

## Submandibular Gland Excision: 10-Year Outcome

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### Abstract

**Background:** Submandibular gland is the second largest salivary gland in human body. There are neoplastic and non-neoplastic diseases affecting the gland, while sialolithiasis is the most common non-neoplastic disease, pleomorphic adenoma is the most common neoplastic disease of the gland. The most common malignant tumor is adenoid cystic carcinoma.

**Material and method:** Patients who underwent submandibular gland operation at Cerrahpaşa Medical School between 2002 and 2012 were retrospectively analyzed.

**Results:** Of the patients, 40 were male and 50 were female. Neoplastic diseases were seen in 42 patients and non-neoplastic diseases were seen in 48. The most common neoplastic benign tumor was pleomorphic adenoma, and the most common malignant tumor was mucoepidermoid carcinoma. The most common non-neoplastic disease was sialolithiasis followed by sialadenitis.

**Conclusion:** While data were consistent with the literature in general, mucoepidermoid carcinoma was found to be the most common malignant tumor of submandibular gland, which was different from the literature.

**Keywords:** Submandibular gland; Outcome assessment (Health Care)

### Introduction

Submandibular gland is the second largest salivary gland in human body. Each submandibular gland weighs approximately 10-15 gm and is anatomically divided to two as superficial and deep parts by posterior part of mylohyoid muscle. Facial vessels, three important nerves including hypoglossal, lingual nerve and marginal mandibular branch of facial nerve proceed in medial part of submandibular gland. Lingual nerve crosses the canal from behind. Submandibular gland produces 71% of daily saliva and the secretion is composed of serous and mucoid components. Submandibular gland is not normally recognized however it may be palpated bimanually if it enlarges due to any diseases. Based on simple classification, diseases which affect the gland may be allocated to two groups as neoplastic and non-neoplastic salivary diseases [1]. Among them, the most common pathologies are sialolithiasis, sialadenitis, malignant and benign pathologies. Sialolithiasis is the most common salivary disease and the most common cause of salivary gland dysfunction [2,3]. 80% of salivary stones are seen in submandibular gland and they are most common in the hilus [2-4]. While 3% of all head and neck tumors are seen in salivary glands, 10% of salivary gland tumors are seen in submandibular gland [5,6]. 50% of tumors involving submandibular gland are malignant. The most common malignant tumor is adenoid cystic carcinoma [2]. The most common benign tumor is pleomorphic adenoma as in parotid gland [2]. The choice of treatment is total excision of the gland in pleomorphic adenoma in order to reduce recurrences [7].

Although submandibular gland excision is the indisputable treatment method for neoplastic salivary gland diseases, gland extirpation is not a standard treatment method for the patients with non-neoplastic diseases [8].

In this study, we retrospectively analyzed the patients who underwent submandibular gland excision.

### Material and Method

In this study, a total of 90 patients who underwent submandibular gland excision at Ear-Nose-Throat Department, Istanbul University Cerrahpaşa Medical School between 2002 and 2012 are presented. Patient records were retrospectively analyzed. The ethic committee of the Istanbul University Cerrahpaşa School of Medicine approved the design of the study before the onset.

Demographic profiles of the patients, surgical excisions, preoperative Fine Needle Aspiration Biopsy (FNAB) results, postoperative complications and histopathologic results were evaluated. Patients who underwent surgery due to non-neoplastic diseases were followed up for at least 6 months and the ones who underwent surgery due to neoplastic diseases were followed up for 2-3 years.

### Results

Of the patients, 40 were male and 50 were female with mean age of 43.58 years (range 5-89). Right submandibular gland of 42 patients and left submandibular gland of 48 patients were excised. While 48 patients underwent submandibular gland excision due to non-neoplastic salivary gland diseases, 42 patients underwent submandibular gland excision with preoperative diagnosis of neoplastic salivary gland diseases.

While calculi were detected in 29 patients on USG, submandibular

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gland abscess was detected in two patients who could not be diagnosed with USG were done Fine Needle Aspiration Biopsy (FNAB). In 59 patients who were performed needle biopsy, pleomorphic adenoma was detected in 25, chronic sialadenitis in 10, mucoepidermoid carcinoma in 4, adenoid cystic carcinoma in three, submandibular gland granulomatous disease in 1, acinar cell carcinoma in two, Sjögren's syndrome in one, carcinoma ex pleomorphic adenoma in one, Squamous Cell Carcinoma (SCC) metastasis in one and hemangioma in one, needle biopsy results of 10 patients were reported as 'insufficient' (Table 1).

Results of the patients who underwent submandibular gland excision with prediagnosis of non-neoplastic salivary gland disease were as follows: calculi (31), sialadenitis (12), submandibular gland tuberculosis (2), Sjögren's disease (1), submandibular gland abscess (2). Benign tumors were detected in 28 patients and malignant tumors were detected in 14 patients who underwent submandibular gland excision with pre-diagnosis of neoplastic salivary gland disease. Results of pathologic assessment were pleomorphic adenoma in 27 and cavernous hemangioma in one. Diagnosis of mucoepidermoid carcinoma was made in five of the malignant tumors, acinar cell carcinoma in four, adenoid cystic carcinoma in three, squamous cell carcinoma metastasis in one, carcinoma ex pleomorphic adenoma in one (Table 2).

