Modified submandibular sialoadenectomy

Akhtar Hussain, FRCS; Daran P. Murray, AFRCIS

Abstract
Submandibular sialoadenectomy is a common head and neck procedure. Indications include the presence of benign and malignant tumors and inflammatory disease with or without intraglandular sialolithiasis. The standard technique involves a variably sized incision. The facial artery and vein are usually ligated and transected during the procedure, and either suction or nonsuction wound drainage is generally instituted. We describe a modified sialoadenectomy technique that involves a minimal incision, preserves the facial artery and vein, and does not require wound drainage because the surgical site is closed in three layers. We performed this procedure on 19 patients and observed only 1 postoperative complication—mild paresis of the right marginal mandibular branch of the facial nerve following the excision of a Warthin’s tumor. This patient recovered fully 3 months postoperatively.

Introduction
In this article, we describe our modified approach to submandibular sialoadenectomy, and we report the results of our use of this technique in 19 patients.

Relevant anatomy
The submandibular gland is the second largest of the salivary glands. It is a seromucous gland—two-third serous and one-third mucous. It has the general shape and size of a walnut, and it weighs approximately 8 to 10 grams.

The large superficial aspect and small deep portion of the submandibular gland are continuous around the free posterior border of the mylohyoid muscle. The posterior border of the superficial part is separated from the parotid gland by the stylomandibular ligament, which is the thick part of the parotid fascia. The upper part of the lateral surface is in contact with the submandibular fossa of the mandible and the medial pterygoid muscle below the mylohyoid ridge. The lower part is covered by skin, subcutaneous tissue, platysma muscle, and an investing layer of deep cervical fascia. The submandibular fascia is nonadherent and free of septa, and it can therefore be easily dissected away from the surrounding structures and the gland.

The submandibular lymph nodes lie on the surface of the submandibular gland as well as within the gland. The upper part of the medial surface rests on the mylohyoid muscle anteriorly and the hyoglossus muscle posteriorly. The lower part of the submandibular gland overlaps the digastric (posterior belly) and stylohyoid muscles. The deep portion of the gland extends forward around the posterior border of the mylohyoid muscle and lies on its upper surface, extending as far as the posterior part of the sublingual gland. The submandibular gland lies between the tongue and the mandible and is covered by the mucous membrane of the floor of the mouth. Medially, it is related to the lingual and hypoglossal nerves as they lie on the hyoglossus muscle.

The facial artery and the posterior facial vein groove the posterior part of the gland. In most cases, two branches of the facial artery supply blood to the gland (figure 1). The submandibular duct is formed in the superficial part of the gland and passes via the deep part where it opens into the anterior floor of the mouth at the side of the frenulum of the tongue. The duct lies above the lingual nerve in the floor of the mouth. The superficial part of the gland is intimately related to the marginal mandibular branch of the facial nerve. The marginal mandibular branch leaves the lower portion of the parotid gland and passes into the neck below the angle of the mandible; it arches lateral to the submandibular gland and continues over the inferior border of the mandible, emerging in the face in front of the masseter muscle. It passes deep into the platysma muscle and lateral to the posterior facial vein and the investing layer of the deep cervical fascia. In some cases, the marginal mandibular branch arises directly from the cervical branch of the facial nerve. A lymph node usually lies along the course of the marginal mandibular branch of the facial nerve. Venous drainage of the submandibular
gland occurs via the posterior facial vein, which drains into the internal jugular vein.

Surgical technique
Our modified approach to submandibular sialoadenectomy is performed with the patient under general anesthesia and in the supine position, with the neck extended and the head turned away from the surgeon. A 2.5- to 3-cm incision is marked 1 cm below the inferior border of the submandibular gland, preferably in a natural skin crease if one is available (figure 2). The area around the incision site is infiltrated with 1% lidocaine and 1:100,000 epinephrine. Magnification with a 2.5-power loupe is used throughout the procedure.

The incision is made through the skin, subcutaneous tissue, and platysma muscle to expose the gland (figure 3). A subcapsular plane of dissection is established. The posterior facial vein is identified and retracted posterosuperiorly. In most cases, two veins drain the submandibular gland; they are usually next to the two arteries that supply the gland. At this point, the two arteries and the facial artery are identified. The veins lie superior to the arterial branches. The vascular supply to the gland is coagulated and ligated while both the facial artery and the posterior facial vein are preserved.

The remainder of the resection is carried out with the help of unilateral mobile deep retraction; the retractor is moved in the direction of the dissection. This maneuver facilitates dissection by preventing the stenting or webbing effect that occurs during standard two-point retraction.

Following removal of the submandibular gland, the surgical site is closed in three layers. The mylohyoid is sutured to the digastric fascia with absorbable sutures. The submandibular capsule is sutured to the cervical fascia below the digastric muscle, and the cut ends of the platysma muscle are repaired. The three layers are closed with 3-0 polyglactin sutures. Finally, the skin is closed with non-absorbable 6-0 nylon (figure 4). The wound is protected with 6-mm Steristrips. No drainage is required.

Results
Between March 10, 1995, and April 20, 1999, we performed our modified submandibular sialoadenectomy on 19 patients. Indications for surgery were chronic sialadenitis in 13 patients, benign pleomorphic adenoma in 4, a submandibular dermoid cyst in 1, and Warthin’s tumor in 1.

We observed only 1 postoperative complication; the patient who underwent excision of a Warthin’s tumor developed mild paresis of the right marginal mandibular branch of the facial nerve. She recovered fully 3 months following the operation. Despite the fact that drainage was not instituted, there were no incidents of hematoma, seroma, or infection. All procedures were carried out safely and efficiently without any technical difficulty.

Discussion
Two techniques for performing submandibular sialoadenectomy have been described in the literature. Patey recom
MODIFIED SUBMANDIBULAR SIALOADENECTOMY

mended making the incision in the upper skin crease and extending it from a point posterior to the angle of the jaw to a point just short of midline. Shaheen recommended making an incision that overlaps the posterior border of the sternocleidomastoid muscle and extends beyond the limit of the gland anteriorly at a level just above the hyoid bone. Both authors recommended ligating and transecting the facial vessels and instituting postoperative wound drainage.

Three factors prompted us to modify the technique: the unnecessary sacrifice of the facial vessels, the overgenerous length of the incision, and the creation of an additional scar for drainage. As a general principle, all tissue that does not need to be sacrificed should be preserved during surgery. It is not necessary to sacrifice the facial vessels during submandibular sialoadenectomy. We feel that there are sizable and clearly identifiable branches to the upper and lower poles of the submandibular gland that can be ligated easily with careful technique. Ligation of the facial vessels clearly jeopardizes their future function, which may be required for oncologic head and neck reconstruction. Although the head and neck region has a good blood supply, the long-term effect of facial vessel ligation remains unknown.

We found that an incision of 2.5 to 3 cm is entirely adequate for submandibular sialoadenectomy. We also feel that magnification during the surgical procedure is very helpful in terms of both keeping the length of the incision to a minimum and preserving the facial vessels. Finally, the three-layer closure obviates the need for drainage.

Our experience has clearly shown that submandibular sialoadenectomy can be safely performed through a small incision with the help of loupe magnification and unilateral mobile retraction. In our view, the surgical field exposure is more than adequate to achieve a safe and efficient execution of the procedure. We believe that our modified technique has improved overall cosmetic outcomes (figure 5), and we highly recommend it.

References