



Transoral versus transcervical approach to submandibular gland: techniques and outcomes

Submandibüler beze transservikale kıyasla transoral yaklaşım: Teknik ve sonuçlarımız

İbrahim Çukurova, MD., İlker Burak Arslan, MD., Suphi Bulğurcu, MD., Erhan Demirhan, MD.

Department of Otolaryngology, Tepecik Training and Research Hospital, İzmir, Turkey

ABSTRACT

Objectives: This study aims to evaluate the risks and benefits of the transoral approach for removal of the submandibular gland compared to the transcervical approach.

Patients and Methods: Twenty consecutive patients who underwent submandibular gland excision surgery via the transoral (6 males, 4 females; mean age 45.4 years) or transcervical (7 males, 3 females; mean age 44.1 years) approach between March 2009 and December 2014 were analyzed retrospectively. Age, surgical indications, complications, duration of hospitalization, and postoperative histopathological results were recorded and compared between two groups.

Results: Of 20 patients, 35% were previously treated with antibiotics. There were no significant differences in demographic characteristics and postoperative histopathological results between the groups ($p<0.05$). Duration of hospitalization was statistically shorter in the patients operated via transoral approach ($p<0.05$). Relapsing sialoadenitis occurred in a patient who was operated by transoral approach due to the incomplete resection of the gland.

Conclusion: The transoral approach for submandibular gland excision has several advantages over the transcervical approach in terms of cosmetic outcome, marginal mandibular nerve injury, and length of hospital stay.

Keywords: Excision; gland; submandibular; transcervical; transoral.

ÖZ

Amaç: Bu çalışmada submandibüler bezin çıkarılmasında transservikal yaklaşıma kıyasla, transoral yaklaşımın riskleri ve faydaları değerlendirildi.

Hastalar ve Yöntemler: Mart 2009 - Aralık 2014 tarihleri arasında transoral (6 erkek, 4 kadın; ort. yaş 45.4 yıl), veya transservikal yaklaşım ile (7 erkek, 3 kadın; ort. yaş 44.1 yıl) submandibüler bez eksizyon cerrahisi yapılan ardışık 20 hasta retrospektif olarak incelendi. Yaş, cerrahi endikasyonlar, komplikasyonlar, hastanede yatış süresi ve ameliyat sonrası histopatoloji sonuçları kaydedildi ve iki grup arasında karşılaştırıldı.

Bulgular: Yirmi hastanın %35'ine daha önce antibiyotik tedavisi verilmişti. Gruplar arasında demografik özellikler ve ameliyat sonrası histopatoloji sonuçları arasında anlamlı farklılık izlenmedi ($p<0.05$). Transoral yaklaşımla ameliyat edilen hastalarda hastanede kalış süresi istatistiksel olarak daha kısaydı ($p<0.05$). Bezin tamamının çıkarılmaması nedeniyle, transoral yaklaşım ile cerrahi uygulanan bir hastada sialoadenit nüksü görüldü.

Sonuç: Transoral yaklaşımla submandibüler bez eksizyonu, transservikal yaklaşıma kıyasla, estetik sonuç, marjinal mandibüler sinir hasarı ve hastanede kalış süresi açısından çeşitli avantajlara sahiptir.

Anahtar Sözcükler: Eksizyon; bez; submandibüler; transservikal; transoral.

Submandibular gland (SMG) excision is traditionally performed through transcervical incision. It is associated with low morbidity except for the postoperative skin scar, which can be cosmetically unappealing, particularly in young patients. The scar may sometimes become worse with hypertrophy or keloid formation.^[1]

The transcervical procedure involves the preservation of three nerves: the marginal mandibular branch of the facial nerve, the lingual nerve and the hypoglossal nerve. The marginal mandibular branch of the facial nerve, which lies in the subplatysmal plane overlying the gland, is the most commonly injured nerve in SMG excision by the transcervical approach. Injury rates of the marginal mandibular nerve in the literature vary between 1-7.7% of cases. The lingual and hypoglossal nerves are rarely injured in the hands of an experienced surgeon and injuries affect 1.4 and 2.9% of patients, respectively.^[2]

An alternative surgical approach, intraoral incision, has been developed to avoid visible scarring and neurologic risk. Although intraoral resection leaves no external scar or drain, it may cause other problems such as lingual nerve paresis and limitation of tongue movement. The transoral approach avoids a cervical incision and dissection in close proximity to the marginal mandibular branch of the facial nerve. A key portion of the surgery is identification and careful control of the vascular pole, which includes the facial artery and vein at the posterior aspect of the gland. The anatomic association of the SMG, lingual nerve, Wharton's duct, and hypoglossal nerve involves different points within the oral cavity. Due to difficulty with visualization of this anatomy, an external approach has been advocated by most.^[3]

However, with the advent of better endoscopic tools and preference of patients for minimal external incision approaches, transoral SMG excision has gained popularity as a safe and effective technique.^[4] We analyze the risks and benefits of both transoral and cervical approaches in patients who were operated by a single surgeon.