Neuropraxia/paresis developed in marginal mandibular branch of facial nerve in 11 (12.2%) patients within first 24 hours postoperatively and while it completely resolved in 7 within 6 months, permanent mandibular injury was detected in 4 (4.4%). In addition, hematoma developed in operative area in 2 (2.2%). Hematomas were evacuated in the postoperative first week. Postoperative wound infection was seen in 4 (4.4%) patients (Table 3).

Pleomorphic Adenoma 25
Chronic Sialoadenitis 10
Mucoepidermoid Carcinoma 4
Granulomatous Disease 1
Sjögren's Syndrome 1
Acinar Cell Carcinoma 2
Carcinoma Ex Pleomorphic 1
Adenoid Cystic Carcinoma 3
Squamous Cell Carcinoma 1
Hemangioma 1
Insufficient 10
Total 59

**Table 1:** Fnap of neoplastic diseases fnap pathology patients (N).

Pleomorphic Adenoma 27 (30%) Sialolithiasis 31 (34.4%)
Mucoepidermoid Ca. 5 (5.5%) Sialoadenitis 12 (13.3%)
Adenoid Cystic Ca. 3 (3.3%) Tuberculosis 2 (2.2%)
Acinar Cell Ca. 4 (4.4%) Abscess 2 (2.2%)
Ca. Ex Pleomorphic Adenoma 1 (1.1%) Sjögren's syndrome 1 (1.1%)
Squamous Cell Ca. 1 (1.1%)
Heamangioma 1 (1.1%)
Total 42 (46.6%) 48 (43.3%)

**Table 2:** Histology of submandibular specimens neoplastic diseases N (%) Non-neoplastic diseases N (%).

Transient Palsy of Mandibular Branch 7 (7.7%)
Persistent Palsy of Mandibular Branch 4 (4.4%)
Wound Infection 4 (4.4%)
Hematoma 2 (2.2%)
Total 17 (18.8%)

**Table 3:** Postoperative complications following submandibulectomy complication No. of patients (%).

## Discussion

Patients who have problems with submandibular gland admit to the doctor with mainly two symptoms: Pain and swelling. Presence of pain and swelling during meals in submandibular gland, support sialolithiasis. Symptomatic sialolithiasis is still the most frequent indication for a submandibular gland resection despite other therapeutic procedures, such as sialendoscopy or lithotripsy [9-12]. A slowly progressing, painless swelling must suggest benign neoplasm.

Direct graphy, ultrasonography and computed tomography are frequently used for radiologic assessment. Calculi may be seen as radioopaque images on direct graphy in presence of sialolithiasis [1]. Ultrasonography is the most commonly used method in diagnosis of calculi and other lesions as it is inexpensive, non-invasive, and easily available. In our series, calculi was detected in 29 patients who were performed USG with prediagnosis of calculi and the diagnosis was verified with submandibular gland excision. The sensitivity of USG in the detection of calculi was 93.5% (29 out of 31 patients). 80% of all salivary gland stones are seen in submandibular gland. High frequency of sialolithiasis in submandibular gland may be explained by the secretion's being more mucous, richer from mucus and canal's being larger, partially gyros and ascending, canal entrance's being more narrow than the canal, organic substance amount's being abundant. The most common cause of surgical indication for submandibular gland is sialolithiasis [13,14]. In our series, the most common indication of submandibular gland excision was sialolithiasis (34.4%). The second leading pathology was pleomorphic adenoma with the ratio of 30%. Benign tumors were detected in 28 (66.6%) patients and malignant tumors were detected in 14 (33.3%) patients who underwent submandibular gland excision with pre-diagnosis of neoplastic salivary gland disease. Results of pathologic assessment were pleomorphic adenoma in 27 and cavernous hemangioma in one. Diagnosis of mucoepidermoid carcinoma was made in five of the malignant tumors, acinar cell carcinoma in four, adenoid cystic carcinoma in three, squamous cell carcinoma metastasis in one, carcinoma ex pleomorphic adenoma in one.

While 3% of all head and neck tumors are seen in salivary glands, 10% of salivary gland tumors are seen in submandibular gland [5,6]. Most of the studies quoted a malignancy rate of more than 50%. In our series 33.3% of the tumors were malignant, differently from the literature. The most common malignant tumor of the submandibular gland is adenoid cystic carcinoma [2]. The most common benign tumor is pleomorphic adenoma as in parotid gland [2]. Pleomorphic adenoma was detected to be the most common benign tumor also in our series (96%-among benign tumors). The most common malignant tumor was detected to be mucoepidermoid carcinoma, differently from literature. The surgical complications of transcervical submandibular gland excision for benign lesions vary: postoperative hematomas are seen in 0-14% and the risk of infection is between 0 and 14% [15-19]. The most common complication of submandibular gland resection is marginal mandibular nerve injury. It was found to be the most common complication also in our series. The second leading complication was wound infection.

In conclusion; when this retrospective study was analyzed, submandibular sialadenectomy is a safe operation with a low rate of complications. Our findings support the literature data in general however the most common malignant tumor was mucoepidermoid carcinoma in contrast to current literature.

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