

## Efficacy of Sistrunk's Operation for Thyroglossal Cyst and Sinus; Tertiary Care Experience

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### Abstract

**Objective:** To study efficacy of Sistrunk's operation for excision of thyroglossal cyst and sinus in reducing the recurrence rate.

**Method:** This study was carried out at the department of ENT and Head and Neck Surgery, Services Institute of Medical Sciences/Services Hospital Lahore from June 2008 to December 2019. All confirmed cases of thyroglossal duct cyst and sinus, both male and female belonging to all age groups were included in the study and operated under G/A.

**Results:** Twenty-five cases were included in the study, 16 females (64%) and 9 males (36%). Male to female ratio is 1:1.78. Out of 25 cases eighteen were thyroglossal cysts (72%), and seven were of thyroglossal sinus (28%). Among cysts, five were suprahyoid (27.77%), eleven were infrahyoid (61%) and two were pre-hyoid 11%. All cases were operated under G/A by Sistrunk technique. Follow-up was done for 02 years. No case was reported for recurrence.

**Conclusion:** Sistrunk operation is a very effective and reliable technique for excision of thyroglossal cyst and sinus.

**Keywords:** thyroglossal duct cyst, thyroglossal sinus, congenital anomaly, sistrunk operation

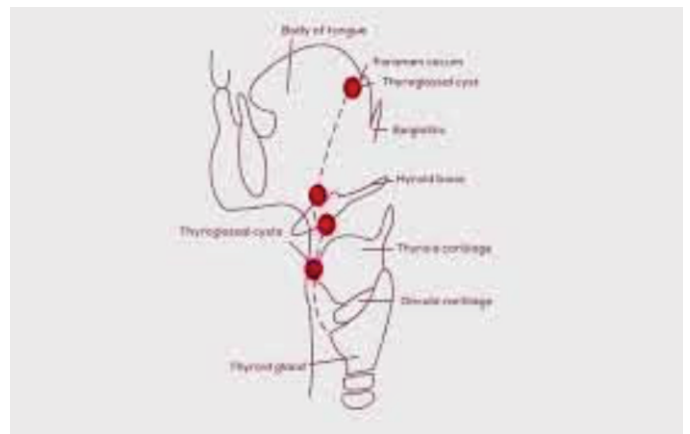
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### Introduction

Thyroglossal cyst is the most common non-neoplastic neck mass. This is the most common form of congenital neck cyst, among developmental, inflammatory and vascular lesions. 90% of Thyroglossal cysts lie in the midline and 10% on one side of the midline. Out of those on one side of the midline, 95% occur on the left side and 5% on the right side<sup>1</sup>. During the 4<sup>th</sup> week of development, thyroid primordium develops from floor of the earliest pharynx between tuberculum impar and posterior one third of tongue at the "foramen caecum". It enlarges caudally, following descent of the heart and great vessels into the loose pre-pharyngeal

soft tissue in the midline. Following migration of the thyroid cells, the thyroglossal tract undergoes regression at around 10<sup>th</sup> week of gestation. However, in some individuals, this tract does not undergo complete regression and persists partially or completely, leading to the development of a thyroglossal cyst.<sup>2</sup> During this migration, the thyroglossal tract passes anterior to the hyoid bone, thyrohyoid membrane and thyroid cartilage. However, part of the tract goes posteriorly to the inner surface of the body of the hyoid bone as a result of growth



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and anterior rotation of the hyoid bone. So, the following are the courses of the thyroglossal tract: pre hyoid, trans-hyoid and retro hyoid.<sup>3</sup>

Two types of abnormal patterns of development of the thyroglossal duct exist. One is thyroglossal duct, which presents in three ways, true duct, fibrous cord or separate islands starting from supra hyoid to infra hyoid part upto pyramidal lobe of thyroid gland but the duct remains tightly adherent to the periosteum of the hyoid bone. In second variety, thyroglossal cyst, may form in isolation or in association with a patent duct or fibrous cord. The cyst is single, uniloculated, round or oval in shape; its walls are clearly defined in relation to surrounding structures, except when it is infected.

