Auris Nasus Larynx xxx (2018) xxx–xxx

Contents lists available at ScienceDirect

Auris Nasus Larynx

journal homepage: www.elsevier.com/locate/anl

Operative technique for benign submandibular gland mass without identifying the mandibular branch of the facial nerve

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ARTICLE INFO

Article history:
Received 19 September 2017
Accepted 25 April 2018
Available online xxx

Keywords:
Submandibular gland
Mandibular branch
Non-identification method facial nerve paralysis
Fascia

ABSTRACT

Objective: The marginal mandibular branch of the facial nerve must be protected during surgery for benign diseases of submandibular gland. Methods for protecting the marginal mandibular branch include the nerve identification method and the non-identification method.
Methods: We performed submandibular gland surgery in 138 patients with benign submandibular gland diseases using the non-identification method to preserve the marginal mandibular branch. In brief, the submandibular gland capsule is incised at the inferior border of the gland and detached along the gland parenchyma. The nerve is protected by this procedure without the need for identification.
Results: Among 138 patients who underwent this surgical procedure, only 7 patients developed transient paralysis of the lower lip.
Conclusion: This method of resecting the submandibular gland without identifying the marginal mandibular branch is an effective procedure associated with a low incidence of transient paralysis. Moreover, no patient developed paralysis due to procedural errors.

1. Introduction

The main indications for submandibular gland surgery include benign diseases, such as benign tumors and sialoliths, as well as malignant tumors. When surgery is performed to treat benign disease, the marginal mandibular branch of the facial nerve must be protected. This branch of the facial nerve is thin and anastomosis with other branches is not necessarily common. If this nerve is injured, the lower lip can be paralyzed, which has a significant influence on the patient's appearance. There are two main methods for protecting the nerve; either the marginal mandibular branch is identified during surgery and then protected (identification method) or the nerve is avoided during surgery without specifically identifying it (non-identification method) [1]. In our department, the non-identification method for nerve protection has been adopted when conducting submandibular gland resection.

In this article, we present our surgical procedure and the results obtained using the non-identification method to protect the marginal mandibular branch.

2. Patients & methods

2.1. Patients

The subjects were 138 patients with benign disease who underwent submandibular gland resection at our department over a period of 17 years from September 1999 to August 2016. Fifty-eight patients had tumors (57 pleomorphic adenomas and 1 basal

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https://doi.org/10.1016/j.anl.2018.04.011
0385-8146/

cell adenoma), 50 patients had submandibular gland sialoliths or transitional zone sialolithiasis, 23 patients had chronic inflammation, and 7 patients had others diseases.

2.2. Methods

Among the 138 patients who underwent surgery, patients who developed postoperative paralysis of the marginal mandibular branch of the facial nerve were reviewed to determine the pathological diagnosis and time to recovery. In addition, the operating time and blood loss were compared between patients with and without paralysis, as well as between patients with benign tumors and those with inflammation (sialoliths and chronic inflammation).

2.3. Operative technique

Submandibular gland resection was conducted under general anesthesia without identification of the marginal mandibular branch in all patients.

A pillow was inserted under the shoulder to maintain the neck in extension. Then a vertical skin incision was made about 3 cm caudally from the edge of the mandible (Fig. 1). The incision cut through the platysma muscle, while the superficial cervical fascia (SCF) was maintained intact. Skin detachment was conducted at the standard layer for neck surgery between the platysma and SCF (Fig. 2). Cranially, the skin was detached up to the middle of the submandibular gland. Since the marginal mandibular branch runs deep to the SCF, our procedure avoids damaging this nerve. However, lean patients have very little fatty tissue between the platysma and SCF, so careful detachment is required. When an electrocautery is used for skin detachment, its position relative to the marginal mandibular branch can be checked by observing contraction of the lip muscles in response to the current. Next, the submandibular gland capsule/SCF was incised at the lower margin of the submandibular gland (at the same level as skin detachment), and the submandibular gland was exposed (Fig. 3). By using an electrocautery for SCF incision, it could be verified that the marginal mandibular branch did not run through this site. Afterward, the exposed submandibular gland was pulled slightly downward using Allis forceps, and the gland was detached upward along the parenchyma. By performing detachment along the curve of the parenchyma, the procedure is carried out at a safe distance from the marginal mandibular branch (Fig. 4). The facial artery and vein are located above the submandibular gland. These vessels are ligated just near the submandibular gland, and the distal part is pulled upward without cutting the string to ensure protection of the nerve (Fig. 5).

