

“HISTOMORPHOLOGICAL STUDY OF SALIVARY GLAND NEOPLASM IN TERTIARY CARE HOSPITAL IN CHHATTISGARH”- A RETROSPECTIVE STUDY

Pathology

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ABSTRACT

Background: Salivary gland tumors are uncommon but diverse lesions representing approximately 3% of all head and neck neoplasms. The parotid gland is the most frequently affected site, with pleomorphic adenoma being the most common benign tumor and mucoepidermoid carcinoma being the most prevalent malignant counterpart. **Aims-** To study the prevalence of salivary gland neoplasms presenting at Department of Pathology.

Objectives –

Primary Objectives- Histomorphological study of salivary gland neoplasms.

Secondary Objectives- Histocyto-correlation of salivary gland tumor.

Methods: This retrospective study included 64 cases diagnosed in the Department of Pathology, CIMS, Bilaspur, from January 2014 to June 2024. All cases were evaluated for age, gender, site, and histopathological subtype. FNAC findings were correlated with histopathological diagnoses.

Result: Out of 64 cases, 49 were benign and 15 were malignant. Pleomorphic adenoma (65.3%) was the most common benign lesion, and mucoepidermoid carcinoma (26.6%) was the predominant malignant tumor. Benign tumors occurred mainly in the 21–40-year age group, while malignant tumors were common in patients aged 41–70 years. Females were more frequently affected (59.1%) than males. The parotid gland was the most common site (55%), followed by the submandibular gland (37%). Cytology-histopathology correlation showed a diagnostic accuracy of 90.4%. **Conclusion:** Salivary gland tumors demonstrate distinct clinicopathological patterns. FNAC is a reliable diagnostic tool with strong correlation to histopathology, although careful evaluation is needed for lesions with overlapping cytomorphology. Early diagnosis and multidisciplinary management improve patient outcomes.

KEYWORDS

Salivary gland tumor, Parotid gland, Pleomorphic Adenoma, Mucoepidermoid Carcinoma.

INTRODUCTION:

The salivary glands are the site of origin of a wide variety of neoplasms and are also relatively uncommon. Salivary gland tumors are rare, comprising about 3% of all head and neck neoplasms. About 80% of the tumors are in parotids, 10% in submandibular glands and the remainders are distributed in sublingual and minor salivary glands¹. Benign tumors observed in third and fourth decade and malignant tumors fourth and fifth decades. The incidence of salivary gland tumors is influenced by geographical and racial factors. The clinical diagnosis of these neoplasms is complex so histopathological diagnosis plays a crucial role in the diagnosis of these neoplasms, with very few contributions using special stains, immunohistochemistry and cytogenetic studies. This study is conducted to evaluate the relative frequencies, types, site of distribution and the histopathological features of salivary gland tumors.

Aims-

To study the prevalence of salivary gland neoplasm presenting at Department of Pathology.

Objectives –

- **Primary objectives-** Histomorphological study of salivary gland neoplasm.
- **Secondary objectives -** Histocyto-correlation of salivary gland tumor.

MATERIAL AND METHODS:

A retrospective study was conducted in the Department of Pathology at Chhattisgarh Institute of Medical Sciences (CIMS), Bilaspur (C.G.), to evaluate salivary gland neoplasms over a period of ten years, from January 2014 to June 2024. The study included a total of 64 cases that were submitted for histopathological examination. A total of 467 tissue blocks and 480 hematoxylin and eosin (H&E) stained slides were studied in detail. Relevant data such as age, sex, and site of the lesion were collected from the histopathology records and departmental registers. Data collection was performed using institutional records and registers as the primary source. All collected data were entered into Microsoft Excel 2011 and presented in the form of figures and

proportions. Statistical analysis was performed using SPSS software version 22.0 (trial version). The study protocol was reviewed and approved by the Institutional Ethics Committee of Chhattisgarh Institute of Medical Sciences (CIMS), Bilaspur (C.G.).

Inclusion Criteria-

- Specimens consisting of incisional biopsies (few)
- Partially resected and excisional biopsies (majority)
- With or without regional draining lymph node.

Exclusion Criteria-

Patient with history of chemotherapy and radiotherapy were excluded from study.

Implications Of The Study:

Histopathological typing of the lesion is still confirmatory or rule out malignancy. It is also very essential for early management to avoid mutilation, cosmetic disfigurement and mental trauma to the patient.

RESULTS:

Out of 64 total cases studied, 49 (76.6%) were benign and 15 (23.4%) were malignant. The benign-to-malignant ratio was 3.2:1.

Benign lesions showed a clear female predominance (Male: Female = 0.7:1) (**Table-2**) and were most commonly observed in the 21–40-year age group. The most frequent benign salivary gland tumour was **Pleomorphic adenoma (65.3%)**, followed by **Chronic sialadenitis (16.3%)** and **Basal cell adenoma (4.08%)** (**Table-1**).

