International Journal of Research in Medical Sciences
Dholiya BM et al. Int J Res Med Sci. 2023 Apr;11(4):1197-1203
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20230861

Original Research Article

Histopathological study of neoplastic and non-neoplastic lesions of salivary gland: a study at a tertiary care center

Bhavika M. Dholiya*, Bhavna N. Gamit, Hiral K. Shah

Department of Pathology, Government Medical College, Surat, Gujarat India

Received: 26 January 2023
Revised: 01 March 2023
Accepted: 06 March 2023

***Correspondence:**
Dr. Bhavika M. Dholiya,
E-mail: bhavikadholiya@gmail.com

ABSTRACT

Background: Salivary gland lesions are highly heterogenous group of disorder. There are no reliable criteria to differentiate benign from malignant lesions on clinical grounds, so histopathological evaluation is essential.
Methods: The present study was retrospective study carried out in the department of pathology, Government medical college, Surat from January 2015 to June 2020. Biopsies/specimens were fixed by 10% neutral buffered formalin and processed, embedded in paraffin and sections were cut and stained with hematoxylin and eosin stain. All the slides were reviewed by authors and re-staining of slides and fresh sections of tissue blocks were performed whenever required.
Results: Out of 80 cases, 22 were non-neoplastic, 45 were benign and 13 were malignant. In our study most common non neoplastic lesion was chronic sialadenitis. Most common benign lesion was pleomorphic adenoma. Most common malignant lesion was mucoepidermoid carcinoma. Most commonly involved gland was parotid gland. In parotid gland, most common lesions were benign. The overall sex incidence of salivary gland lesions in male was 45% and 55% in females with a male to female ratio of 1:1.2.
Conclusions: Thorough knowledge of morphology of salivary gland lesion is helpful in final diagnosis in predicting prognosis, typing, staging and grading of salivary neoplasms.

Keywords: Mucoepidermoid carcinoma, Pleomorphic adenoma, Salivary gland

INTRODUCTION

Salivary gland lesions constitute less than 1% of all tumor and 4% of all epithelial neoplasm in head and neck. Salivary gland lesions encompass a heterogenous group of disorder and are broadly classified as neoplastic and non-neoplastic. Non-neoplastic lesions range from inflammatory disorder of infectious, granulomatous or autoimmune etiology to obstructive, developmental and idiopathic disorder. They often clinically present as tumor and may have pathological features similar to some of neoplasm.[1]

Benign tumors may be present for months to several years before coming to clinical attention, while cancers more often come to attention promptly. It is commonly present as swelling in parotid and submandibular region. Facial palsy can be seen in patient with facial nerve involvement. There are no reliable criteria to differentiate benign from malignant lesions on clinical grounds, and histopathological evaluation is essential.[2]

Heterotopic salivary glands also have been reported commonly in the periparotid and intraparotid lymphnode, soft tissue and other organ in head, neck and chest region, rectum, vulva, stomach, pterygopalatine fossa and cerebellopontine angle. These glands recapitulate normal salivary glands.[3]

Benign tumors are much more frequent than malignant ones. Most frequently encountered tumor is pleomorphic

adenoma and mucoepidermoid carcinoma being the most common malignant tumor.[4]

Aims and objectives

To study histomorphological appearance of salivary gland lesions. To find out the incidence of benign and malignant salivary gland tumors. To study age, sex and site wise distribution of salivary gland lesions.

METHODS

Study setting

The present study was retrospective study carried out in the department of pathology, government medical college, Surat from January 2015 to June 2020. The cases included were those specimens received from department of otorhinolaryngology and department of surgery and further processed at the department of pathology. A total of 80 cases were studied. A detailed clinical history including age, sex, location, clinical presentation, clinical examination findings, radiological examination and provisional clinical diagnosis were collected from histopathology request form. Biopsies/specimens were fixed in 10% neutral buffered formalin and processed preferably within 24 hours. Following fixation, the tissues were processed, embedded in paraffin and sections were cut and stained with hematoxylin and eosin. All the slides were reviewed by authors and classified according to WHO Classification of tumors of salivary gland. Re-staining of slides and fresh sections of tissue blocks were performed whenever required. The study was approved by institutional ethics committee.

Inclusion criteria

Non neoplastic, benign and malignant lesions of major and minor salivary glands.

Exclusion criteria

Inadequate and improperly fixed tissue biopsies.

