18.18%), 12 in the prehyoid region (54.54%), six at the level of the thyroid cartilage, i.e. suprasternal (27.27%) (Table 1).

The commonest reason for seeking treatment was recurrence of the cyst after operation in 18 cases. Seven patients had incision and drainage done for the swelling on one occasion earlier and two cases had incision and drainage done twice earlier. Thyroid pathology or swelling was not associated in any of the 22 cases. An external fistula was seen in two cases (Table 1).

The clinical diagnosis was suggested by the presence of a cystic mass situated towards the front of the midline neck, which moved with protrusion of the tongue and could be transilluminated in some. Six cases were initially treated with antibiotics for infected thyroglossal cysts.

The treatment performed was a variant of Sistrunk's procedure in which the thyroglossal tract was excised to a variable extent, but in all cases with central hyoidectomy (Figs 6 to 10). The size of the cyst ranged from 1.5 to 6 cm (Figs 8 and 10). Postoperative course was uneventful in all cases. In this study, two cases of recurrence were seen after one year of follow-up (Table 1).



Fig. 6: The tract being probed before excision



Fig. 7: Recurrent cyst being excised out

## DISCUSSION

Thyroglossal cyst is a relatively common congenital anomaly which occurs usually in the anterior midline of the neck.<sup>11</sup>



Fig. 8: The whole tract with cyst and core of tongue base muscle after excision



Figs 9A to C: The cyst tract being excised



Fig. 10: The whole tract after excision

Surgical management of these cysts is a real challenge to many surgeons for many reasons.<sup>11</sup> It is an interesting differential diagnosis for midline anterior neck swellings.<sup>11</sup> The cyst or a sinus presenting in younger age is of a greater concern cosmetically. The major problems arise when it is inadequately treated, poses the problem of morbidity due to recurrent infections and sinuses.<sup>11</sup>

By the 7th or 8th week of development, the thyroid reaches its normal position, the area below the thyroid cartilage, descending through the thyroglossal duct.<sup>11</sup> During the 10th week of fetal life, the duct is usually obliterated.<sup>11</sup> Failure of obliteration may result in the development of a cystic dilatation at any time in life.<sup>11</sup> The body of the hyoid bone subsequently develops in the mesoderm joining the ventral ends of the second and third branchial arches and may incorporate the thyroglossal tract into its substance.<sup>11</sup> Cysts are localized towards the midline, between the base of the tongue and the pyramidal lobe of the thyroid gland.<sup>11</sup> Cysts are present in approximately 7% of the general population; up to 62% of these may contain ectopic and functional thyroid tissue, thereby enabling the development of thyroid-related tumors.<sup>11</sup> Around 70% are diagnosed in childhood, and 7% are diagnosed in adulthood.<sup>11</sup>

As cysts are most often diagnosed in the pediatric age group, only a minority of cases with primary cysts are operated at adult age.<sup>12</sup> The most common clinical sign was a nontender, mobile neck mass, which was painful at swallowing in the anterior midline of the neck, usually in close proximity to the hyoid bone.<sup>12</sup> Less often, cysts may show signs and symptoms of secondary infection or present evidence of a fistula.<sup>12</sup> The cystic mass is situated anteriorly towards the midline of the neck, which moved with tongue protrusion and could be transilluminated.<sup>12</sup>

The thyroglossal cyst may contain the only aberrant thyroid tissue present in the body, hence excision of the cyst may result in thyroxine deficiency.<sup>13</sup> Clinical confirmation of aberrant thyroid tissue is proved by a radioactive iodine scan.<sup>13</sup> The ultrasound-guided fine-needle aspiration (FNA) is only moderately sensitive for a preoperative evaluation of cysts.<sup>13</sup> Cytomorphologic

features are not always specific, but associated with clinical and radiological signs, they may be helpful for an accurate diagnosis.<sup>13</sup> Thyroid epithelium is rarely identified.<sup>13</sup>

The standard surgical approach to thyroglossal cysts, dating back to early 20th century, is Sistrunk's operation encompassing removal of the mid-portion of the hyoid bone in continuity with the cysts and excision of a core of tissue between the hyoid bone and the foramen cecum<sup>1</sup>. The Sistrunk procedure is recommended as the main operation of choice, especially in adults in whom a more extended tract resection should be performed.<sup>14</sup>

The risk of recurrence is high in case of inadequate tissue resection from the tongue base with such multiple tracts.<sup>15</sup> In our series, we performed a complete thyroglossal tract in 18 cases with recurrence 1 to 2 years after the simple cyst removal.<sup>15</sup> The alternative solution for surgical treatment is percutaneous ethanol injection. Percutaneous ethanol injection may be considered as a secondary treatment in patients with thyroglossal duct cysts who refuses surgery.<sup>15</sup>

Prevention and management of recurrent cysts remain a clinical challenge.<sup>8,16</sup> Identification of the indistinct thyroglossal duct epithelium is always difficult and may be especially challenging in the presence of inflammation.<sup>17</sup> Excision of the tract through the base of the tongue is usually performed and the amount of tissue to be removed from this region is debated.<sup>17</sup> There is conical narrowing of the surgical specimen as dissection approaches the tongue base, which makes it possible for the duct to be avulsed before reaching the foramen cecum, and makes it difficult to determine how much tongue musculature has actually been excised.<sup>17</sup> Exposure of base of the tongue is difficult in old age.<sup>17</sup> Some has advised radical excision of the tongue base and pharyngeal mucosa, but still the problem persisted.<sup>17</sup>

Surgical techniques were classified into six categories based on the extent of the primary and secondary cyst surgery.<sup>17</sup> Type 1 and type 2 are surgeries for primary cyst and type 3 to 6 surgeries are for secondary (recurrent) cysts.<sup>17</sup> Type 1 includes simple excision of the cyst without hyoid bone excision.<sup>17</sup> Type 2 (classical Sistrunk) include cyst excision with central cyst excision with variable amount of tongue base excision.<sup>17</sup> Type 3 includes secondary cyst excision with central neck dissection with hyoid excision.<sup>17</sup> Type 4 includes wide hyoid excision without extensive tongue base dissection.<sup>17</sup> Type 5 includes excision of the hyoid bone and wide tongue base removal through pharyngeal mucosa.<sup>17</sup> Type 6 includes cyst excision, hyoid excision and removal of core of tongue base muscle through to the pharyngeal mucosa.<sup>17</sup>

## CONCLUSION

Thyroglossal cyst results from a failure of obliteration of the embryogenic duct produced during thyroid migration. The cyst usually appears as an asymptomatic swelling in

the prehyoid region of the neck. The standard surgical approach to cysts is Sistrunk's operation with low recurrence rates. The initial management of the cyst has not changed significantly over the years. So, it is recommended for removal of core of tongue base muscle and foramen cecum mucosa in recurrent cyst.

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