

Original Research Article

Clinicopathological profile of salivary gland lesions: a prospective study on parotid gland tumors in Kashmir

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ABSTRACT

Background: The parotid gland and the other salivary glands provide a crucial role in the oral cavity by secreting saliva that makes eating, swallowing, speaking, and digesting easier. In order to explore the prevalence of parotid gland tumours by age and gender, clinical modes of presentation, surgical treatments, histological pattern of parotid gland tumours, assess treatment success, and assess consequences, a prospective clinicopathological research was conducted. **Methods:** The study was conducted among patients who presented in the outpatient department of ear, nose and throat (ENT) and head and neck surgery (HNS), Government Medical College (GMC), Srinagar with lesions of the salivary glands. The present study was an observational study conducted over a period of 18 months w.e.f. May 2020 up to October 2021.

Results: A total of 220 subjects were enrolled in the present study. More than half of patients were males. The participants were (33.89±15.7) years old on an average. Males predominated over females among the recruited individuals (59% versus 41%). Sub-mandibular gland lesions were most common in the patients (50.4%), followed by parotid gland lesions (38.6%), minor salivary gland lesions (6%) and sub-lingual gland lesions (5%). Pleomorphic adenoma was the most prevalent neoplastic lesion (29.4%). The most prevalent non-neoplastic lesion was parotitis (21.1%).

Conclusions: More often than malignant tumours, benign parotid tumours are more common. Malignant parotid tumours usually present at a later clinical stage and begin to develop at a younger age than other tumour types. Accurate clinical diagnosis, with the use of fine needle aspiration cytology (FNAC) and imaging as needed, is essential for effective therapy. The primary therapeutic option is a safe operation called a parotidectomy.

Keywords: Salivary gland tumours, Histopathology, Parotid gland tumors, Parotidectomy

INTRODUCTION

The exocrine salivary glands use a network of channels to create saliva. There are hundreds of small salivary glands in addition to the three pairs of main salivary glands (parotid, sub-mandibular, and sublingual).¹ All salivary glands are derivatives of ectoderm. Salivary glands can be classified as serous, mucous and seromucous (mixed). The two parotid glands are the largest of the salivary glands wrapped around the mandibular ramus in humans.² It is situated in the retromandibular fossa, which is mostly

filled by this gland. The masseter muscle, the zygomatic arch, and the sternocleidomastoid muscle surround it on both sides. The superficial lobe, on the other hand, extends anteriorly and covers the masseter muscle's back and the mandibular ramus.¹

The parotid gland and the other salivary glands provide a crucial role in the oral cavity by secreting saliva that makes eating, swallowing, speaking, and digesting easier.² The parotid gland and facial nerve have a special relationship since the facial nerve runs through the body of the gland,

which necessitates careful attention while doing parotidectomies or other surgeries in the area.³ Parotid tumour incidence ranges from 1 to 3 incidences per 100,000 per year.³ Parotid gland tumours have a significant degree of morphological variability, which makes diagnosis and treatment difficult. Their vast spectrum of biologic activity and relative rarity make diagnosis and treatment challenging. The mainstay of treatment for parotid tumours is surgery. Fear of causing facial nerve damage may result in subpar surgery and a high likelihood of recurrence. In order to explore the prevalence of parotid gland tumours by age and gender, clinical modes of presentation, surgical treatments, histological pattern of parotid gland tumours, assess treatment success, and assess consequences, a prospective clinicopathological research was conducted.

METHODS

The study was conducted among patients who presented in the outpatient department (OPD) of ear, nose and throat (ENT) and head and neck surgery (HNS), Government Medical College (GMC), Srinagar with lesions of the salivary glands. The present study was an observational study conducted over a period of 18 months w.e.f. May 2020 up to October 2021.

Inclusion criteria

The study included patients who presented with congenital lesions, traumatic lesions, inflammatory lesions, granulomatous lesions and tumorous lesions of the salivary glands. The study was age unrestricted i.e., it included patients of all age groups. The study included patients with new lesions of salivary glands as well as patients previously diagnosed and treated for salivary gland lesions and had again developed the same or different salivary gland lesion.

Exclusion criteria

Patients who did not give consent were excluded from the study.