RESULTS

During the period from January 2015 to June 2020, total 17157 specimens were received for histopathological examinations, of which 80 cases were of salivary gland lesions. Out of these 80 cases, 22 (27.5%) were diagnosed as non-neoplastic lesions and 58 (72.5%) as neoplastic lesions.

Chronic sialadenitis was the most common non neoplastic lesion in our study. Pleomorphic adenoma was the most common benign tumor and mucoepidermoid carcinoma was the most common malignant tumor (Table 1).

Table 1: Distribution of non-neoplastic, benign and malignant salivary gland lesions.

Lesion	No. of cases	Percentage
Non-neoplastic lesions		
Chronic sialadenitis	9	11.25
Mucocele	7	8.75
Lymphoepithelial cyst	5	6.25
Nodular oncocytic hyperplasia	1	1.25
Benign neoplastic lesions		
Pleomorphic Adenoma	39	48.75
Warthin's Tumor	04	5.00
Oncocytoma	01	1.25
Basal cell adenoma	01	1.25
Malignant neoplastic lesions		
Mucoepidermoid carcinoma	09	11.25
Acinic cell carcinoma	02	2.50
Adenoid cystic carcinoma	02	2.50
Total	80	100

Table 2: Site wise distribution of lesions.

	Non neoplastic	Benign	Malignant	Total	Percentage
Parotid gland	7	38	7	52	65.82
Submandibular gland	6	5	3	14	17.72
Minor salivary gland	9	1	3	13	16.46
Percentage	22	44	13	79	100

Table 3: Age wise distribution of the salivary gland lesions (age in years).

Lesions	0-10	11-20	21-30	31-40	41-50	51-60	>60
Non neoplastic	1	8	6	6	1	0	0
Benign	1	1	9	14	7	9	4
Malignant	0	0	1	1	5	4	2
Total	2	9	16	21	13	13	6

One case of Warthin's tumor was found in heterotopic salivary gland in cervical lymphnode. In our study, it was observed that the common site of salivary gland lesion was parotid gland (65.82%), followed by submandibular glands (17.72%) and minor salivary glands (16.46%) in decreasing frequency (Table 2).

In age wise distribution, non-neoplastic lesions were commonest between 11-20 years of age group, benign lesions were common in 4th decade and malignant lesions were common in 5th decade of life (Table 3).

Table 4: Sex wise distribution of salivary gland lesions.

	No. of cases	Percentage
Male	36	45
Female	44	55
Total	80	100

In our study, salivary gland lesions were more common in female with male: female ratio is 1:1.2 (Table 4).

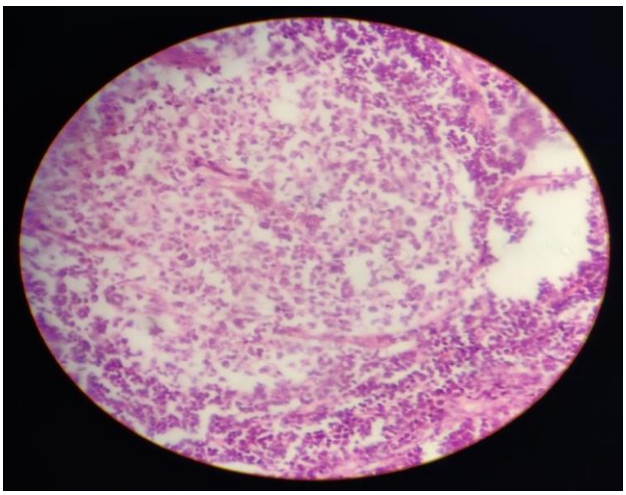

Figure 1: Chronic sialadenitis.
Marked mixed inflammatory infiltrates predominantly consisting of lymphocytes and plasma cells and few eosinophils (H and E, X400).

Histopathological examination of chronic sialadenitis showed varying degrees of acinar destruction, ductal proliferation and fibrosis associated with inflammatory cell infiltrate with normal architecture (Figure 1).

Nodular oncocytic hyperplasia showed lobules of oncocytic cells with intervening residual normal tissue of salivary serous gland and ducts (Figure 2). This finding is helpful in differentiating it from oncocytoma, which show arrangement of oncocytes in sheets, nest, and trabeculae without residual non oncocytic salivary gland parenchyma within the nodule.

