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Morphological Spectrum of Salivary Gland Tumours

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Abstract:

Background: *Salivary gland tumours consist of heterogeneous lesions with complex and diverse characteristics and distinct biological behaviour. Histopathology is one of the most valuable means of diagnosis in salivary gland tumours.*

Methods: *This retrospective study comprised of cases selected from the archives of the Department of Pathology. Patient's demographic details were obtained from the records. The sections for histopathology were prepared from formalin-fixed paraffin-embedded tissues and stained with Haematoxylin and Eosin.*

Results: *Out of thirty one cases of salivary gland specimens, twenty five cases were diagnosed as benign and six cases were malignant. Pleomorphic adenoma was the commonest benign tumour (61.4%). Mucoepidermoid carcinoma was the commonest malignant tumour (13%). Among the benign tumours, three cases of Warthin tumour and one case each of Oncocytoma and Intraductal papilloma were found. Among the malignant tumours, one case each of Acinic cell carcinoma, Clear cell carcinoma and Adenoid cystic carcinoma were found.*

Conclusion: *Histopathological examination plays an important role in the diagnosis of salivary gland lesions. It helps to predict the prognosis by histological typing and the staging and grading of malignant neoplasms.*

Keywords: ***Pleomorphic adenoma, salivary gland neoplasm, parotid gland.***

1. Introduction

Salivary gland tumours are a group of heterogeneous lesions in the head and neck region with varying morphological characteristics and biological behaviour. They are rare lesions and represent less than 1% of all tumours and 3-6.5% of all head and neck tumours.[1],[2] Histopathology is one of the most valuable means of diagnosis in salivary gland tumours. These tumours pose a diagnostic challenge because of their diverse histological pattern, complex classification and rarity.[3] Malignant and benign salivary gland tumours may resemble each other grossly and sometimes even microscopically if seen early in their clinical course.[4] Hybrid tumours, dedifferentiation and malignant transformation of benign tumours are few other confounding factors in histopathological interpretation.[5] Due to their difficult diagnosis, unpredictable clinical course and association with various biological factors, several difficulties are faced during their mangement and therapy.[4],[6] Although various epidemiologic studies provide valuable knowledge, some data are contradictory. Many studies have shown that the incidence, clinical course and distributions of subgroups of salivary gland neoplasms vary across the world, with diverse demographic results in different regions.[7]-[9]

2. Materials and Methods

This retrospective study comprised of cases selected from the archives of the Department of Pathology. Patient's demographic details were obtained from the records. The sections for histopathology were prepared from formalin-fixed paraffin-embedded tissues and stained with Haematoxylin and Eosin. The histology of all tumors was reviewed and classified according to the World Health Organization (WHO) Histological Typing of Salivary Gland Tumours.[10]

3. Results

Out of thirty one cases of salivary gland specimens, twenty five cases were diagnosed as benign (80.65%) and six cases were malignant (19.35%).

The youngest patient in this study was 15 year old while oldest patient was 70 year old. The peak age of incidence was between fourth and fifth decade. The most common presenting symptom was presence of painless swelling over the parotid region. Benign tumours were predominantly seen in females whereas malignant tumours showed an equal sex predilection.

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Majority of the tumours were located in parotid gland (80.64%), followed by submandibular gland (12.90%) and minor salivary glands (6.46%). Pleomorphic adenoma was the commonest benign tumour (61.4%) followed by Warthin tumour (9.68 %). Mucoepidermoid carcinoma was the commonest malignant tumour (13%).

Nineteen cases of Pleomorphic adenoma were seen. All of them presented with painless swelling in the parotid region ranging in duration from 1 month to 15 years. Grossly, these tumors were irregular to globular & lobulated, showed partial to complete capsulation and ranged in size from 0.4 to 7 cm in their greatest dimension. Cut section revealed solid, grey white homogenous areas [Figure 1a], few of them showing cystic changes & myxoid areas.

Microscopically, they were composed of both epithelial and mesenchymal components. The epithelial component showed cuboidal to squamoid cells arranged in varying patterns like sheets, cords and trabeculae. Few cases showed glandular spaces of varying sizes lined by low columnar cells with lumina containing pink secretions [Figure 1b, c]. Sheets and nests of myoepithelial cells were seen. The stroma had fibromyxoid to chondroid appearance with few cases showing cartilaginous areas.