PATIENTS AND METHODS

Twenty patients (13 males, 7 females) who underwent excision of the SMG for benign SMG

pathology between March 2009 and December 2014 were separated equally into two groups (group 1- transcervical, and 2- oral). All patients were evaluated by ultrasonography and computed tomography and none of the patients had a prior history of the SMG surgery. A senior surgeon performed all operations. The series of data was examined for age, indication for operation, complications, length of stay, and postoperative pathology. Photodocumentation and surgical technique were also reviewed.

Surgical procedure

Transoral approach

The procedure was performed under nasotracheal general anesthesia in the supine position. Mouth gag and a lip retractor were used to expose the mouth floor. The floor of the mouth on the operation side was infiltrated with 40 milligram lidocaine +0.05 milligrams epinephrine to lessen mucosal bleeding. The tongue was retracted to the contralateral side. An incision was made parallel to the Wharton's duct, from the papillary region anteriorly to the retromolar trigone posteriorly. A cuff of gingival mucosa was preserved to provide a surface for tension-free wound closure and to limit the risk of tethering the tongue. The lingual nerve, located on the superior-posterior-lateral surface of the gland, was carefully dissected away from the gland and protected (Figure 1). Wharton's duct was circumferentially dissected along its length, from the caruncle to the glandular parenchyma, so that it could be elevated and excised en bloc with the gland. The gland was then dissected off through the undersurface of the mylohyoid, genioglossus, and hyoglossus muscles. Posteriorly and laterally careful dissection identified the facial artery and vein branches involved in the gland which were clipped and divided. The hypoglossal nerve should have been identified inferior and lateral to the gland when the anterior and lateral portions of the gland were released (Figure 2). The wound was carefully inspected for hemostasis and intact neural and vascular structures. The floor of the mouth was then closed with interrupted 4-0 polyglactin sutures, leaving a small opening posteriorly for blood efflux. No drains were placed. All patients received prophylactic antibiotics effective against oral flora. A cold compress was placed on the submandibular triangle in order to diminishing edema.

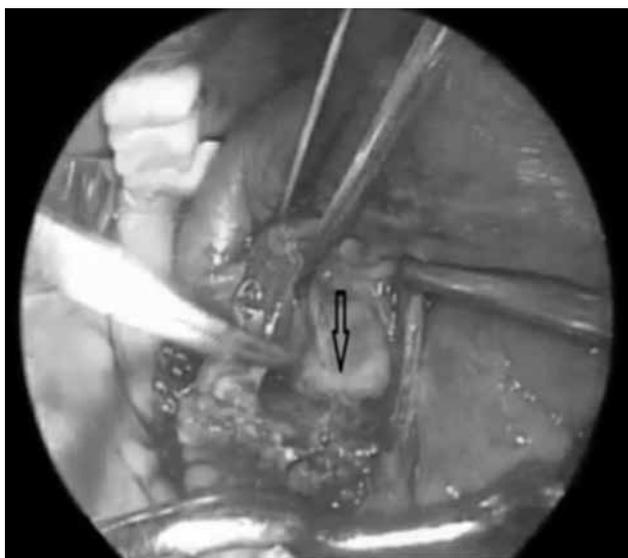


Figure 1. The lingual nerve is seen superficial to the submandibular gland.

Transcervical approach

The procedure was performed under general anesthesia with orotracheal intubation. The skin incision was made two fingers from the lower edge of the mandible to protect the marginal mandibular branch of the facial nerve. The capsule of the gland was directly approached and dissection was continued on the capsule. The facial artery was ligated or preserved by ligating only the branches of the facial artery to the gland. Blunt dissection then continued towards the superiomedial gland where the mylohyoid muscle had to be retracted anteriorly to complete the dissection. Posterior and inferior traction on the gland facilitated identification and differentiation of Wharton's duct, the lingual nerve with its attachment to the submandibular ganglion, and the hypoglossal nerve. The submandibular duct was then ligated and divided close to its opening in the floor of the mouth. The gland was released from the submandibular ganglion and removed preserving the lingual and hypoglossal nerves. Finally, the wound was closed in layers over a drain. We preferred a 10 French suction drain. Sutures were removed 5-7 days after operation.

RESULTS

Ten patients were operated by transoral approach technique (6 males, 4 females; mean age 45.4 years) and 10 were operated by transcervical



Figure 2. The hypoglossal nerve can be identified in the surgical bed.

approach technique (7 males, 3 females; mean age 44.1 years). Thirty-five percent were previously treated with antibiotics. The patients' data is shown on Table 1. Relapsing sialoadenitis occurred in a patient operated by transoral approach. Complications of patients are shown in Table 2. There were no significant differences in demographic characteristics and postoperative histopathology between the groups ($p < 0.05$). Statistically shorter duration of hospitalization was determined in patients operated via transoral approach ($p < 0.05$).

DISCUSSION

The transcervical approach is relatively simple and widely accepted for SMG excision. Alternative surgical approaches have been developed to avoid neurologic risks and visible scarring in the upper neck. Hong and Kim^[5] reported a new surgical approach for transoral removal of benign submandibular disorders and suggested that the transoral approach could be an alternative to the transcervical approach.