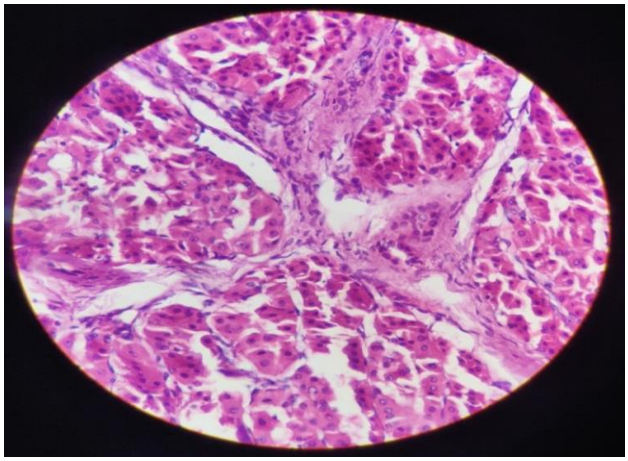

Figure 2: Nodular oncocytic hyperplasia.
Lobules of oncocytic cells with intervening residual normal tissue of salivary serous duct (H and E, X400).

Figure 3: Pleomorphic adenoma.
Gross showing encapsulated, well circumscribed and 5 x 4 x 3 cm^3 of size mass. Cut surface shows solid areas with glistening surface.

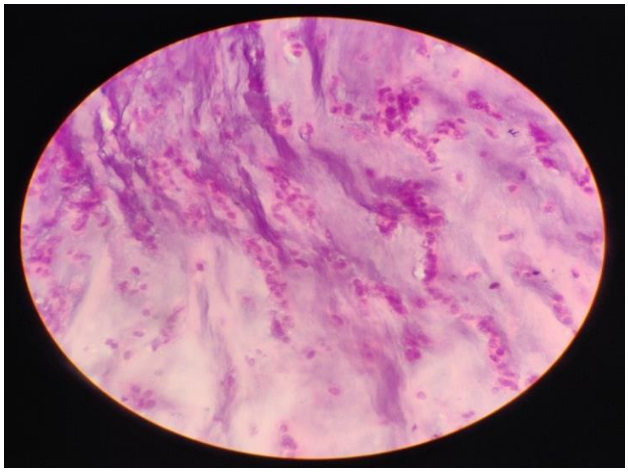

Figure 4: Pleomorphic adenoma.
Showing epithelial cells in myxoid stroma (H and E X400).

All classic PA showed biphasic appearance- epithelium and myoepithelial/stroma. Most of the epithelial component is of a glandular, tubules and trabeculae. In stromal component predominant component was

chondroid and myxoid (Figure 4). Two cases of cell rich pleomorphic adenoma were found.

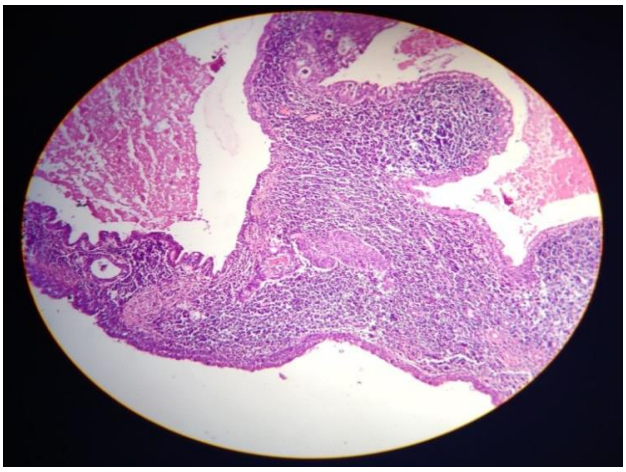

Figure 5: Warthin's tumor.
Cystic spaces lined by two layers of oncocytic columnar and cuboidal cells, with lymphoid cells in stroma (H and E, X100).

All Warthin's tumor showed bilayer of oxyphilic cells consisting of outer columnar and inner cuboidal cells arranged in glandular and papillary formations. Stroma showed lymphoid follicles (Figure 5).

