A decade of experience of thyroglossal cyst excision

KM Ubayasiri, J Brocklehurst, O Judd, N Beasley

Nottingham University Hospitals NHS Trust, UK

ABSTRACT

INTRODUCTION We report our ten-year experience of thyroglossal cyst excision at Queen's Medical Centre, Nottingham, comparing outcomes, practice and technique.

METHODS Retrospective case note analysis was conducted alongside surgical histopathology review for all thyroglossal cyst excisions performed between 2000 and 2010. This yielded 108 patients with histopathology results confirming a thyroglossal cyst.

RESULTS The mean patient age was 21 years (range: 1 week – 76 years). Over half the patients ($n=59$, 55%) were less than 18 years of age. Fifty-five patients (51%) were male and fifty-three (49%) were female. Seventy cases (63%) were operated on by ear, nose and throat (ENT) surgeons. The rest were performed by paediatric surgeons ($n=35$, 32%), maxillofacial surgeons ($n=2$, 2%) and general surgeons ($n=1$, 1%). Paediatric surgeons undertook 35 (69%) of the 59 paediatric cases, with ENT surgeons operating on the rest ($n=24$, 41%). The primary surgeon was a consultant in 59 operations (55%) while in 49 cases (45%) it was a registrar. Thyroglossal cysts were ruptured in 21 operations (19%) during removal. The central portion of the hyoid bone was not excised in seven cases (6%). Twelve patients (11%) suffered postoperative complications, six of which were recurrences.

CONCLUSIONS There was a combined recurrence rate of 6% across all specialties for the Sistrunk procedure. This is in keeping with commonly reported recurrence rates. However, we found that central compartment neck dissection, as a modification of the original Sistrunk procedure, provides a highly effective method for permanently excising a thyroglossal cyst and, in our experience, it eliminates recurrence.

KEYWORDS

Thyroglossal – Cyst – Neck dissection – Surgery

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CORRESPONDENCE TO

Kishan Ubayasiri, ST3 in ENT, Stafford Hospital, Weston Road, Stafford ST16 3SA, UK
E: kishan.ubayasiri@gmail.com

Thyroglossal cyst is a well recognised congenital malformation that occurs in 7% of the population.¹ It is a fibrous cystic swelling that forms from the failure of the embryological thyroglossal duct to obliterate at eight weeks' gestation.² The duct runs from the foramen caecum at the junction between the anterior two-thirds and posterior third of the tongue and the anatomical resting place of the thyroid, overlying the upper trachea. Therefore, a thyroglossal cyst may form at any point along the duct. The majority, however, form around the level of the hyoid bone, through and around which the duct passes.² They tend to present most commonly in the second and third decade of life.²

Surgical treatment for problematic cysts such as recurrent infection or inflammation has long been established and was first described by Sistrunk in 1920.³ He described removal of the cyst and the central portion of the hyoid bone as is common practice today. However, he also described the importance of excising the duct tissue that passes from the hyoid to the foramen caecum in its entirety. He explains that 'better results are obtained when no attempt is made to isolate the duct above the hyoid bone'.³ This is achieved by

'coring out, as it were, the tissues between the hyoid bone and the foramen caecum'.³

Using this technique, Marshall and Becker described a recurrence rate of just 1.3% in their series of 310 cases.² Nevertheless, the current published data give a recurrence rate of over 4%.⁴ We believe that this is representative of the modification of the Sistrunk procedure as it is commonly practised. This involves the classic removal of the central hyoid bone but not the coring out of the suprahyoid tissues as described by Sistrunk.³

Case series

The electronic operative log was interrogated for all operations recorded as thyroglossal cyst excisions between 2000 and 2010 at the Queen's Medical Centre, Nottingham. This yielded 135 records for operations carried out for clinically presenting thyroglossal cysts, for which case notes were retrieved. All 135 sets of case notes were scrutinised. Retrospective case note review was conducted, alongside analysis of the surgical histopathology. This revealed 27 cases for

Table 1 Cases for which surgical histopathology was not thyroglossal cyst
8 dermoid cysts (1 of which was a steatocystoma)
4 neck abscesses
2 submental lymph nodes
1 midline neck cyst
1 squamous lined benign cyst
1 thyroid tissue
1 multinodular goitre
1 scarred adipose tissue
1 chronic inflammation
1 ranula
1 skeletal muscle and collagenous tissue within vessels
1 follicular adenoma
1 sinus tract, not thyroglossal in nature
1 papillary carcinoma with a squamous cell carcinoma within a thyroglossal duct remnant
1 that was inconclusive
1 where no histopathology results could be found either in the notes or electronically

which surgical histopathology was not that of a thyroglossal cyst (Table 1). These were eliminated from the case series, leaving 108 cases. Of these, 70 were operated on by ear, nose and throat (ENT) surgeons, 35 by paediatric surgeons, 2 by oral and maxillofacial (OMFS) surgeons and 1 by a general surgeon. Figures 1 and 2 show the breakdown of specialties operating on adult and paediatric thyroglossal cysts.