Sinus openings are always secondary to spontaneous or surgical drainage of the infected cysts. It may also be secondary to simple cyst removal when the hyoid bone and part of the tract are left behind. The epithelial lining of the tract is pseudo stratified ciliated columnar, but may be squamous. The discharge from the sinus is mucus and not saliva. Thyroid tissue is present in wall of the cyst in approximately 2/3rd of the patients due to its origin from the thyroid tissue<sup>4</sup>. Most common presentation of Thyroglossal cyst is as a discrete palpable neck mass in midline above, at or below the level of the hyoid bone, painless if not infected, mobile on swallowing and tongue protrusion. If infected, patients present with pain in throat, pain on swallowing (odynophagia), dyspnea, fever and variable spectrum of symptoms.<sup>5</sup>

Intralingual cysts can present with dysphagia and dyspnea. Approximately 1/3<sup>rd</sup> of the cysts present with coincident or previous infection, more commonly in adults. 25% of patients present with a discharging sinus resulting from spontaneous rupture of an infected abscess.<sup>6</sup> Diagnosis is made by history, clinical examination and investigations. In all cases thyroid function tests, radioisotope scanning to avoid ectopic thyroid, ultrasonography and FNAC to confirm the diagnosis should be done. If infected, then get specimen for culture and sensitivity. In thyroglossal sinus, sinogram should be done. The differential diagnosis is dermoid cyst, infected lymph node, sebaceous cyst, lipoma, minor salivary glands tumor, hypertrophic pyramidal lobe of thyroid, tumor of the thyroid cartilage, synovial cyst and choristoma, (mass of normal tissue found in abnormal location). The treatment of thyroglossal duct cyst is complete excision of the tract with central part of body of the hyoid bone to avoid recurrence. Thyroglossal sinus also requires complete excision of the tract with central core of hyoid bone to avoid recurrence. This is called

Sistrunk's operation.

Techniques of Sistrunk's operation: The patient is anesthetized preferably with a nasal endotracheal tube, positioned in supine position; a pillow is placed under the shoulders and head is stabilized with a ring. The neck is prepared and oral cavity is left exposed, as guidance with a finger is needed during operation. A 4-5 cm horizontal incision is made at the midpoint between thyroid cartilage and hyoid bone in infra hyoid cyst and encircling the sinus, if sinus is present. Flap is elevated in sub-platysmal plane, while staying clear of the lesion to avoid rupture of the cyst. Infra hyoid strap muscles are exposed. The cyst usually lies underneath the raphe of sternohyoid muscles. The cyst tract is freed from the surrounding muscles and tissues up to the level of hyoid bone. At the hyoid bone level, the muscles which are attached to the center of the hyoid body are resected and separated and the body of hyoid bone between the lesser horns is divided with Mayo scissor or bone cutting forceps. Bleeding from cut ends of the hyoid bone should be controlled with bipolar cautery to avoid damage to the hypoglossal nerve. From the upper aspect of hyoid bone, a part of the genioglossus, mylohyoid and geniohyoid muscles are removed up to the foramen caecum, depending upon the location of the cyst and path of tract. If tract extends up to the base of tongue, then a finger is placed in the oral cavity at the site of foramen caecum and the tract is excised. Before excision of the tract, a purse string suture is applied at the base of tongue and tightened after excision of the tract. Hemostasis is secured, wound washed with normal saline, muscles are sutured with absorbable sutures, drain is inserted and wound is closed in layers. Drain is removed after 2-3 days. Patient is put on injectable antibiotics for 3 days and then orally for 5 days. Stitches are removed after one week. Follow up after every three months is recommended for two years.

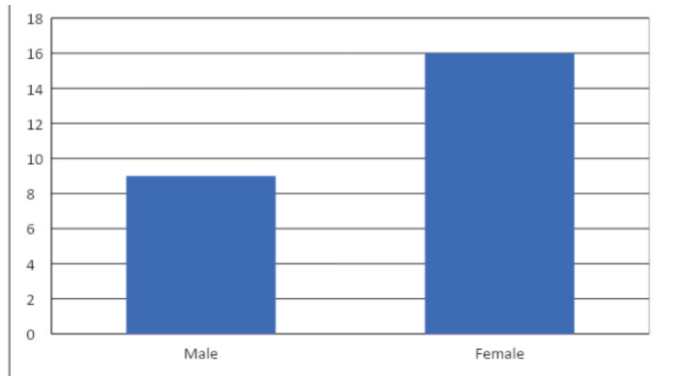
### **Material and Method**

The study was carried at the department of ENT and Head and Neck Surgery Services Institute of Medical Sciences/Services Hospital Lahore from June 2008 to December 2019. The mode of study was retrospective. All confirmed cases were admitted two days before surgery. Detailed history and physical examination were carried out in each patient. Each swelling was examined for site of location in relation with hyoid bone, mobility with swallowing and tongue protrusion along with consistency, fluctuation, Transillumination and relation with surrounding structures. Thyroid Function

