Morbidity associated with Submandibular Gland Excision: A Retrospective Analysis

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Abstract

Background: Submandibular gland excision is a common surgical procedure. It is often considered to be a relatively simple operation and so is frequently performed by trainees. However, the anatomy of the region is such that nerve injury is possible, in particular to the marginal mandibular branch of the facial, hypoglossal and lingual nerves.

Method: Here we have performed a retrospective, case note analysis of the submandibular gland excisions performed in our hospital over a ten-year period, and have assessed morbidity associated with the operation.

Results: We had 88 patients in our study. Common indication was submandibular sialolithiasis (61%). The complications were marginal mandibular weakness (18%), lingual nerve weakness (4%) and haemorrhage (1%). There was a statistically significant difference between the trainees and consultants.

Conclusion: Our results show significant risk of marginal mandibular nerve palsy. Our results are comparable to other published series. We have reviewed the existing literature to see how these results compare with previously reported studies. Methods for avoiding these complications are suggested.

INTRODUCTION

Excision of the submandibular gland is a relatively common operation. It is carried out for a number of indications, non-neoplastic and neoplastic, benign or malignant. The most common indication for sm gland excision is chronic sialadenitis secondary to calculus formation[1].

The operation is considered as minor procedure by many. However, the anatomy of the submandibular triangle is such that careful consideration needs to be given to various nerves in the region to prevent injury and consequent morbidity. The three principal nerves that the surgeon needs to be aware of and protect during excision of the submandibular gland are the marginal mandibular branch of the facial, hypoglossal and lingual nerves[2].

The course of the marginal mandibular nerve can be quite variable. This variability has been studied and so possible recommendations have been made on how best to avoid this nerve[3]. It is suggested that incisions below the inferior border of the mandible should be made with a margin of 2cm from the mandible. Also, the nerve sits in the plane between platysma and investing layer of deep cervical fascia. An incision taken through the investing fascia enables the nerve to be reflected with the fascia, protecting the nerve without needing to directly identify it. The facial veins and facial artery also lie in this region and these may require careful dissection and ligation[4].

The hypoglossal nerve and lingual nerve have a more consistent course in relation to the submandibular gland, and it is important to identify and preserve these nerves by directly visualising them. The lingual nerve lies superior to the sm gland[5]. The hypoglossal nerve lies deep to the gland, running superficial to hyoglossus and deep to digastric.

In this article we have analysed the submandibular gland excisions performed in our hospital over a ten-year period, and have assessed morbidity associated with the operation. We have also reviewed the existing literature to see how these results compare with previously reported studies.

METHODS

A retrospective analysis was made of the case notes of all patients who had undergone submandibular gland excision during the ten year period June 1994 to May 2004. These patients were identified from theatre records. A total of 88 patients had undergone submandibular gland excision over this period. Having obtained the notes, the case histories, operation notes and clinic reviews were assessed by the authors to identify the indication for surgery, which speciality and grade performed the operation, and the presence and duration of any postoperative complications

The data was analysed by simple statistical tests.

A Medline search was also performed using the search terms submandibular gland and mandibular nerve. Relevant articles from this search were analysed to obtain a comparison of morbidity data.

RESULTS

We had 88 patients in our study group. The age range was between 21 and 86 with median age of 51 year. The male to female ratio was 48:40. The common indication for excision was submandibular sialolithiasis (61%). Our data from the final biopsy result's show that, 68% inflammatory pathology, 22% neoplastic pathology and 10% others (drooling, normal gland and tuberculosis). The incidence of marginal nerve palsy was 18%. Out of which one third were temporary and two thirds were permanent. The incidence of lingual nerve palsy was 4%, half of which were permanent. Haemorrhage rate of 1%. There was high rate of complications with trainees compared with consultants (overall 17% vs. 6%). In case of marginal mandibular nerve it was 14% vs. 4%. However rate of complication with respect to lingual nerve was same (2%).