In contrast, malignant lesions exhibited an almost equal sex distribution (Male: Female = 1.1:1) (**Table-4**) and were more frequently seen in the 41–70-year age group. Among the malignant tumours, **Mucoepidermoid carcinoma (26.6%)** was the most common, followed by **Adenoid cystic carcinoma (20%)** and **Carcinoma ex Pleomorphic adenoma (20%)** (**Table-3**).

The parotid gland was the most commonly affected site (55%), followed by the submandibular gland (37%).

Table 1. Benign Salivary Gland Tumours With Their Type And Age Distribution (n = 49)

Benign Salivary Gland Tumours	Cases n (%)	<10	11–20	21–30	31–40	41–50	51–60	61–70	>70
Pleomorphic adenoma	32 (65.3%)	1 (3.12%)	3 (9.37%)	10 (31.25%)	11 (34.37%)	3 (9.37%)	2 (6.25%)	1 (3.12%)	1 (3.12%)
Basal cell adenoma	2 (4.08%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (50%)	1 (50%)	0 (0.00%)	0 (0.00%)
Warthin tumor	1 (2.04%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Chronic Sialadenitis	8 (16.32%)	0 (0.00%)	1 (12.5%)	1 (12.5%)	2 (25%)	3 (37.5%)	0 (0.00%)	1 (12.5%)	0 (0.00%)
Benign myoepithelial tumors	1 (2.04%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Neurofibroma	2 (4.08%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (50%)	1 (50%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Schwannoma	2 (4.08%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (50%)	1 (50%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Lipoma	1 (2.04%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Total	49 (100%)	1 (2.04%)	4 (8.16%)	11 (22.45%)	16 (32.65%)	11 (22.45%)	3 (6.12%)	2 (4.08%)	1 (2.04%)

Table 2. Benign Salivary Gland Tumours: Type, Gender, And Site Distribution (n = 49)

Benign Salivary Gland Tumors	Cases n (%)	Sex – Male	Sex – Female	Site – Parotid	Submandibular	Sublingual	Other/Minor
Pleomorphic adenoma	32 (65.3%)	14 (43.75%)	18 (56.25%)	19 (38.78%)	12 (59.37%)	1 (3.12%)	0 (0.00%)
Basal cell adenoma	2 (4.08%)	1 (50%)	1 (50%)	2 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Warthin tumor	1 (2.04%)	0 (0.00%)	1 (100%)	1 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Chronic Sialadenitis	8 (16.32%)	3 (37.5%)	5 (62.5%)	2 (25%)	6 (75%)	0 (0.00%)	0 (0.00%)
Benign myoepithelial tumors	1 (2.04%)	0 (0.00%)	1 (100%)	1 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Neurofibroma	2 (4.08%)	1 (50%)	1 (50%)	2 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Schwannoma	2 (4.08%)	1 (50%)	1 (50%)	2 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Lipoma	1 (2.04%)	0 (0.00%)	1 (100%)	1 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Total	49 (100%)	20 (40.82%)	29 (59.18%)	30 (61.22%)	18 (36.73%)	1 (2.04%)	0 (0.00%)

Table 3. Malignant Salivary Gland Tumours – Type And Age Distribution (n = 15)

Malignant Salivary Gland Tumors	Cases n (%)	11–20	21–30	31–40	41–50	51–60	61–70	>70
Mucoepidermoid carcinoma	4 (26.6%)	0 (0.00%)	1 (25%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (25%)	2 (50%)
Adenoid cystic carcinoma	3 (20%)	0 (0.00%)	0 (0.00%)	2 (66.66%)	1 (33.33%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Acinic cell carcinoma	2 (13.3%)	0 (0.00%)	1 (50%)	0 (0.00%)	1 (50%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Ex pleomorphic adenoma	3 (20%)	1 (33.33%)	0 (0.00%)	1 (33.33%)	0 (0.00%)	1 (33.33%)	0 (0.00%)	0 (0.00%)
Carcinosarcoma	2 (13.3%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (50%)	0 (0.00%)	1 (50%)
Basal cell adenocarcinoma	1 (6.66%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (100%)
Total	15 (100%)	1 (6.67%)	2 (13.33%)	3 (20.00%)	2 (13.33%)	2 (13.33%)	1 (6.67%)	4 (26.67%)

Table 4. Malignant Salivary Gland Tumors- Correlation Between Age, Gender, And Site (n=15)