2.4. Statistical analysis

Statistical analysis was performed by using the two-sample Kolmogorov–Smirnov test, and significance was accepted at $p < 0.05$.

3. Results

Postoperative damage to the marginal mandibular branch was observed in 7 of the 138 patients (5.1%), including 5 patients with benign pleomorphic adenoma and 2 patients with submandibular gland sialolith. All 7 patients had transient paralysis of the lower lip and the time to recovery ranged from 3 days to 3 months. There were no patients with permanent paralysis. Patients who had benign tumors tended to take longer to recover compared to patients with inflammation.

We compared the 131 patients who did not experience transient postoperative paralysis of the lip due to marginal mandibular branch injury with the 7 patients who experienced such paralysis. The mean operating time was 88 and 91 min, respectively ($p = 0.43$), while mean intraoperative blood loss

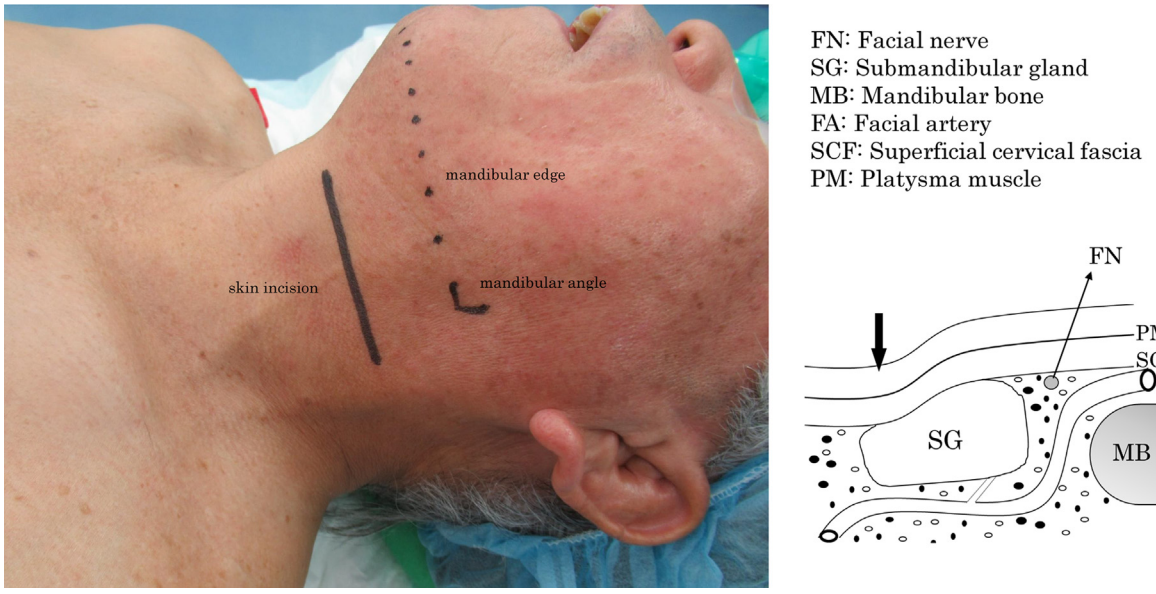

Fig. 1. A pillow is placed under the shoulder, and a horizontal skin incision is made about 3 cm caudal from the mandibular edge.

Please cite this article in press as: Kikuoka Y, et al. Operative technique for benign submandibular gland mass without identifying the mandibular branch of the facial nerve. Auris Nasus Larynx (2018), https://doi.org/10.1016/j.anl.2018.04.011