Sample size

No fixed number of cases was decided for the study. All the patients presenting with salivary gland lesions to the OPD of the concerned unit of department during the study period were considered for study. After taking an informed written consent, such cases were screened for inclusion and exclusion criteria. Only those patients who gave the consent and fulfilled the criteria were taken into the study. Thus, a total of 220 patients were taken for the study.

Ethical clearance

Ethical clearance was obtained from the institutional ethical committee of GMC, Srinagar, before the start of study.

The study commenced with taking an informed consent from the patients in the local language. This was followed by taking an exhaustive history with focus on the following points: demographic data which included name, age, district of residence; onset of the lesion in terms of sudden or gradual; duration of the lesion in months; progression of the lesion whether progressive or non-progressive; and symptoms associated with the swelling including pain, fever, mouth dryness, dysphagia, facial weakness.

After taking the history examination of the lesion was done which included the following.

Inspection with focus on following - gland involved (parotid/sub-mandibular/sub-lingual/minor salivary gland); shape of the lesion (globular/irregular); skin/mucosa over the lesion (normal/infiltrated/red/bluish); and surface over the lesion (smooth/irregular).

Palpation was done to inspect the following - size of the lesion; shape of the lesion (spherical/ovoid/irregular); surface of the lesion (smooth/globular/irregular); margins of the lesion (well defined/poorly defined); consistency (hard/soft/cystic); fixity to skin/mucosa/underlying structures (adherent/non adherent); mobility of the lesion (mobile/non mobile); and bimanual palpation (sub mandibular gland) (palpable/non palpable).

The following investigations were performed wherever indicated to evaluate the salivary gland lesions: X-ray floor of the mouth (occlusal view), sialography, ultrasonographic examination (USG); USG guided fine needle aspiration cytology (FNAC)/aspiration, FNAC, non-contrast/contrast enhanced computed tomography (CECT), cone beam computed tomography (CT), plain/contrast enhanced magnetic resonance imaging and MR sialography.

Radiological imaging of lesions was done in the department of radiodiagnosis, GMC, Srinagar. FNAC of lesions was done in the department of pathology, GMC, Srinagar. Salivary gland lesions were managed either conservatively with medications or surgically.

Treatment/management

The kind of tumour, grade, and stage of the malignant tumour were taken into consideration while choosing a treatment modality in this study. Medical treatment included; antibiotics and non-steroidal anti-inflammatory drugs (NSAIDs) for suppurative and inflammatory lesions for 10-14 days. Parotidectomy was one of the available treatment options, either by itself or in combination with postoperative chemoradiotherapy. Enucleation was performed for capsulated tumors and incision and drainage for parotid abscesses. The removed tumour samples were forwarded for histological confirmation and pathological staging. Following surgery, all the patients were evaluated for early and late complications. Malignant cases were referred to oncology department, for postoperative

radiotherapy/chemotherapy. All patients were asked for follow-up every month for the 1st year, every 3 months in the 2nd year to detect morbidity and recurrence. The data obtained were descriptively analyzed using statistical package for the social sciences (SPSS) software version 20.0 (IBM Corp., Armonk, NY, USA).

Statistical analysis

Data obtained was entered into Microsoft excel spreadsheet and exported to data editor of SPSS version 23. Categorical variables were described as frequencies and percentages. Continuous variables were described as mean and standard deviation. Chi square test was used to analyze the relationship between two categorical variables and t test was used to compare two continuous variables. Appropriate graphics like pie chart, bar chart and box plots were used to describe and present the data. A p value of <0.5 was considered as statistically significant. Analysis was done using SPSS.

RESULTS

A total of 220 subjects were enrolled in the present study. More than half of patients were males. The participants were (33.89±15.7) years old on an average. Males predominated over females among the recruited individuals (59% versus 41%). Out of all the enrolled subjects, Srinagar (14.5%) had the highest percentage of subjects, followed by Baramulla (12.7%), Budgam (10.9%), and Anantnag (10.9%). Sub-mandibular gland lesions were most common in the patients (50.4%), followed by parotid gland lesions (38.6%), minor salivary gland lesions (6%) and sub-lingual gland lesions (5%). However, in this paper we have exclusively and comprehensively studied parotid gland lesions. Out of 85 parotid gland lesions; (52.9%) had right laterality, (44.7%) had left laterality and around 2.35 had bilateral laterality.