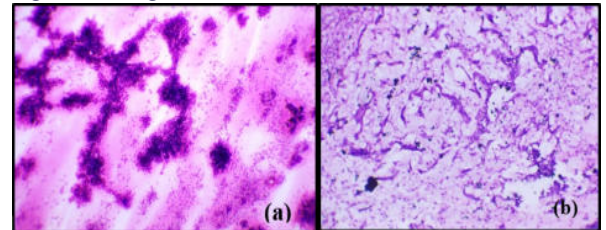
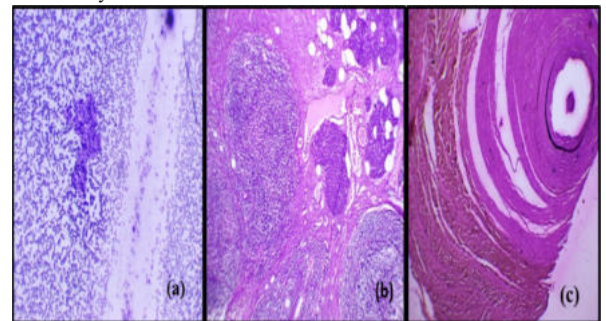
Malignant Salivary Gland Tumors	Cases n (%)	Sex – Male	Sex – Female	Site – Parotid	Submandibular	Sublingual	Other/Minor
Mucoepidermoid carcinoma	4 (26.6%)	3 (75%)	1 (25%)	3 (75%)	1 (25%)	0 (0.00%)	0 (0.00%)
Adenoid cystic carcinoma	3 (20%)	1 (33.33%)	2 (66.66%)	3 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Acinic cell carcinoma	2 (13.3%)	1 (50%)	1 (50%)	2 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Ex pleomorphic adenoma	3 (20%)	2 (66.66%)	1 (33.33%)	3 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Carcinosarcoma	2 (13.3%)	1 (50%)	1 (50%)	2 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Basal cell adenocarcinoma	1 (6.66%)	0 (0.00%)	1 (100%)	1 (100%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
Total	15 (100%)	8 (53.33%)	7 (46.67%)	14 (93.33%)	1 (6.67%)	0 (0.00%)	0 (0.00%)

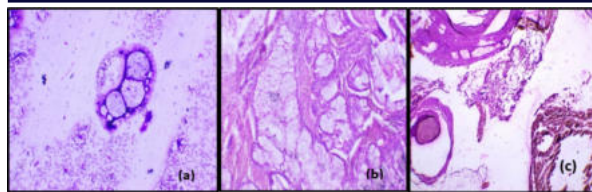
Cytological evaluation using Fine Needle Aspiration Cytology (FNAC) played an essential role in the preoperative diagnosis of these lesions. The present study demonstrated a cyto-histopathological correlation rate of **90.4%**, indicating high diagnostic accuracy of FNAC in salivary gland lesions, which is comparable to findings reported by **Omhare A et al.¹¹** and **Singh A et al.¹²**, who also observed strong histo-cytological concordance in their respective studies. However, a few diagnostic discrepancies were noted in cases such as low-grade Mucoepidermoid carcinoma (**fig-3**), Chronic sialadenitis (**fig-2**) and mucocele, where overlapping cytomorphological features posed challenges. Chronic sialadenitis accounted for 16.3% of benign lesions, often showing ductal and acinar atrophy with lymphocytic infiltration, sometimes accompanied by sialolithiasis. (**Table-5**)

Table 5: Cytology–Histopathology Correlation (10 Cases)

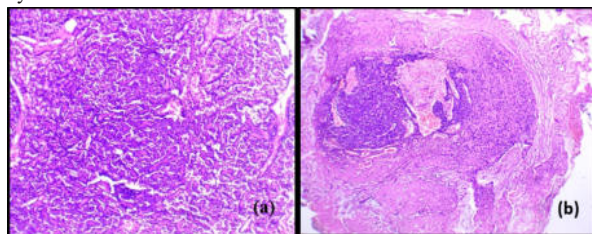
Case No.	Cytology Diagnosis	Histopathology Diagnosis
1	Pleomorphic Adenoma	Pleomorphic Adenoma
2	Pleomorphic Adenoma	Pleomorphic Adenoma
3	Pleomorphic Adenoma	Pleomorphic Adenoma
4	Pleomorphic Adenoma	Pleomorphic Adenoma
5	Pleomorphic Adenoma	Pleomorphic Adenoma
6	Pleomorphic Adenoma	Pleomorphic Adenoma
7	Chronic Sialadenitis	Chronic Sialadenitis
8	Low-grade Mucoepidermoid Carcinoma	Chronic Sialadenitis with Sialolithiasis
9	Adenoid Cystic Carcinoma	Adenoid Cystic Carcinoma
10	Low-grade Mucoepidermoid Carcinoma	Mucocele

In present study cytology–histopathology correlation demonstrated a diagnostic accuracy of 90.4%, confirming that FNAC is a reliable and effective preliminary diagnostic tool for evaluating salivary gland lesions.