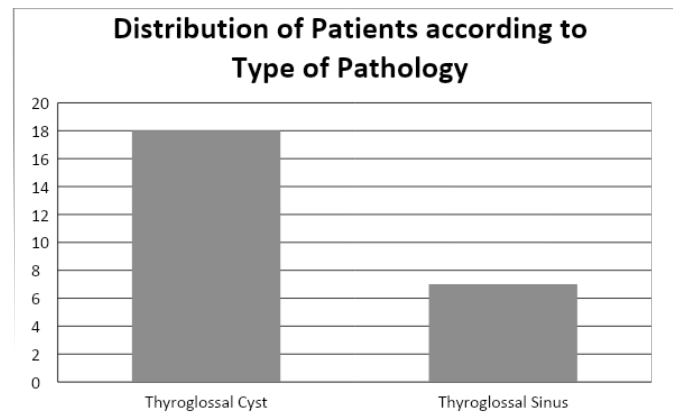
Test, Thyroid scanning, Ultrasonography of neck and FNAC was done in all cases along with routine blood and urine tests. Those with infected cyst were given antibiotics according to culture and sensitivity. These cases were operated under G/A after complete resolution of infection.

### Results

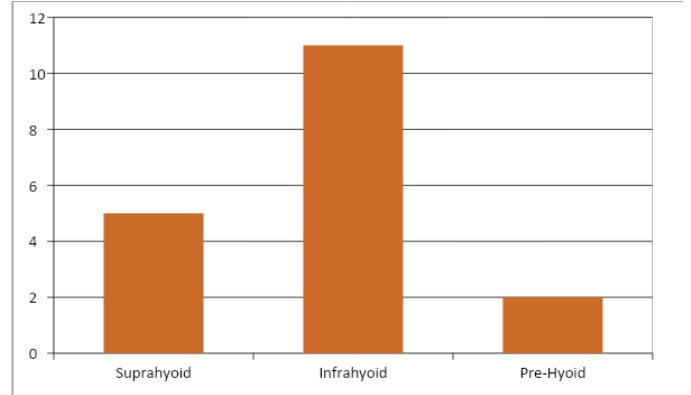
Twenty-five cases were included in the study, 16 females (64%) and 9 males (36%). Male to female ratio is 1:1.78. Out of 25 cases eighteen were thyroglossal cysts (72%), and seven were of thyroglossal sinus (28%). Among cysts, five were suprahyoid (27.77%), eleven were infrahyoid (61%) and two were pre-hyoid 11%.



**Fig-1:** Distribution of Patients according to Gender



**Fig-2:** Distribution of Patients According to Type of Pathology.



**Fig-3:** Distribution of Patients according to Site of Pathology

### Discussion

Thyroglossal duct remnants are the commonest mid line neck masses in children as well as in adults. Sistrunk's operation, with dissection of the tract along with cyst or sinus and removal of the central part of the hyoid bone body is accepted as the operation of choice. WENGLOWSKI in 1912 performed much of the embryological study on neck cysts. He first suggested removal of body of hyoid bone with central core of tissue between this and foramen cecum. SCHLANGE 1893 was first to remove the body of hyoid. Sistrunk, adopted Wenglowski's suggestion and removed a central core of tissue between hyoid bone and foramen cecum.<sup>7</sup> A better understanding of the embryology and developmental anatomy of the thyroid gland is important for the successful management of thyroglossal duct cyst.<sup>8</sup> Sistrunk after original work, later concluded that foramen cecum and mucosa of tongue should be left undisturbed and the core of tissue removed from supra hyoid region should be 10 millimeters in diameter. The infected cyst must not be incised or excised. First aspiration of the cyst should be done with a wide bore needle to improve antibiotic penetration and allow resolution to be followed by removal later on.

The cysts are usually infected with H Influenza, Staphylococcus aureus and staphylococcus epidermidis.<sup>6</sup> Antibiotics effective against these organisms should be given.

The recurrence after Sistrunk procedure is 1.5-10%.<sup>9</sup> Risk factors for recurrence are: surgery performed on infected cyst, rupture of cyst during removal, multiple thyroglossal ducts and technical errors especially insufficient removal of base of tongue or fragmentation of the duct. Schlang's technique which is more rapid and

easier to perform, consists of removing the cyst and body of hyoid, associated with recurrence rate of 30% while simple cyst removal is associated with 100% recurrence rate.<sup>10</sup>

### Conclusion

Sistrunk's operation is very effective procedure for treating thyroglossal cyst and sinus with comparatively low risk of recurrence. Cyst rupture during dissection and multiple off shoots of the tract lead to recurrence and meticulous surgical technique can reduce the risk of recurrence.

**Conflict of Interest:** *None*

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### Authors Contribution

**GM:** Conceptualization of Project

**SHS:** Data Collection

**SN:** Literature Search

**FR:** Statistical Analysis

**MAS:** Drafting, Revision

**MI:** Writing of Manuscript