Table 1: Distribution of patients according to gender (n=220).

Sex	Frequency	Percentage
Male	130	59
Female	90	41
Total	220	100.0

Table 2: Age distribution (n=220).

Number (N)	N
Minimum age in years	2
Maximum age in years	75
Mean age in years	33.89
Standard deviation	15.712

Swelling (81.7%) and discomfort (45%) were the two most frequently reported symptoms among the 85 individuals with parotid gland abnormalities. Fever (41.2%), dysphagia (21.2%), facial paralysis (10.6%), and mouth

dryness (3.5%) were other symptoms. Among patients with parotid gland lesions, 62 underwent USG examination.

On USG examination, parotitis was present in 29.5% and parotid abscess was observed in 27.9%.

Table 3: Presenting symptoms among patients with parotid gland lesion.

Symptoms	Type	Frequency
Swelling	Present	78
	Absent	7
Pain	Present	40
	Absent	45
Fever	Present	35
	Absent	50
Dysphagia	Present	18
	Absent	67
Facial weakness	Present	9
	Absent	76
Mouth dryness	Present	3
	Absent	82

Table 4: MRI/CEMRI features in patients with parotid gland lesions (n=33).

MRI/CEMRI	Frequency
Heterogeneously enhancing lesion	6
Pleomorphic adenoma	20
Lymphangioma	3
Homogenous enhancement	4
Total	33

Among patients with parotid gland lesions 33 underwent MRI/CEMRI, pleomorphic adenoma was seen in the majority of the individuals (60.6%). Additionally, 18.2% of lesions had heterogeneously enhancing lesions, 12.1% had heterogeneous enhancement, and 9.1% had lymphangiomas. Eleven (11) individuals who had parotid gland lesions underwent CT/CECT and of them (54.5%) had hypodense lesions with peripheral enhancement.

Table 5: Distribution of parotid gland lesion patients according to the FNAC report (n=45).

FNAC	Frequency
Pleomorphic adenoma	18
Warthins tumor	3
Mucoepidermoid carcinoma	2
Benign epithelial cells	3
Malignant lesion	2
Chronic sialadenitis	1
Inconclusive results	12
Blood aspirated with epithelial cells and lymphocytes	4
Total	45

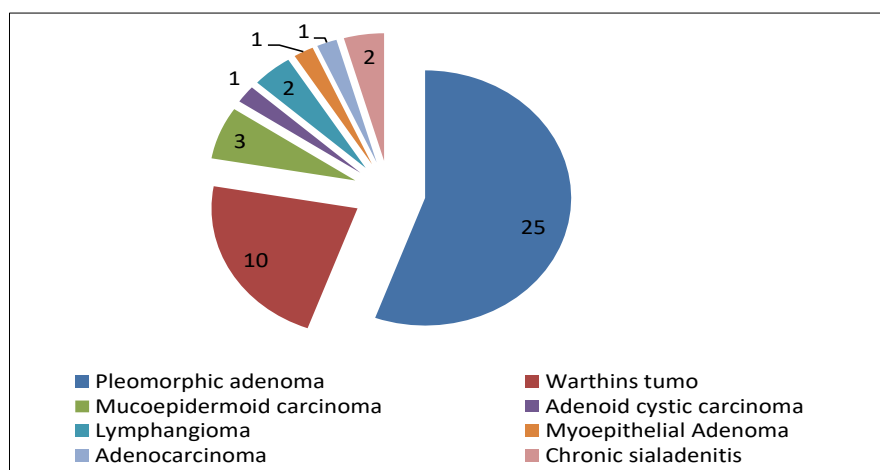


Figure 1: Distribution of patients (45) with parotid gland lesions according to the HPE report.

Around 45 individuals who had lesions of the parotid gland underwent FNAC. Pleomorphic adenoma was observed in 40% of patients, whereas FNAC was inconclusive in 26.7% of patients. The outcomes are shown in Table 9. Out of the total number of patients with parotid gland lesions (85), 27.1% received medicinal care, and 72.9% had surgical care. The majority of surgically treated patients (40%) got a superficial parotidectomy.

