

Spectrum of Salivary Gland Disorders at a Tertiary Care Hospital in Central Lahore

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ABSTRACT

Background: Salivary glands disorders remain a frequent presentation in general surgery outpatient departments. The disease spectrum varies from inflammatory pathology, ductal obstruction to benign and malignant neoplasms. Pleomorphic adenoma still remains on the top with its attendant risk of damage to facial nerve as the most feared complication. Selection of appropriate preoperative diagnostic investigation and suitable surgical procedure are the mainstay to achieve acceptable outcome. The aims of this study was to determine demographic details, clinical and histopathological features of salivary gland disorders and outcome of surgery at a tertiary care hospital in Central Lahore.

Patients and Methods: This prospective observational study was carried out in the Department of Surgery, Fatima Jinnah Medical University, Sir Ganga Ram Hospital Lahore over 4 years period. Sixty-one consecutive patients were admitted with various salivary gland disorders from January 2013 till December 2017. All patients were assessed by thorough history, physical examination and relevant investigations. Fine needle aspiration cytology was performed in all cases. All patients underwent surgery. Postoperative morbidity and mortality were recorded. Histopathology report was compared with preoperative diagnostic investigations to assess the investigation of choice. Follow up on all patients is available for variable period of time.

Results: Age of the patients ranged from 15 to 79 years (mean 34±1.4 years). There were 24 males and 37 females, male to female ratio of 1:1.65. Most of the patients (60.3%) presented in 2nd and 3rd decades. Swelling was the commonest clinical presentation and mean duration was 2±2.2 years. Pleomorphic adenoma was the most common benign tumor (86.2%), affecting parotid gland in 95.55% of cases. Mucoepidermoid carcinoma was the most frequent salivary gland malignant tumor (7%), predominantly affecting submandibular glands.

Conclusion: Salivary gland disorders are more frequent in middle age female population. Benign tumors remain the most common salivary gland pathology. Pleomorphic adenoma is the most common benign salivary gland tumor affecting predominantly parotid gland. Mucoepidermoid carcinoma is the commonest malignant salivary neoplasm and affects predominantly submandibular glands.

Keywords: salivary glands, presentation, tumors, histopathology, surgery, outcome, complications.

INTRODUCTION

Common adult salivary gland affections observed in the surgical outpatients include inflammatory and neoplastic etiologies. The presentation is usually recurrent, chronic or progressive disease. Recurrent or chronic sialadenitis is more frequently inflammatory rather than infectious and obstructing sialolithiasis is more likely etiology. Management is mainly directed towards treating the obstruction. Benign and malignant neoplasms affect the salivary glands and frequently present as painless solitary neck masses. Diagnosis is made initially by fine needle aspiration cytology. Common imaging

modalities, employed selectively, include ultrasonography, computed tomography and magnetic resonance imaging. The prevalence of salivary gland tumors ranges from 0.4 to 14 cases per 100,000 population per year.¹ Among all the salivary gland disorders the commonest benign and malignant tumors are Pleomorphic adenoma and mucoepidermoid carcinoma are the most common benign and malignant salivary gland neoplasms respectively.² Nearly 80% involves parotid glands, whereas another 10% to 20% affect submandibular and sublingual glands.¹⁻⁴

Salivary gland tumors presenting as progressive painless swelling remain the most frequent cause of seeking surgical advice in the local population. Surgical excision remains the mainstay of treatment. The purpose of this study is to report the demographic details, clinical presentation, diagnosis and treatment outcome of salivary gland disorders in the patient population presenting to a tertiary care hospital in the Central Lahore.

PATIENTS AND METHODS

This prospective descriptive observational study was carried over 4-year period in the Surgical Unit 2 of the Department of General Surgery, Sir Ganga Ram Hospital Lahore from January 2013 till December 2017. Sir Ganga Ram Hospital is a tertiary care teaching hospital affiliated with Fatima Jinnah Medical University and caters a large population of patients from Central Lahore. After getting approval from Institutional Review Board, all consecutive patients presenting with salivary gland disorders requiring surgical treatment were included. All patients underwent evaluation by a detailed history and physical examination complemented by relevant investigations, including fine needle aspiration cytology (FNAC) in all cases, ultrasonography (USG) and computed tomography (CT) in selective cases where other investigations were either inconclusive or inconsistent with clinical diagnosis and to confirm the extent of disease in patients with extensive neoplastic growths. Frozen section, though available, was not used in any patient due to availability of conclusive FNAC reports. All patients underwent the appropriate surgical procedure. Prophylactic antibiotic included three doses of injection amoxiclav administered at induction and continued for two more doses in all patients. Superficial conservative parotidectomy was employed for tumours involving the superficial lobe of parotid gland, whereas deep lobe tumours were dealt with total conservative parotidectomy. Facial nerve was identified in all patients. No specific nerve detection technology was used. Bipolar cautery and adrenaline soaked gauze (1:10,000) were used to achieve intraoperative hemostasis. Submandibular and sublingual gland pathologies were treated with appropriate excisional surgery. The relevant nerves were saved by employing standard technique recommended for the flaps and dissection during resection. A low-vacuum suction drain was kept in all cases after excisional surgery and removed on second or third day or when the