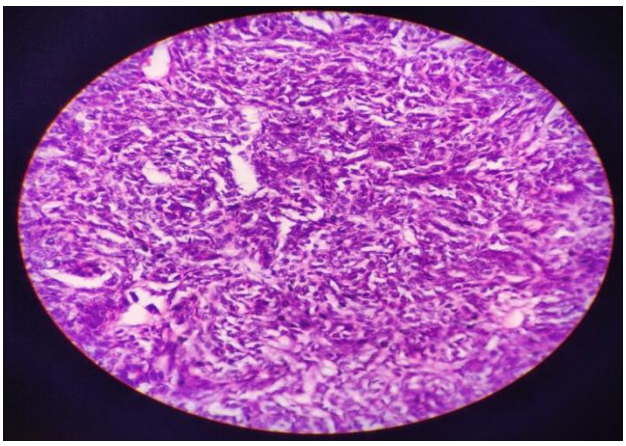

Figure 6: Basal Cell adenoma.
Showing basaloid cells with uniform, round-oval nuclei, eosinophilic cytoplasm (H and E, X400).

A case of basal cell adenoma showed basal cells, round to oval in shape having scanty basophilic cytoplasm and hyperchromatic nuclei arranged in solid, trabecular and tubular pattern. Peripheral palisading was seen in a few cell nests (Figure 6).

In mucoepidermoid carcinoma, the tumors showed variable proportions of three types of cells: mucin producing cells, intermediate cells and squamous cells (Figure 7). In low grade, predominantly cystic spaces lined by mucus cells were seen. Small component of intermediate cells and few squamous cells were seen. In intermediate grade, small nests, cords and sheets consisting of squamous cells with few mucous cells and intermediate cells with some atypia were seen. In high grade, nests, sheets, cords of pleomorphic squamous cells and intermediate cells with nuclear atypia and occasional mucous cells were seen.

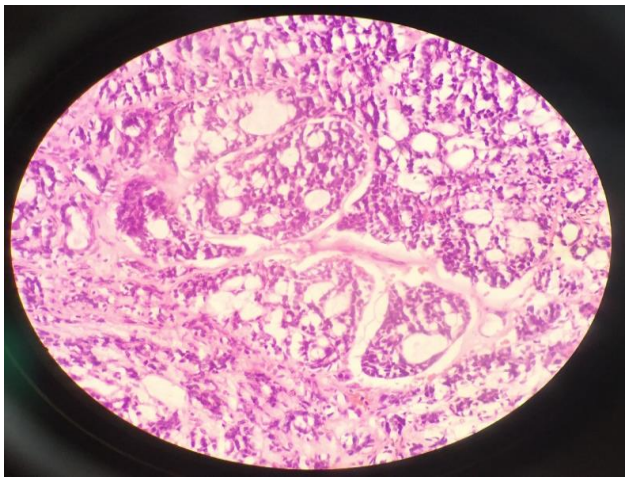

Figure 7: Adenoid cystic carcinoma.
Showing cribriform pattern admixed with occasional tubules (H and E, X400).

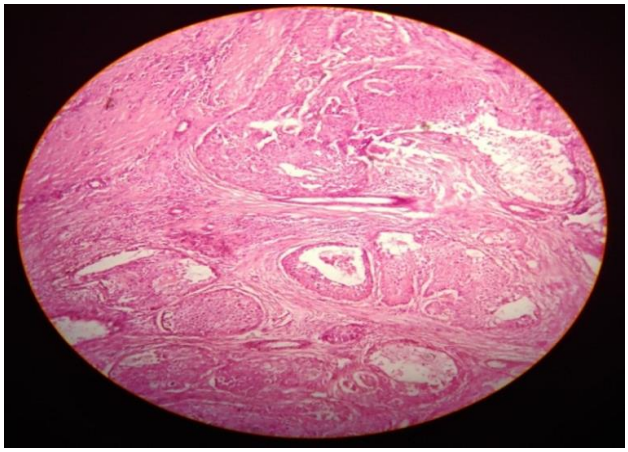

Figure 8: Mucoepidermoid carcinoma.
Showing cells arranged in small nests and sheets consisting of squamous and intermediate cells and few mucous cells lining cyst (H and E, X100).

In adenoid cystic carcinoma, histopathological features were characteristic and showed tumor acinar cells in solid and microcystic pattern. Acinar cells were large, polygonal, with basophilic granular cytoplasm and round, eccentric nuclei (Figure 8). One case of papillary cystic variant was found in which cells were arranged in papillary cystic, microcystic and solid pattern.