The transoral approach can improve cosmetic satisfaction. It avoids the risk of marginal mandibular nerve injury because it is not exposed in the surgical field. The marginal mandibular nerve's position in a subplatysmal plane will remain untouched in the transoral technique.^[6,7] Advantages of the transoral approach include minimal risk of postoperative mucocele formation or inflammation of Wharton's duct.^[3,7] However in this technique, 88% of the patients

Table 1. Clinic data of patients

	Surgical approach					
	Transoral (n=10)			Transcervical (n=10)		
	n	Mean age	Range	n	Mean age	Range
Age (years)		45.4	18-70		44.1	30-66
Gender						
Female	4			3		
Male	6			7		
Indications						
Chronic sialoadenitis with sialolithiasis	7			8		
Chronic sialoadenitis without sialolithiasis	3			2		
Duration of hospitalization (days)	2.1			4		
Pathology						
Chronic sialoadenitis	3			2		
Chronic sialoadenitis with sialolithiasis	6			8		
Kuttner tumor with sialolithiasis	1			0		

complained of an abnormal tongue sensation due to compression or stretch injury of the lingual nerve during traction of the floor of the mouth and the tongue. Skeletonization of the lingual nerve should be limited during the operation to reduce this complication.^[3] In addition, the hypoglossal nerve is a critical structure that should be identified at all times and never injured. It causes transient or persistent limitation of tongue movement and anesthesia of the tongue. Transoral resection leaves no drain because postoperative drainage occurs spontaneously through the intraoral incision.

Another disadvantage of the intraoral approach is the greater difficulty in identifying and ligating the vessels. The facial artery and vein are located at the posterior of the gland making control of the vascular pole of the gland

more difficult than in transoral techniques. Slow and careful dissection prevents bleeding from the vessels and other complications.^[6,8]

According to the current study, the transcervical approach involves less morbidity than the transoral approach except for the incision scar. Relapsing sialoadenitis due to inadequate resection of the gland is the most striking complication. Indications for the transoral approach and the anatomy related to this surgical approach should be evaluated carefully to increase success. Patients who have malignant or likely malignant pathology of the submandibular gland, trismus, mandibular hypoplasia or benign submandibular tumors with size greater than 20 mm are not recommended for operation via transoral approach.^[9] Drains may be a reason for

Table 2. Complications of patients

Complications	Surgical approach	
	Transoral	Transcervical
	n	n
None	5	8
Diminished taste perception	2	0
Transient anesthesia of the tongue	2	1
Relapse chronic sialoadenitis (cause of not enough resection)	1	0
Transient paralysis of marginal mandibular branch of the facial nerve	0	1

longer hospital stay in patients undergoing transcervical approach.

Most patients who have SMG pathologies can be operated on via two approaches. The transoral approach may be recommended in patients who are concerned about surgical cosmesis. In the future, complication rates may decrease as the number of transoral operations increases.

In conclusion, the transoral approach for SMG excision has several advantages over the transcervical in terms of cosmetic outcome, marginal mandibular nerve injury, and hospital stay. The transoral approach can be recommended as an alternative to the transcervical approach. Our experience suggests that this approach is indicated for management of chronic sialoadenitis and sialolithiasis.

Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Papaspyrou G, Werner JA, Sesterhenn AM. Transcervical extirpation of the submandibular gland: the University of Marburg experience. *Eur Arch Otorhinolaryngol* 2014;271:2009-12.
2. Ellies M, Laskawi R, Arglebe C, Schott A. Surgical management of nonneoplastic diseases of the submandibular gland. A follow-up study. *Int J Oral Maxillofac Surg* 1996;25:285-9.
3. Kauffman RM, Netterville JL, Burkey BB. Transoral excision of the submandibular gland: techniques and results of nine cases. *Laryngoscope* 2009;119:502-7.
4. Weber SM, Wax MK, Kim JH. Transoral excision of the submandibular gland. *Otolaryngol Head Neck Surg* 2007;137:343-5.
5. Hong KH, Kim YK. Intraoral removal of the submandibular gland: a new surgical approach. *Otolaryngol Head Neck Surg* 2000;122:798-802.
6. Chang YN, Kao CH, Lin YS, Lee JC. Comparison of the intraoral and transcervical approach in submandibular gland excision. *Eur Arch Otorhinolaryngol* 2013;270:669-74.
7. Hong KH, Yang YS. Surgical results of the intraoral removal of the submandibular gland. *Otolaryngol Head Neck Surg* 2008;139:530-4.
8. Song CM, Jung YH, Sung MW, Kim KH. Endoscopic resection of the submandibular gland via a hairline incision: a new surgical approach. *Laryngoscope* 2010;120:970-4.
9. Lee JC, Kao CH, Chang YN, Hsu CH, Lin YS. Intraoral excision of the submandibular gland: how we do it. *Clin Otolaryngol* 2010;35:434-8.