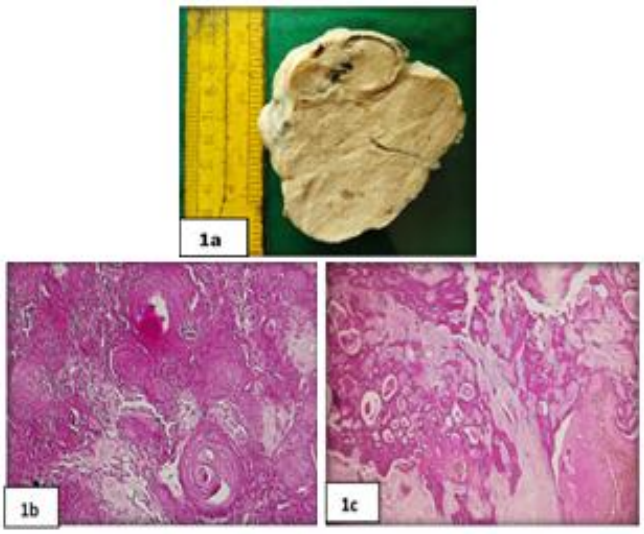

Figure 1a: *Gross photograph of Pleomorphic adenoma showing homogenous grey white lesion.*
1b: *Photomicrograpgh of Pleomorphic adenoma showing squamoid cells and* ***1c:*** *glandular spaces with lumina containing pink secretions.*

Three cases of Warthin tumour (9.68%) were seen in the study. Grossly all three showed cystic areas [Figure 2a]. Microscopically, they showed cysts lined by double layered epithelium, composed of surface oncocytic columnar cells and underlying discontinuous basal cells, resting on a dense lymphoid stroma with variable germinal centres [Figure 2b, c].

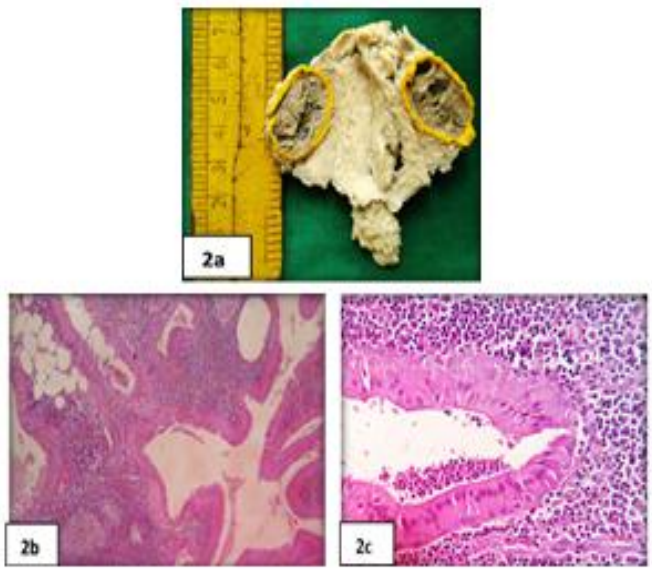

Figure 2a: *Gross photograph of Warthin tumour showing cystic areas.* ***2b:*** *Photomicrograph of Warthin tumour showing cysts and lymphoid stroma with germinal centre.* ***2c:*** *Higher magnification showing cysts lined by bilayered epithelium.*

One case each of Oncocytoma (3.22%) [Figure 3] and Intraductal papilloma (3.22%) [Figure 4] was also seen.

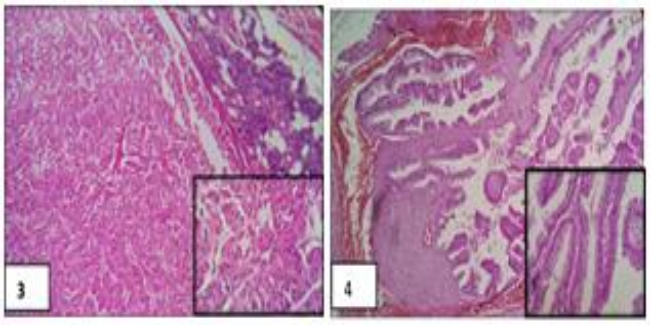

Figure 3: *Photomicrograph of Oncocytoma showing oncocytic cells arranged in sheets. Inset shows these cells having granular eosinophilic cytoplasm.*

Figure 4: *Photomicrograph of Intraductal papilloma showing papillary proliferations with fibrovascular cores. Inset shows these papillary proliferations lined by cuboidal to columnar epithelial cells.*

Among the malignant tumours, four cases of Mucoepidermoid carcinoma (13%), one case each of Adenoid cystic carcinoma (3.22%), Acinic cell carcinoma (3.22%) and Clear cell carcinoma (3.22%) were found.

Grossly, the malignant tumours varied in size from 1-6cm in greatest dimension. On cut surface they were grey white to grey brown, at places showing cystic spaces containing mucinous fluid and areas of haemorrhage. A well-defined capsule was not appreciated in majority of the tumours.

