THYROGLOSSAL DUCT CYSTS: A RETROSPECTIVE STUDY

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The thyroglossal duct cyst (TGDC) represents a retention cyst which arises in a patent portion of the vestigial thyroglossal tract and occurs anywhere in the midline along its pathway from the base of the tongue to the region between the hyoid bone and the thyroid gland. In the period between January 2001 and December 2009, 32 patients underwent to TGDC treatments at the Pediatric Surgery Unit, S Anna Hospital, Ferrara, Italy. Patients included 15 (46.8%) females and 17 (53.2%) males. Age ranged from 2 to 17 years with a mean value of 5.7 at the time of admission. TGDC were treated with anterior neck approach under general anesthesia. Only one case (3.1%) had a recurrence since it was incompletely removed. The diagnosis was made since TGDC had suppuration. The most effective surgical procedure was originally described by Sistrunk in 1920 and modified in 1928. This technique is based on the removal of the central portion of the hyoid bone with a core of tissue from the hyoid bone up to the foramen caecum and of some muscle surrounding the proximal ductules The greatest opportunity for cure is surgery at initial non-inflamed presentation. Once infected, surgical excision is more difficult and recurrence will increase. Our series confirm what reported in the English literature since the only relapsed case was diagnosed during suppuration.

The thyroglossal duct cyst (TGDC) is the most common form of congenital neck cysts, accounting for up to 70% of such lesions (1). Both sexes appear to be equally affected. It is more frequently observed in children, but may develop at any age (2).

A TGDC represents a retention cyst which arises in a patent portion of the vestigial thyroglossal tract and occurs anywhere in the midline along its pathway from the base of the tongue to the region between the hyoid bone and the thyroid gland (1). Therefore, it is the embryologic remnant of the thyroid gland that migrates from the base of the tongue (foramen caecum) to its final resting place in the inferior midline neck (3). During the development of the human embryo the isthmus of the thyroid gland is derived from a bud of hypoblast which arises as an evagination or outpocketing in the midventral portion of the floor of the primitive pharynx between the first and second pharyngeal pouches. This position is marked in adult life by the foramen caecum at the base of the tongue behind the apex of the "V"-shaped row of the circumvallate papillae. The primitive thyroid structure descends in the midline through tissue which later becomes the hyoid bone. It is just the primitive bud of the thyroid structure that migrates downward to forming the thyroglossal duct. Inasmuch as the hyoid bone develops either simultaneously with, or later than, the descent of the thyroid gland, the thyroglossal duct may vary in its relation to the hyoid bone (2, 3). The duct (i.e. the tract lined with epithelium produced by this descent) usually and normally atrophies between the fifth and eighth weeks of fetal life, but occasionally fails to become obliterated. When it fails to fully involute, or if either a portion of thyroglossal duct fails to involute, the persistent secretory epithelium may form a cyst anywhere along the course of

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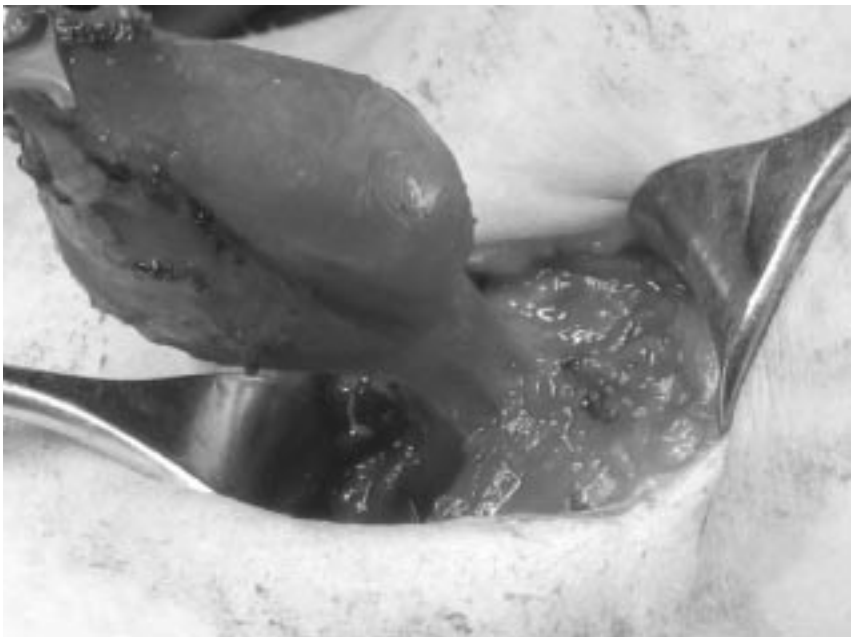

Fig. 1. *Surgical excision of thyroglossal duct cyst.*

this tract (4). Rarely, following infection of a cyst a fistula can reach the exterior by breaking through the thin skin lining (3).

Clinically, the site of the cyst is far more common below the level of the hyoid bone than above it. The clinical picture is that of a midline "lump or bump," which may vary in size from a few millimetres to four or five centimetres. It is not adherent to the overlying tissues but moves in a vertical direction on swallowing. Forced protrusion of the tongue also moves the cyst, a sign distinguishing it from a dermoid cyst, which does not move (2, 5). The finding of a midline neck mass is the most common presentation of in toddlers, whereas infection is the most common presenting symptoms in school-aged children (5). Frequently, the cyst ruptures through the skin spontaneously or is incised; an intermittent draining channel which may end blindly in the tissues, that is, a sinus, may result from rupture or the channel may run uninterruptedly to enter the mouth through the foramen caecum, that is, a fistula (1).