discharge was reduced to less than 5 ml in 24 hours. Skin sutures were removed on 7th day. Postoperative complications were recorded. For the purpose of this study, transient nerve palsy was defined as temporary loss of nerve function identified and saved during surgery and gaining substantial or complete recovery in six-month time. Permanent palsy was defined as documented or inadvertent nerve damage resulting in permanent loss of nerve function. Wound infection was graded as mild (treated with appropriate empirical antibiotics), moderate (necessitating suture removal, drainage and antibiotics according to culture sensitivity) and severe (requiring debridement and specific antibiotics). Cuticular necrosis was defined as change of skin color with marginal blackening recovering with watchful waiting only. Flap necrosis was defined as necrosis of the flap treated with surgical debridement and repair. The specimens were examined by the institutional histopathology department to report the nature of disease. All patients were followed in the outpatients. Patients with confirmed tumours on definite histopathology were followed initially every month for first six months and then every six months. No specific measure apart from physiotherapy was adopted for transient nerve palsy. The quantitative data was analyzed using SPSS version 22.

RESULTS

A total of 61 patients were admitted with mean age of 34 ± 1.4 years (range 15–79 years) during the four-year period. There were 24 males (39.3%) and 37 females (60.7%); male: female ratio being 1:1.65. Most of the patients (75.4%) presented in 2nd (16 patients) and 3rd decades (20 patients). Right-sided pathologies were observed in 31 patients (50.8%), reflecting almost similar affections on each side. Swelling was the commonest presentation observed in all patients (100%) with mean duration of 2 ± 2.2 years. Most of the swellings (87%) were firm on palpation and frequently exhibited a slow growth pattern (67%). Pain, facial nerve involvement, fixity, skin involvement, cystic features, and cervical lymphadenopathy included various other significant findings (Table 1). FNAC performed in all patients accurately reported inflammatory pathology but missed all 4 mucoepidermoid cancers among 57 neoplastic lesions (false negative rate of 7% and sensitivity of 93% for major salivary gland neoplasms). Two patients with

palpable discrete level II cervical lymph nodes at presentation had inflammatory pathology on FNAC of the lymph nodes; both had obstructive sialadenitis of submandibular glands. CT scan was performed selectively in 17 patients and changed the operative decision in 5 patients (3 for total parotidectomy after identifying deep lobe involvement, one for submandibular gland excision in a patient with clinical diagnosis of submandibular lymphadenopathy and one for excision of sublingual and submandibular gland upon identification of plunging ranula involving ipsilateral glands with initial clinical diagnosis of sublingual gland only). Benign salivary gland disorders comprised 93% (57 patients) cases whereas malignant pathology was reported in only 4 patients (7%). Among 57 benign disorders requiring surgery, 53 (93%) were benign salivary gland tumors, 2 (3.5%) were inflammatory and rest 2 (3.5%) were benign cysts. Accordingly, 43 patients underwent superficial conservative parotidectomy and 3 had total conservative parotidectomy for lesions involving the deep lobe of the gland. Excision of submandibular gland was performed in 9 patients; 7 for neoplasms and 2 for obstructive sialadenitis. Two patients each underwent superficial parotidectomy and submandibular gland excision for mucoepidermoid carcinoma. This is worth noting that all these mucoepidermoid cancers were reported on definite histopathology following conservative excisional surgery according to preoperative FNAC report. No completion was advised by the tumour board held at oncology centre due to low grade nature and complete oncological clearance reported in the histopathology. These patients however were kept

under close surveillance. Only two patients underwent excision of sublingual glands for benign lesions affecting the gland. Among the benign tumours, pleomorphic adenoma was the commonest histopathological finding (87%) in the parotid glands followed by submandibular (13%) glands. Malignant pathology was more frequent in submandibular glands (18.2%) followed by parotid glands (4.2%) and mucoepidermoid carcinoma comprised the most frequent (6.6%) histopathological type reported in all 4 patients with malignant lesions. Table 2 summarizes the age-wise distribution of salivary gland pathologies observed in 61 patients. Table 3 depicts the histopathology of excised lesions in all 61 patients; pleomorphic adenoma being the most frequent pathology (87%) affecting the major salivary glands in adult population.