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Microscopically Mucoepidermoid carcinoma showed sheets, cords and clusters of mucous, squamoid and intermediate cells [Figure 5a, b]. Few cases showed clear cells and oncocytic change. Low grade tumours showed cells with bland nuclei floating in mucinous pools and cystic spaces lined by mucinous cells. The intermediate grade tumour showed more solid nests and less cystic spaces.

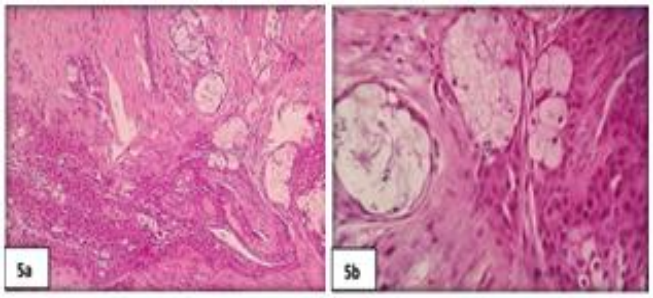

Figure 5a: *Photomicrograph of mucoepidermoid carcinoma showing mucous, intermediate and squamoid cells.* ***5b:*** *Higher magnification of the same showing mucous cells.*

Adenoid cystic carcinoma [Figure 6a] showed predominantly cribriform pattern with few glandular and psuedoglandular spaces surrounded by myoepithelial cells in a myxoid stroma [Figure 6b]. Perineural invasion was identified [Figure 6c].

Acinic cell carcinoma showed tumour cells arranged in predominantly solid and microcystic pattern and having basophilic granular to clear cytoplasm [Figure 7]. Clear cell carcinoma showed solid masses and nests of clear cells composed of glycogen with nuclei showing mild atypia [Figure 8].

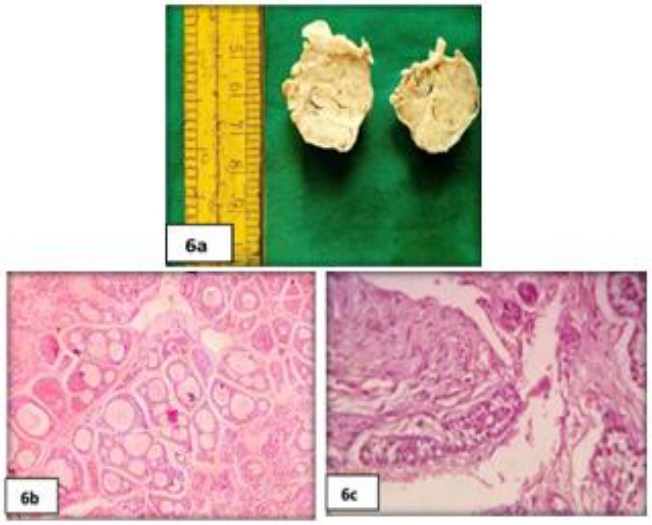

Figure 6a: *Gross photograph of Adenoid cystic carcinoma showing lobulated appearance.* ***6b:*** *Photomicrograph of Adenoid cystic carcinoma showing cribriform pattern.* ***6c:*** *Perineural invasion in adenoid cystic carcinoma.*

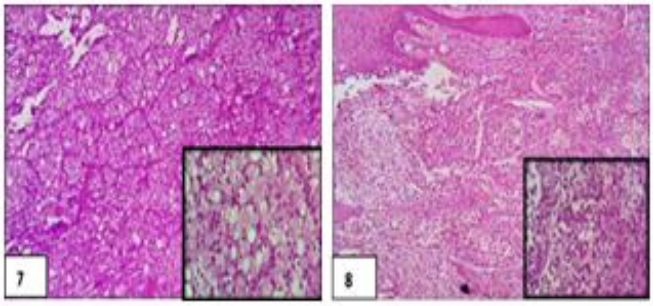

Figure 7: *Photomicrograph of Acinic cell carcinoma showing solid sheets of cells having basophilic granular to clear cytoplasm with eccentric nuclei. Inset shows higher magnification of the same.*

Figure 8: *Photomicrograph showing Clear cell carcinoma with clear cells arranged in sheets. Inset shows higher magnification of the same.*

4. Discussion

In the present study, thirty one cases of salivary gland specimens were studied out of which, twenty five cases were diagnosed as benign (80.65%) and six cases were malignant (19.35%). This was consistent with majority of other studies where benign tumours were more common than malignant.[1]-[5] The study done by Taghavi et al (2015) in Iran showed predominance of malignant salivary gland tumour (64.7%) in contrast to other studies and the present study.[6] In the present study, pleomorphic adenoma was the most common benign tumour (61.4 %) which was consistent with other studies.[7]-[9]

Mucoepidermoid carcinoma was the most common malignant tumour in the present study accounting to 13% of all tumours. This was similar to that observed by various other studies.[11]-[14] In contrast, studies done by Zohreh Jaafari-Ashkavandi et al (2013).[3] Vuhahula E A.M (2004)[4] Sharma et al (2016)[5] and Srivani et al (2016)[15] showed that Adenoid cystic carcinoma was the most common malignant tumour.