Figure With Legends**(Fig-1) Pleomorphic adenoma (FNA, H&E 40X):** - (a) myoepithelial cells intermingle with fibrillary matrix, in a chondromyxoid background (**Histology 40X**); (b) cord and tubular arrangement of epithelial and myoepithelial cells, stromal component chondromyxoid.**(Fig-2) Chronic sialadenitis (FNA, H&E 40X):** - (a) lymphocytic infiltration with mucinous background. (**Histology 40X**); (b) lymphocytic infiltration and acinar atrophy and (c) sialolith.



(Fig-3) Mucoepidermoid carcinoma (FNA, H&E 40X): -(a) mucin secretin cell with mucinous background. Mucoepidermoid Carcinoma (Histology 40X): (b,c) mucous and epidermoid cell components with cystic areas.



(Fig-4) Basal Cell Adenocarcinoma (H&E 10X, 40X): (a&b) basaloid cells with peripheral palisading showing neural infiltration

DISCUSSION:

The present retrospective histomorphological study of salivary gland neoplasms, conducted over a 10-year period, included **64 cases** of benign and malignant lesions. Among the benign tumors, **Pleomorphic adenoma** was the most common histological subtype, accounting for **65.3%** of benign cases, which was similar to the

Table 6- Comparison Of Age Distribution, Sex Preponderance, Site And Common Histological Diagnosis In Various Studies.

Study	Total Cases	Common Age Group (Years)	Male: Female Ratio	Most Common Site	Common Benign Tumor	Common Malignant Tumor
Present Study (CIMS, Bilaspur, 2025)	64	21–40yr (Benign), 41–70yr (Malignant)	0.8:1	Parotid (55%)	Pleomorphic Adenoma	Mucoepidermoid Carcinoma
Ghartimagar et al. ¹ , 2020 (Nepal)	130	21-40yr (Benign), 51-70 yr (Malignant)	1:1.36	Parotid	Pleomorphic Adenoma	Mucoepidermoid Carcinoma
Saldanha et al. ⁶ , 2018 (India)	65	40-50 yr (Benign) 50-60 yr (Malignant)	1:1.03	Parotid	Pleomorphic Adenoma	Mucoepidermoid Carcinoma
Bobati et al. ⁷ , 2017 (India)	59	18-68 yr	1:1.8	Parotid	Pleomorphic Adenoma	Adenoid Cystic Carcinoma
Torabinia et al. ⁵ , 2014 (Iran)	229	30–60yr	1:1.3	Parotid	Pleomorphic Adenoma	Mucoepidermoid Carcinoma

CONCLUSION:

Salivary gland neoplasms, though uncommon, exhibit a wide spectrum of histomorphological variations. Pleomorphic adenoma remains the most frequent benign tumor, while Mucoepidermoid carcinoma is the predominant malignant lesion. The parotid gland is the most common site for both categories. FNAC serves as a valuable, minimally invasive preoperative diagnostic tool with high correlation to histopathological diagnosis. However, a few limitations exist in differentiating low-grade malignancies from benign lesions cytologically. A multidisciplinary approach combining cytology, histopathology, and immunohistochemistry ensures accurate diagnosis and optimal patient management.

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Competing Interests: None

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findings reported by Bobati et al.⁷ and Torabinia et al.⁵

In present study, the **age distribution** revealed that benign tumors were more frequent in the **third and fourth decades** of life, while malignant tumors were more commonly encountered in the **fifth and sixth decades** of life which was concordant with Ghartimagar et al.¹ and Shrestha et al.³

The **gender distribution** showed a slight **female predominance (59.1%)**, which was in concordant with the studies of Torabinia et al.⁵, Saldanha et al.⁶, and Bobati et al.⁷, but was discordant with the observation of Shrestha et al.³, who reported male predominance.

The **parotid gland** was the most commonly affected site (**55%**), followed by the **submandibular gland (37%)**. The predominance of parotid involvement was consistent with previous reports from Nepal and India by Ghartimagar et al.¹ and Shrestha et al.³. The **cytological evaluation** showed a high concordance rate with histopathological diagnosis (**90.4%**), indicating the reliability of FNAC in preoperative assessment.

Among the malignant neoplasms, **Mucoepidermoid carcinoma** was the most common type (**26.6%**), followed by **Adenoid cystic carcinoma (20%)**. The majority of malignant tumours occurred in the **parotid gland**, with **males slightly more affected than females**. These findings were consistent with the observations of Torabinia et al.⁵ and Saldanha et al.⁶, but was discordant with the observation of Bobati et al.⁷ (Table 6).

Overall, both benign and malignant salivary gland tumours were found to occur in any of the major salivary glands, though **parotid predominance** remained evident across most studies.

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