On histological investigation (45); pleomorphic adenoma was found in the majority of participants (55.5%), followed by Warthins tumour (11.8%), mucoepidermoid carcinoma (6.7%), and adenoid cystic carcinoma (2.2%) in patients with parotid gland abnormalities who had surgery. Of the 85 cases of parotid gland lesions; neoplastic lesions made up 50.6% and non-neoplastic lesions made up 49.4%. Pleomorphic adenoma was the most prevalent neoplastic lesion (29.4%). The most prevalent non-neoplastic lesion was parotitis (21.1%).

DISCUSSION

In our investigation, 220 individuals with benign and malignant salivary gland lesions were recruited, and their clinical characteristics were recorded. The patient distribution with respect to gland involvement and lateralization was assessed. And it was found that sub-mandibular gland lesions were most common in the patients (50.4%), followed by parotid gland lesions (38.6%), minor salivary gland lesions (6%) and sub-lingual gland lesions (5%). However, in this paper we have exclusively and comprehensively studied clinicopathological features of parotid gland lesions. Out of 85 parotid gland lesions; (52.9%) had right laterality, (44.7%) had left laterality and around 2.35 had bilateral laterality. There were about comparable numbers of patients from different districts in Kashmir Province who had salivary gland lesions. Srinagar had the highest proportion of individuals with salivary gland lesions (14.5% of all cases), followed by Baramullah (12.7% of all cases). The individuals in our study ranged in age from

33.89 to 15.7 years, with an average age of the subjects as 33.89 ± 15.7 years. Majority of the patients were in the age group 20 to 40 years. Bobati et al in their study reported similar results with the mean age of patients around 43 years.⁴ Similar to our study, Subhasraj in his study included 684 cases and Sando et al in their reported that the mean age of likewise patients as 46 years and 37.4 years respectively.^{5,6} In our investigation, the patients who presented with abnormalities of the salivary glands were overwhelmingly male compared to females (59% versus 41%). Among neoplastic lesions male to female ratio for benign lesions was 1.3:1 and for malignant lesions it was 1.4:1. Likewise to our study, Otoh et al in a tertiary care hospital in Nigeria, discovered a male to female ratio of 1.4:1.88 which is consistent with our study.⁷ Similarly, Tian et al reported that males outnumbered females among patients with salivary gland neoplasms in their study which is also comparable with our study.⁸ Albeit, in contrast to our study, a recent Indian study that included a total of 73 salivary gland tumours, revealed female preponderance in their cohort with a male to female ratio of 1:1.89.⁹ Male to female ratio was found to be 1:1.08 in another due to Laishram et al.¹⁰ While several research have produced conflicting findings about the occurrence of salivary gland lesions in men and women, it is still necessary to further investigate the role of gender in such disparities, if any. More replicative studies with a high sample size are needed to better understand the impact of gender on the occurrence of salivary gland lesions because the majority of the research conducted to date are underpowered and based on small sample sizes. Out of 85 parotid gland lesions; (52.9%) had right laterality, (44.7%) had left laterality and around 2.35 had bilateral laterality. Swelling (81.7%) and discomfort (45%) were the two most frequently reported symptoms among the 85 individuals with parotid gland abnormalities. Fever (41.2%), dysphagia (21.2%), facial paralysis (10.6%), and mouth dryness (3.5%) were other symptoms. In a likewise study by Venketesh et al, parotid gland's gradual steady swelling was the most typical clinical manifestation followed by parotid gland's pain, which is in line with our study.¹¹ Pain is mostly experienced by patients with malignant parotid