Parotid gland was the most common site for various tumours in this study which was consistent with majority of other studies[16]-[19], whereas the study done by Taghavi et al (2015)[6] showed minor salivary glands as the most common site especially for malignant tumours.

Peak age of presentation of the tumours was between 4th and 5th decade in the present study which was similar to various other studies.[14],[19] Benign tumours showed female preponderance with male: female ratio being 1:1.4 which is in concordance with studies done by Srivani et al (2016)[15] and Iqbal et al (2013).[19] In contrast, few other studies showed a male predominance.[13]-[18] The present study showed an equal sex predilection in malignant tumours

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which was consistent with the study done by Venugopal et al (2016).[12]

Microscopically, Pleomorphic adenomas show a great degree of morphological diversity. The essential components are mainly the capsule, epithelial and myoepithelial cells, and mesenchymal or stromal elements.[10] The epithelial component may show a wide variety of cell types including cuboidal, basaloid, squamous, spindle cell, plasmacytoid and clear cells. The mesenchymal-like component shows mucoid/myxoid, cartilaginous or hyalinised areas.[19]

In few cases, the epithelial component forms the bulk of the tumour and hence these tumours are known as cellular pleomorphic adenomas. This has no prognostic significance.[10] Multiple sections should be studied to look for mesenchymal component which will be helpful to confirm the diagnosis. Focal oncocytic change may be seen. Occasionally, the entire tumour is affected and may be mis-diagnosed as an oncocytoma. Squamous metaplasia may also be present which can be mistaken for malignancy. Mucous metaplasia or conspicuous clear cell change may lead to false diagnosis of mucoepidermoid carcinoma.[10] Pleomorphic adenoma may sometimes show an epithelial malignancy and is known as Carcinoma ex pleomorphic adenoma.[5] Recurrences are common and rarely, a histologically benign pleomorphic adenoma may manifest with local or distant metastasis.[20]

Basal cell adenoma is a rare benign neoplasm which shows a basaloid appearance of the tumour cells and differs from pleomorphic adenoma by the absence of the myxochondroid stromal component. Myoepithelioma, a benign salivary gland tumour can be distinguished from pleomorphic adenoma by the relative lack of ducts and the absence of myxochondroid stroma.[10]

Mucoepidermoid carcinoma is a malignant glandular epithelial neoplasm characterized by mucous, intermediate and epidermoid cells, with columnar, clear cell and oncocytoid features.[10] The proportion of different cell types and their architectural configuration may vary. The Armed Forces Institute of Pathology (AFIP) scoring system which is based on five histologic features: intracystic component, neural invasion, necrosis, mitotic activity, and cellular anaplasia has been widely used to grade these tumours and proven to be reproducible in defining low, intermediate and high-grade tumours.[12]

Adenoid cystic carcinomas usually show three defined patterns: tubular, cribriform and solid. The cribriform pattern is the most common and is characterized by nests of cells with cylindromatous microcystic spaces filled with hyaline or basophilic mucoid material. Tumours composed of tubular and cribriform patterns pursue a less aggressive course than those with greater than 30% of solid component.[10],[12] Along with the histologic pattern, clinical stage greatly affects prognosis. Perineural and intraneural invasion is a common feature.[12],[19] These tumours should be carefully distinguished from various other tumours like Basal cell adenocarcinoma, Polymorphous low-grade adenocarcinoma and cellular Pleomorphic adenoma.[10]

Acinic cell carcinomas are malignant tumours characterized by serous acinar cell differentiation with large, polygonal acinar cells showing lightly basophilic, granular cytoplasm and round, eccentric nuclei.[12] Vacuolated cells can be seen which are similar in size to intercalated duct-type cells but have clear, cytoplasmic vacuoles, which sometimes distend the cellular membranes. These clear cells may sometimes lead to false diagnosis of clear cell oncocytoma or clear cell carcinoma.[10] Frequent mitoses, necrosis, neural invasion, pleomorphism, infiltration and stromal hyalinization indicate more aggressive course. Here, staging rather than grading is considered a better indicator of prognosis.[10],[12]

Clear cell carcinoma may be distinguished from other tumours having clear cell component by the presence of monomorphous population of clear cells and absence of features characteristic of these other neoplasms.[10]

5. Conclusion

Salivary gland tumours are relatively rare and may lead to diagnostic problems due to the wide spectrum of tumour entities and histological complexities in many cases. Histopathological examination is the mainstay for diagnosis and categorization of these groups of tumours and it also helps to predict the prognosis by typing, staging, and grading of the malignant neoplasms.

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