Overall early operative morbidity (thirty days of surgery) was 34.4%. Transient facial nerve paresis was observed in 13 patients (21.3%); 11 following superficial and 2 after total parotidectomy. All, except 2, had involvement of only one or more branches. All patients had almost complete recovery (no grossly detectable cosmetic problem) in six months period (mean 24 weeks). Permanent facial palsy involving trunk (1 patient) and major branches (2 patients) was observed in additional 3 (4.9%) patients (2 after superficial and 1 after total conservative parotidectomy). Two of these patients were found to have mucoepidermoid carcinoma on definite histopathology and in both patients the intraoperative damage was recorded due to extensive involvement of the nerve branches.

Table 1: Clinical features of salivary glands disorders

Clinical features	Number of patients	Percentage
Swelling	61	100
Pain	10	16.39
Slow Growth Pattern	42	68.85
Facial nerve involvement	1	1.63
Fixity to underlying structures	2	3.27
Skin involvement	2	3.27
Transillumination in a clinical solid swelling	2	3.27
Cervical lymphadenopathy (Level II)	2	3.27
Consistency		
Soft	4	6.55
Firm	53	86.88
Hard	4	6.55

Table 2: Age-wise distribution of salivary gland disorders

Age (Years)	Histopathology					Total
	Pleomorphic adenoma	Mucoepidermoid carcinoma	Chronic sialadenitis	Lymphoepithelial cyst	Epidermal inclusion cyst	
<20	8 (16.0)	0	0	0	0	8 (13.8)
21-40	30 (49.1)	2 (50)	2 (100)	1(100)	1(100)	36 (59.01)
41-60	12 (19.67)	2 (50)	0	0	0	14 (22.95)
>60	3 (6.0)	0	0	0	0	3 (5.2)
Total	53	4	2	1	1	61 (100)

(values in parenthesis represent percentage of lesions for patient in each column)

Table 3: Frequency of salivary glands pathology according to histopathology

Salivary gland disorders	Total Number (%)	Parotid gland (%)	Submandibular gland (%)	Sublingual gland (%)
<i>Benign</i>				
Pleomorphic adenoma	53 (86.9)	46 (75.4)	7 (11.5)	0
Chronic sialadenitis	2 (3.5)	0	2 (3.3)	0
Lymphoepithelial cyst	1 (1.75)	0	0	1 (1.6)
Epidermal inclusion cyst	1 (1.75)	0	0	1(1.6)
<i>Malignant</i>				
Mucoepidermoid carcinoma	4 (7)	2 (3.5)	2 (3.5)	0

Table 4: Early postoperative complications (overall morbidity = 34.4*)

Complication	Number	Percentage
Transient facial nerve palsy	13	27.1*
Permanent facial nerve palsy	3	6.35*
Marginal mandibular nerve damage	3	27.3*
Wound hematoma	4	6.6
Sialocele	2	3.3
Wound infection:	5	8.2
Mild	4	6.6
Moderate	1	1.6
Cuticular blackening (mastoid part of s-shaped parotid incision)	2	3.3
Salivary (parotid) fistula	1	1.64

*percentages calculated for total number of parotid (48) and submandibular gland (11) surgeries



Figure 1: CT scan of a patient with right pleomorphic adenoma in a suspicious (Bimanually palpable) case. The scan confirms tumour confined to superficial lobe only (white arrow) changing the initial operative plan of total parotidectomy to superficial parotidectomy.

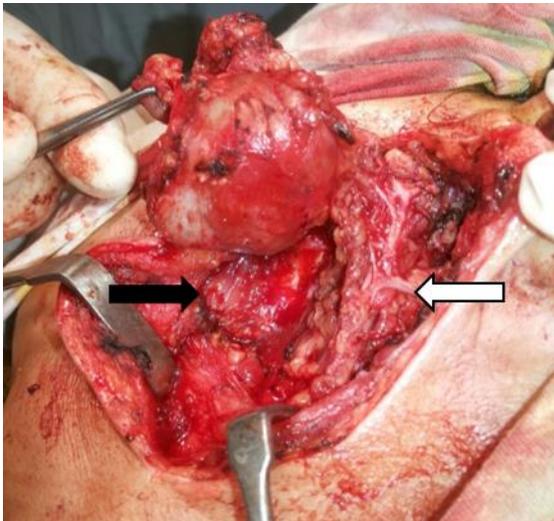


Figure 2: Total conservative parotidectomy for deep lobe pleomorphic adenoma. Black arrow shows deep lobe, White arrow shows facial nerve trunk and subsequent branches.

Permanent marginal mandibular nerve damage was evident in 1 out of 11 patients (9%) undergoing submandibular gland excision; whereas 2 (18.2%) additional had transient nerve

paresis with complete recovery in 6 months follow up. Table 4 summarizes main postoperative complications observed in 61 patients.