Results

The mean patient age was 21 years (range: 1 week – 76 years). Over half the patients (n=59, 55%) were less than 18 years of age. Fifty-five patients (51%) were male and fifty-three (49%) were female. Eighty patients (74%) had preoperative ultrasonography, one of whom also had magnetic resonance imaging (MRI). Preoperatively, two patients (2%) had computed tomography (CT), one (1%) had MRI and two (2%) had fine needle aspiration. Twenty-eight patients (26%) had no preoperative imaging documented in the notes or electronically.

The primary surgeon was a consultant in 59 operations (55%) while in 49 cases (45%) it was a registrar. Each operation note was analysed on four criteria: whether the thyroglossal cyst was removed, whether the cyst was ruptured during removal, whether the central portion of the hyoid was excised, and whether a central compartment neck dissection was undertaken and documented.

In two operations (2%) the thyroglossal cyst was not removed entirely. Registrars were the primary surgeons in both of these cases. The thyroglossal cyst was ruptured in 21 operations (19%) during removal. The central portion of the hyoid bone was not excised in seven cases (6%). A portion

of the operation note representing a central compartment level 1a neck dissection (ie the removal of a suprahyoid core of tissue extending to the tongue base) was clearly documented in only 12 cases (11%).

Twelve patients (11%) suffered postoperative complications. Six of these were recurrences. Complications other than recurrence included two patients requiring haematoma evacuation (one with an intensive care unit stay for ventilation), one case of hypothyroidism (despite normal preoperative ultrasonography), one case of abscess formation requiring incision and drainage, one case of discharging sinus postoperatively, which settled with conservative management, and one patient, who originally had a thyroglossal cyst on histopathology but who was reoperated on after histopathology also showed an additional branchial cyst and sinus.

Recurrence of thyroglossal cysts occurred in six cases (6%). In all six recurrences, there was no clear documentation of any central compartment level 1a neck dissection in the original operation note. Of the recurrences, four patients required one further operation, one required three further operations and one required four further operations. The last two of these patients both eventually underwent documented central compartment level 1a neck dissections, which pre-

vented further recurrence. Out of all 12 patients who were documented as having undergone central compartment level 1a neck dissections, none experienced recurrence. The only complication experienced in this group was a postoperative discharging sinus, which was treated conservatively.

Discussion

Thyroglossal cyst excision, as originally described by Sistrunk in 1920, should always include excision of the suprahyoid thyroglossal duct, to prevent recurrence.⁵ Over many years, this technique has evolved and now many surgeons do not perform this procedure as Sistrunk originally described. Although a central portion of the hyoid bone is frequently removed along with the cyst, the tissue above the hyoid is often not excised fully.⁵ Instead, it is common practice to simply follow the tract above the hyoid until it breaks off or disappears. This is entirely contrary to the procedure described by Sistrunk, who stated that this was the exact reason for the previous high recurrence rates.⁵

A few histological studies have been performed to characterise the common routes of the thyroglossal duct around the hyoid bone.^{6–8} It has been shown that in the majority of cases the duct ‘arborises’, and there are many branches and duplications of the duct around the bone.^{6–8} When a main duct is identified, it has a position anterior to the hyoid in 72% of cases and posterior to the hyoid in 28% of cases.⁶ To this end, it follows that if enough tissue surrounding the main duct is not excised, many of these arborising branches will be left and the cyst may therefore recur.^{4,5}

En bloc dissection of the whole central level 1a neck compartment can be highly efficacious in excising these cysts and ducts, and virtually abolishes the chance of recurrence, as seen in our small series of 12 documented cases. Central compartment dissections have been described previously as a modification of the original Sistrunk procedure.^{4,5,9} All have shown a reduced recurrence rate and echo Sistrunk’s original description.⁵ Proper central compartment dissection removes all tissue *en bloc* and so removes the whole thyroglossal complex, including the cyst and all duct remnants. As a result, this leaves no tissue that could contain remnant ducts or branches and so eliminates the chance of recurrence.

The thyroglossal cyst may be the only thyroid tissue present and best practice therefore dictates that preoperative imaging is obtained to identify a normally located thyroid. Although it is extremely rare for the thyroglossal cyst to be the only thyroid tissue, preoperative imaging was not undertaken in an alarming 26% of patients.

Despite low rates of documentation for central compartment level 1a neck dissections, from anecdotal evidence, the actual number of those being undertaken during thyroglossal duct cyst excision is probably much higher. Apart from being poor practice, this poor documentation hinders any surgeon undertaking revision surgery. One potential solution to this problem is an operation note proforma or, potentially, an electronically submitted operative note containing essential fields.

Our case series found that taking a narrow approach (dissecting close to the thyroglossal cyst, hyoid bone and suprahyoid tissues) rather than a wide approach, as described in Sistrunk’s original description,⁵ leads to increased recurrence. Where revision surgery is necessary, the central portion of the hyoid must always be excised (if not already done so in the original operation) and an *en bloc* dissection including the level 1a central compartment neck nodes should be undertaken.

Conclusions

We report a recurrence rate of 6% across all specialties for Sistrunk’s procedure. This is in keeping with recurrence rates commonly reported in textbooks.¹⁰ However, central compartment neck dissection, as a modification of the original Sistrunk procedure, provides a highly effective method for permanently excising a thyroglossal duct cyst and, in our experience, eliminates the chance of recurrence.

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