In acinic cell carcinoma, tumor cells arranged in cribriform, tubular pattern and solid pattern separated by hyaline stroma. The cribriform pattern consists of basaloid epithelial cells forming nest with sharply punched out space filled with basophilic material. Cells

were having small, round hyperchromatic nuclei with scant amount of cytoplasm (Figure 9).

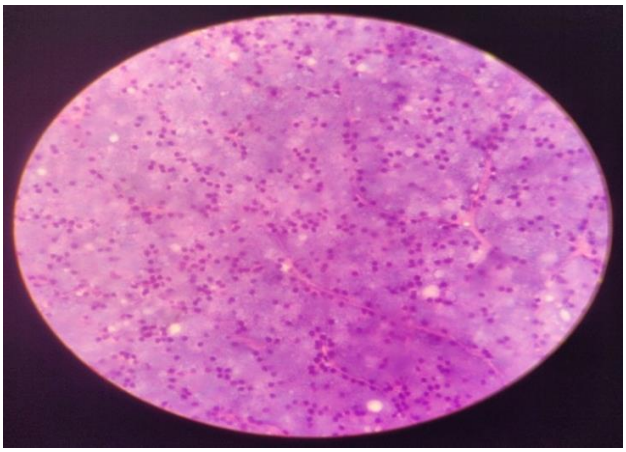

Figure 9: Acinic cell carcinoma.
Showing tumor comprising of polygonal cells arranged in solid pattern (H&E, X400).

DISCUSSION

In our study out of 80 cases, non-neoplastic lesions were 27.5% and neoplastic lesions were 72.5%, which is similar to studies done by Teeda et al and Kumar et al.[1,5]

Table 5: Comparison of incidence of benign and malignant lesions with other studies.

Study name	Total	Benign %	Malignant %
Nagarkar et al[6]	36	27 (75)	9 (25)
Saldanha c et al[7]	65	48 (73.8)	17 (26.2)
Ito et al[8]	496	335 (67.5)	161 (32.5)
Edda et al[9]	268	143 (53.4)	125 (46.6)
Present study	58	45 (82.4)	13 (17.6)

In neoplastic lesions, benign tumors predominate over the malignant tumors (Table 5).

Site of involvement:

In our study parotid gland was the most commonly involved gland followed by sub mandibular gland and minor salivary glands in descending order which is consistent with the other studies (Table 6).

Table 6: Site distribution of salivary gland lesions in different studies.

Study name	Parotid gland	Submandibular gland	Minor salivary gland
Teeda et al[5]	73.5%	16.9%	9.4%
Rewsuwan et al[10]	80.11%	15.34%	3.41%
Laishram et al[11]	58.65%	31.73%	9.62%
Patel et al[12]	75.71%	21.42%	1.4%
Present study	65.82%	17.72%	16.46%

Age distribution

For age wise distribution of neoplastic lesions, most common age group affected in benign lesions was 31-40 years which is correlated with the study of Shinde et al and Edda et al.[9,13]

The most common age group affected by malignant lesions was 41-50 years in our study which is correlated with the study of Shinde et al, Chatterjee et al and Edda et al.[9,13,14] Benign lesions are seen in lower age group than malignant.

In non-neoplastic lesions, mucocele was most common in 2nd decade which is similar to the study More et al and Jani et al.[15,16] While other cystic and inflammatory conditions had wide age range similar to study Mohan et al.[17]

Gender distribution

In present study, there was female preponderance in both benign and malignant lesions.

Table 7: Male:female ratio in benign and malignant lesions in various studies.

Study name	Benign	Malignant
Edda et al[9]	1:1.5	1:1.1
Srivani et al[18]	1:1.2	1:3.3
Saldanha et al[7]	1:1.25	1:0.5
Bobati et al[19]	1:2.3	1:1
Present study	1:1.4	1:1.6

In our study out of 22 (27.5%) cases of non-neoplastic lesions, 9 (40.9%) cases were of chronic sialoadenitis and 7 (31.8%) cases were of mucocele which is similar to study Kumar et al and Kanpuriya et al.[1,2]

Pleomorphic adenoma was the most common tumor accounting 48.75 % of all lesions and 86.67% of all benign tumors. This correlates to the result of other studies by Bookya et al (43.75% of all lesions and 70% of all benign tumor) and Kakoty et al (44% of all lesions and 81% of all benign tumors).[20,21] The peak age incidence of pleomorphic adenoma was 31-40 year with female preponderance with male to female ratio of 1:1.4. These findings are similar to other studies Ankur et al (peak age 31-40 to years and M:F ratio of 1:1.5), Ayub et al (peak age 31-50 years and M:F ratio of 1:2.3) and Vargas et al (peak age 31-40 to years and M:F ratio of 1:2).[22-24]

In present study parotid gland is the most common site of pleomorphic adenoma and is consistent with Patel et al and Rewsuvan et al.[10,12] Few cases showed foci of squamous metaplasia. Few cases also showed keratinized epithelial plugs in the lumen. Few cases showed foci of squamous metaplasia.