gland cancer than benign tumours as also reported by Spiro's research that malignancy is indicated by pain, facial palsy, involvement of lymph nodes, fixity, and deep lobes.^{12,13} Potdar reported that the incidence of pain in malignant parotid neoplasm is 25%–33% and facial nerve paralysis is 20–33%.¹⁴ The clinical characteristics observed in the present study are comparable to studies by Lin et al, Mag et al, Takahama et al and Drivas et al.^{15–18} Neoplastic lesions made up 43 (50.6%) of the parotid gland lesions in this research and around 42 (49.4%) were non-neoplastic tumours. Overall, neoplastic lesions were most prevalent in parotid glands (60.6%) in our research, followed by sub-mandibular glands (19.7%), minor salivary glands (15.5%), and sub-lingual glands (4.2%). Similar to our study, Subhashraj reported that salivary gland tumors are more common in parotid glands but unlike our study he found that after parotid glands, minor salivary glands are more frequently involved.⁵ Kalburge et al also reported neoplastic salivary gland tumors are more common in parotid glands and likewise to our study, authors reported sub-mandibular glands are more frequently involved than minor salivary glands.⁹ Ito et al also reported that salivary gland tumors are more common in parotid glands but again unlike to our study found neoplastic lesions of minor salivary glands more common than sub-mandibular glands.¹⁹ Spiro in his study also reported that salivary gland neoplasms most commonly involves the parotid glands followed by sub-mandibular glands which is similar to our study.¹³ Of the non-neoplastic parotid glands (42), 38 were benign and 5 were malignant in nature. The parotid gland is more likely to develop benign tumours than malignant ones. Similar to this, Venkatesh et al, Drivas et al, Gieriek et al, and Mag et al, reported that benign tumours outnumbered malignant tumours.^{8,11,16,18,20} Venkatesh et al in their study reported that the proportion of patients with benign tumour was 77.97% and that of malignant tumours was 22.03%.¹¹ According to reports, 80% of benign tumours occur in the parotid gland occur and (75% to 85%) of all parotid lesions on average are benign tumours.²¹ Similar to our study, Nagler et al in their study reported benign parotid neoplasms (73.5%) were more common than malignant neoplasms (26.5%).⁹⁸ However unlike our study, Nagler et al reported that the most frequent site of salivary gland neoplasms were minor salivary glands.²² Similarly, Costas et al in their study reported benign neoplasm (70.5%) were more common than malignant neoplasms (29.5%) and overall the most frequently involved glands were parotid glands.²³ Pleomorphic adenoma was the most prevalent benign tumour of the parotid glands, according to our study. In our analysis, the majority of parotid gland tumors—about 58.13%—were pleomorphic adenomas. This is consistent with research by Drivas et al, Gieriek et al, Mag et al, and Takahama et al which found that PA was the most prevalent benign tumour, followed by Warthin's tumour and BCA.^{16,18,20} Similarly, Laishram et al in their study reported that the most common neoplasm involving salivary glands is pleomorphic adenoma and most commonly involves the parotid gland.¹⁰ Kara et al in their study also found that pleomorphic adenoma was the most

common neoplastic lesion of salivary glands and most commonly involves the parotid glands.²⁴ In our study Warthin tumor accounted for 23.3% of all parotid neoplasms and was the 2nd most common benign parotid neoplasm after pleomorphic adenoma. Similar to our investigation, Vargas et al found that the second most frequent benign tumour of the parotid glands was a Warthin tumour.²⁵ The second most frequent benign tumour of the parotid glands, according to research by Ito et al, is the Warthin tumour.¹⁹ It's interesting that among the participants in our research who had parotid gland abnormalities, we did not discover any basal cell adenomas. In 2% of individuals, there was a myoepithelial adenoma. Similar to our study, Bradley et al in their study found the incidence of myoepithelial adenoma in patients with salivary gland neoplasms to be 1-3%.²⁶ The varied presentation in such tumors can be attributed to differences in the sample size of different studies.

The findings of our study are limited due to a small sample size.

CONCLUSION

Due to dietary and lifestyle changes, parotid salivary gland tumours are becoming more common and developing in younger age groups. More often than malignant tumours, benign parotid tumours are more common. Malignant parotid tumours usually present at a later clinical stage and begin to develop at a younger age than other tumour types. Accurate clinical diagnosis, with the use of FNAC and imaging as needed, is essential for effective therapy. The primary therapeutic option is a safe operation called a parotidectomy. The intraglandular position of the tumour informs the choice of parotidectomy type. The most prevalent benign and malignant parotid tumours are PA and MEC, respectively. Parotidectomy is used to treat benign parotid tumours. The stage and histological grade of the malignant parotid tumour determine how it should be treated; those who are in the advanced stage are given adjuvant chemoradiotherapy and complete parotidectomy with MRND.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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