Aim of this retrospective study is to asses the clinical outcome in a series of patients affected by TGDC and discusses the pertinent literature.

MATERIALS, METHODS AND RESULTS

In the period between January 2001 and December 2009, 32 patients underwent to TGDC treatments at the Pediatric Surgery Unit, S Anna Hospital, Ferrara, Italy.

Patients

Patients included 15 (46.8%) females and 17 (53.2%) males. Age ranged from 2 to 17 years with a mean value of 5.7 at the time of admission.

Treatment

TGDC were treated with anterior neck approach under general anesthesia. Only one case (3.1%) had a recurrence since it was incompletely removed. The diagnosis was made since TGDC had suppuration.

DISCUSSION

TGDCs are one of the most common causes of benign neck masses. Cadaveric studies reveal persistent TGDCs in 7% of the asymptomatic adult population (6). They generally occur in young patients and are caused by a defect in thyroglossal duct closure, which sometimes is in close contact with the hyoid (7). TGDCs may be found anywhere along the embryologic anlage, typically in close apposition to the hyoid bone and thyrohyoid membrane (approximately 60%–65%) (8).

The majority of operations for the treatment of these conditions are unsuccessful unless the entire tract running from the cyst to the foramen caecum is removed (3, 9). The most effective surgical procedure was originally described by Sistrunk in 1920 and modified in 1928. This technique is based on the removal of the central portion of the hyoid bone with a core of tissue from the hyoid bone up to the foramen

caecum and of some muscle surrounding the proximal ductules (the length of single duct above the hyoid bone spreads into many ductuli as it approach the foramen cecum) (7). The cyst will usually be found lying on the thyrohyoid membrane. Moreover, the relation of the thyroglossal tract to the hyoid bone is variable, usually passing through or beneath the bone, but occasionally passing above it. So, in cases in which the duct is patent above the hyoid bone the formen caecum also removed (10).

The Sistrunk procedure remains the operation of choice for removal of the TGDC because this procedure has successfully reduced the number of recurrences compared to local excision of the cyst (7). Maddalozzo et al. (11) believe that recurrence of TGDCs occurs if small portions of the tissues remain after surgery as a consequence of incomplete resection of: 1) microscopic suprahyoid ductules and/or 2) infra- and perihyoid tissue. However, they showed as the true anatomy of the relationships of the posterior hyoid space provides an insight into the effectiveness of the Sistrunk procedure. When the surgery is properly performed, with attention to key surgical landmarks, the risk of major complication is minimal. Complications that do occur are minor and wound related. Extensive dissection can cause pharyngodynia (12).

The greatest opportunity for cure is surgery at initial non-inflamed presentation. Once infected, surgical excision is more difficult and recurrence will increase. So, if there is a considerable surrounding inflammation, it is usually best to treat the infection with antibiotic medication and to make a simple incision. Then, several weeks after the inflammation has subsided completely, it is possible to perform the radical surgical Sistrunk operation.

Our series confirm what reported in the English literature since the only relapsed case was diagnosed during suppuration.

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REFERENCES

1. Pemberton JD, Stalker LK. Cysts, Sinuses and Fistulae of the Thyroglossal Duct: Results in Two Hundred and Ninety-Three Surgical Cases. Ann Surg 1940; 111:950-7.
2. Charrier JB, Garabedian EN. [Congenital cysts, sinuses and fistula of head and neck]. Arch Pediatr 2008; 15:473-6.
3. Stahl WM, Jr., Lyall D. Cervical cysts and fistulae of thyroglossal tract origin. Ann Surg 1954; 139:123-8.
4. Singh S, Rosenthal DI, Ginsberg LE. Enlargement and transformation of thyroglossal duct cysts in response to radiotherapy: imaging findings. AJNR Am J Neuroradiol 2009; 30:800-2.
5. Shah R, Gow K, Sobol SE. Outcome of thyroglossal duct cyst excision is independent of presenting age or symptomatology. Int J Pediatr Otorhinolaryngol 2007; 71: 1731-5.
6. Kurt A, Ortug C, Aydar Y, Ortug G. An incidence study on thyroglossal duct cysts in adults. Saudi Med J 2007; 28: 593-7.
7. Navas Molinero C, Sendra Tello J, Plaza Mayor G, Fragola Arnau C, Martinez San Millan J, Martinez Vidal A. [Thyroglossal cyst: retrospective study of 58 cases. Results of the Sistrunk operation]. Acta Otorrinolaringol Esp 2000; 51:340-7.
8. Slotnick D, Som PM, Giebfried J, Biller HF. Thyroglossal duct cysts that mimic laryngeal masses. Laryngoscope 1987; 97:742-5.
9. Lenkiewicz T. [Results of the surgical treatment of children with residual developmental anomalies of the 1st and 2d branchial clefts and thyroglossal duct]. Probl Med Wieku Rozwoj 1979; 9:246-71.
10. Montreuil F. Congenital cysts and fistulae of the neck. Can Med Assoc J 1955; 73:883-6.
11. Maddalozzo J, Alderfer J, Modi V. Posterior hyoid space as related to excision of the thyroglossal duct cyst. Laryngoscope; 120:1773-8.
12. Maddalozzo J, Venkatesan TK, Gupta P. Complications associated with the Sistrunk procedure. Laryngoscope 2001; 111:119-23.