Warthin tumor accounting 5% of all tumor and 8.8% of all benign tumor result of which correlate with study Ankur et al (6.6% of all lesions and 16.6% of all benign tumor) and Soni et al (5% of all lesions and 9.6% of all benign tumor).[22,25] Peak age range of Warthin tumor was 41-50 year and male preponderance(M:F ratio 3:1) which is similar to study Soni et al (peak age 41-60 years and M:F ratio of 1.5:1) and Ankur et al (peak age 41-50 years and M:F ratio of 4:0).[22,25] Parotid gland most commonly affected which is consistent with study Kumar et al.[26] Heterotopic salivary tissue refers to the existence of salivary tissue at sites other than the 3 major salivary glands and the minor salivary glands. Heterotopias have been described in lymph nodes, external auditory canal, thyroglossal duct cyst, hypophysis, mandible, mastoid bone, middle ear, tongue, sternoclavicular joint, thyroid and parathyroid glands. In our study, one case of Warthin tumor was found in heterotropic salivary gland in cervical lymph node.

Among malignant lesions, mucoepidermoid carcinoma was comprised of 11.25% of all lesions and 69.24% of malignant tumor which correlate with the study Ankur et al (8.33% of all lesions) and Patel et al (14.28% of all lesions).[12,22] Peak age range for mucoepidermoid carcinoma was 41-50 years and female preponderance (M:F ratio 1:1.2) which is similar to study Srivani et al (peak age 41-50 years and M:F ratio of 1:1) and Patel et al (peak age 31-50 to years and M:F ratio of 1:2.3).[12,18] In our study parotid gland was most common site for mucoepidermoid carcinoma followed by submandibular gland and minor salivary gland which correlates with the study of Renehan et al and Nagarkar et al.[6,27]

In this present study acinic cell carcinoma accounts for 15.38% of malignant tumor which is consistent with the study Vahahula et al, Mohd Ayub et al and Rewsuwan et al.[9,10,23] Age group was 50-70 year which is consistent with the study Rewsuwan et al.[10] Both cases occurred in female patient which is consistent with Vargas et al, Renehan et al and Mohd Ayub et al study.[23,24,27]

In our study, 2 cases of adenoid cystic carcinoma were noted which was 15.38% of all the malignant tumor which is similar to that of Dave et al and Shinde et al.[4,13] One was in 60-year-old female and another was noted in 64-year-old male patient. Both were in palate. So, adenoid cystic carcinoma is most common in minor salivary gland which is similar to study Kumar et al, Rewsuwan et al and Hussain et al.[10,26,28]

Limitations of this study included a limited number of available cases of each tumor type and missing of some tumor types due to its relatively infrequent occurrence.

CONCLUSION

The present study shows salivary gland lesions are wide range of lesions from non-neoplastic to neoplastic lesion. Benign lesions are more common than malignant lesions with parotid gland being the most common site and pleomorphic adenoma, the most common tumor type. Mucoepidermoid carcinoma is the most malignant tumor. Most common age group affected is 31-40 years. Among tumors, female preponderance is seen except in Warthin tumor.

Salivary gland lesions are very heterogeneous with histomorphological features in different benign and malignant lesion.

Heterotopia of salivary gland may occur in intra nodal and extra nodal sites. Lymphnodes near parotid gland, mylohyoid muscle, pituitary gland and cerebellopontine angle are site of heterotopic.

So, thorough knowledge of morphology of salivary gland lesion is helpful in final diagnosis in predicting prognosis, typing, staging and grading of salivary neoplasms.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Dholiya BM, Gamit BN, Shah HK. Histopathological study of neoplastic and non-neoplastic lesions of salivary gland: a study at a tertiary care center. Int J Res Med Sci 2023;11:1197-203.