Follow up is available from 2 to 48 months (mean, 23 months). Fourteen patients (4 with inflammatory and 10 with benign neoplasms) were lost to follow up after initial 30 months. Nine additional patients (8 with benign, 1 with malignant lesion) disappeared after initial follow up of 37 months. Complete follow up is available in rest 38 patients (62.3%). All four patients diagnosed with low grade mucoepidermoid cancer had complete follow up (mean 32 months) with no observed recurrence. One of these patients opted for radiotherapy advised upon seeking second opinion from a private oncological centre. No recurrence was observed in any patient within the follow up period.

DISCUSSION

The major salivary glands include paired parotid, submandibular and sublingual glands. Adult salivary gland pathologies present frequently in any busy tertiary care hospital outpatient department. Neoplasms remain the most common affections. Both benign and malignant tumors can involve the glands. Relatively younger population with mean age of 34 years is affected in this study. This finding is younger than that reported by Ashkavandi and colleagues (41.8 years) and Shrestha and associates (44.8 years).^{5,6} Female preponderance observed in this study also is contradictory to international reports with male predominance.⁶⁻⁸ However both findings, younger age and female preponderance are consistent with various local studies.⁹⁻¹¹ Though the mean age is younger than other reports, still the decade-wise distribution in this study is largely similar to that of Kumar and group (majority of patients received in 2nd (25%) and 3rd (18.3%) decade) and Souvagini and colleague with maximum number of patients reported in 3rd (31%) and 4th decades (39.8%).^{12,13} However, Lawal and associates reported majority of patients in 5th and 6th decades (53.5%).

No statistically significant side predilection was observed in this study. Parotid remained the most commonly affected gland (78.7%) followed by submandibular gland (18%) which is well supported by other studies as well.^{3-8,12,14} In this study the clinical features noted were slowly growing lumps (69%) with mean duration of 2 ±2.2 years, firm on palpation (87.9%) and other features

including nerve involvement, fixity, cervical lymphadenopathy are consistent with studies of Souvagini and associates and Wahiduzzaman and colleagues.^{13,15} On histopathological examination among the neoplasms, 53 neoplasms (86.9%) were benign (all pleomorphic adenomas) and only 4 (6.6%) were malignant. Pleomorphic adenoma remained the commonest benign tumor affecting parotid glands (95.5%) followed by submandibular glands (63.3%). These findings are similar to those of various national and international other studies.⁴⁻¹⁴ In a large study of 235 patients, Etit and group reported 146 cases (62.1%) as benign and 89 (37.87%) as malignant.¹⁶ The authors further reported that among the major salivary glands, parotid gland was commonly affected 82.38%, followed by submandibular gland 17.62%. They found that the two most common benign tumors were pleomorphic adenoma (67.12%) and Warthin's tumor (21.23%).¹³ No Warthin tumour or any other benign tumour type was observed in present study. Predominance of benign pleomorphic adenoma and identification of no other benign neoplasm in the present study may reflect merely a small sample size or a true epidemiological change in disease pattern. In this study the overall incidence of malignancy was 6.9% and mucoepidermoid carcinoma was the most common malignant tumor. Mucoepidermoid carcinoma was predominantly found in submandibular glands (22.2% of all submandibular neoplasms; 2 of 9 patients), followed by parotid (4.2% of all parotid neoplasms; 2 of 48 patients). These results are in conformity with various national and international reports.^{9-11,15-17} However, again it is worth noting that only one malignant tumour type (mucoepidermoid carcinoma) was observed in this study, both in parotid and submandibular glands. Sole reliance on FNAC for confirmation of preoperative diagnosis is highlighted to be discouraged in this study. Clinical correlation and liberal use of complementary imaging, especially CT scan, is emphasized in equivocal diagnosis as it may change the surgical decision, affecting the postoperative outcome. Transient facial nerve palsy (27.1%) following parotid gland surgery in this study is well within reports of 1.6%-33.3% reported by national and international studies.^{9-11,18,20} Other complications including wound hematoma, infection, sialocele are also consistent with various local and international reports.^{9-11,18,20} However, permanent palsy (9%) and transient paresis (18.2%) of

marginal mandibular branch of facial nerve following excision of submandibular gland observed in this study is more than 4.4% permanent and 7.7% transient damage reported by Yilmaz and colleagues in a study of 90 patients undergoing submandibular gland surgery.²⁰ This could partly be explained by smaller sample size in present study but highlights need of more expertise and skill required in submandibular gland excision, especially in inflammatory pathologies.

CONCLUSION

Results of this study highlight spectrum of salivary gland pathologies in local patient population. A relatively younger mean age at presentation, female preponderance, and single predominant tumour type (pleomorphic adenoma among benign and mucoepidermoid carcinoma among malignant) are significant findings. The authors recommend a careful approach regarding use of FNAC as sole diagnostic modality, complementary use of CT scan in doubtful clinical diagnosis and a keen follow up of definite histopathology for diagnostic surprises. Multidisciplinary approach with tumour board advice for individualized management is encouraged.

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