The rate of complication were higher in the neoplastic group (25%) compared to inflammatory group (19%).

DISCUSSION

The incidence of post-operative complications after submandibular gland excision surgery, as reported in the various literatures, is presented in Table 1[1,2,6,7,8,9,10].

Figure 1

Table 1: Results of previous studies.

Author	Patient Group	Type of study	Main Results
Ichimura et al[2]	133 patients undergoing excision of submandibular triangle components	Retrospective analysis	29.8% of patients had facial paralysis – all resolved. 4.8% Hypoglossal nerve paralysis. 2.4% Lingual nerve paralysis.
Hald & Andreassen[6]	159 benign sm glands in 157 patients 86 patients followed up	Retrospective analysis	18.2% mandibular nerve neurapraxia; 92.3% resolved. 18.2% residual stones in duct.
Smith et al[7]	86 patients, 92 gland excisions	Retrospective analysis	96% non-neoplastic disease. 36% temporary paresis of lower branches of facial nerve. 5% lingual nerve paralysis.
Berini-Aytes & Gay-Escoda[1]	206 sm gland excisions for non-neoplastic disease	Retrospective analysis	14.6% early complications. 25.3% late complications. 16% neurological complications.
Adjei & Hammersley[8]	2 patients undergoing sm gland excision	Case report	Mylohyoid nerve injury causing numbness around the chin
Kennedy & Poole[9]	74 patients with benign disease	Retrospective analysis	9.3% mandibular nerve injury – all recovered. 2.7% major haemorrhage.
Milton et al[10]	134 patients, 137 excisions	Retrospective analysis	Male:Female ratio 1.6:1 18.2% marginal mandibular nerve injury – 7.3% permanent. 2.9% permanent lingual nerve, 0.7 % temporary hypoglossal nerve injury.
Present study	88 patients, 88 excisions	Retrospective analysis	18% marginal mandibular nerve palsy – 12% permanent and 4% lingual nerve palsy.

The high incidence of temporary marginal mandibular nerve palsy in the study is to the experience of the surgeon, as shown by our study (overall 17% vs. 6% with $p<0.0003$). Marginal mandibular palsy usually leads to weakness of the angle of the mouth secondary to dysfunction of depressor anguli oris [2]. The incidence of nerve palsies were 18 % for marginal mandibular nerve, 4% for lingual nerve. Thus, we can say that the surgeon's experience and their familiarity with this region can reduce morbidity. Our results compare favourably with the figures quoted in previous literature (Table 1). All the authors in the literature agree that the lingual nerve should be identified. The paresis is usually temporary. Milton et al described a three percent incidence of permanent lingual nerve damage while Turco et al quote six percent permanent damage[10,11]. It is also necessary to identify the hypoglossal nerve to reduce complication rates, which are quoted around one percent.

The surgery for tumours should be distinguished from that for inflammatory lesions as nerve damage is more likely in the former[2,12]. Our figures show that 68% were inflammatory disease and 22 were neoplastic disease. The complication rates in the inflammatory group were 19% compared to 25% in the neoplastic group. This is explained by the nature of the disease and need for wider clearance.

RECOMMENDATIONS

If the indication for surgery is calculus disease, a low incision at the level of the hyoid and an intracapsular dissection of the gland will avoid the nerve because the plane of dissection is deep to it.

If a tumour is suspected, or confirmed with cytology, and a wider resection is required, the senior author's recommendation is to use a nerve monitor with stimulator to identify the nerves, thereby reducing the likelihood of nerve damage in neoplastic disease.

In our series, most patients undergoing surgery were between 21 and 86 years. The majority of cases were male (48:40), which is similar to previous findings[4]. Goudal et al quoted six percent risk of ranula formation[13]In our series there was no such complication.

CONCLUSION

Submandibular gland excision is an operation frequently performed by different surgical specialities. From our study we can see that there is a variation of complication rates between specialities as well as according to grade of surgeon. A detailed knowledge of the surgical anatomy of the region can reduce the morbidity.

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