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Salivary Gland Neoplasms, A Clinicopathological Study

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Abstract

A salivary gland tumor is an uncontrolled growth of cells that originates in one of the many saliva-producing glands in the mouth. The salivary glands are afflicted by a greater variety of neoplasms than any other organ system in the body. The objective of this study was to find the most common age group, sex affected, location, and types of salivary gland tumors in Erbil City.

A retrospective analysis was done for all the cases of salivary gland tumors received, in the Department of Histopathology, Rizgari Teaching Hospital, for the years 2006, 2007 and 2008, and four histopathological laboratories in different area of Erbil City. All the cases were analyzed for age, sex, site, and type of the tumor, the slides of all cases under the study were re-examined for the histopathological presence or absence of any invasion.

The number of the salivary gland tumors was (44) case. The age range of the patients was from (15-69) years, with a mean age of (42.05) years for the males, and (41.54) years for the females. The highest number of patients was seen above (54) years. The total male to female ratio was 0.76:1. Most of the salivary gland tumors were seen associated with the parotid gland and (31.82%) was seen within the age group (28-40) years. Histopathological study showed that the most common benign tumor was pleomorphic adenoma followed by Warthin's tumor, and the most common malignant tumor was adenoid cystic carcinoma and mucoepidermoid carcinoma. Statistical analysis showed no significant differences present between the benign and the malignant tumor regarding the age, sex, and the invasion.

The highest number of patients with salivary gland tumors was seen above (54) years. The total male to female ratio was 0.76:1. Most of the salivary gland tumors were seen associated with the parotid gland .The most common benign tumor was pleomorphic adenoma followed by Warthin's tumor, and the most common malignant tumor was adenoid cystic carcinoma and mucoepidermoid carcinoma.

Key words: Minor salivary glands neoplasm, major salivary glands neoplasm, pleomorphic adenoma, benign and malignant neoplasm of salivary glands.

Introduction

The salivary glands consist of three paired major glands, and countless minor salivary glands. The secretion of saliva is essential for the normal function and health of the mouth, and

moistens food to aid chewing and swallowing^(1,2,3).

A salivary gland tumor is an uncontrolled growth of cells, and pleomorphic adenomas are the most

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common benign tumor. The most common location of occurrence is the parotid (85%) followed by the minor salivary glands (10%). These tumors are most often diagnosed in the 4th to 6th decades of life and are more common in women with male to female ratio of 1:3.4^(4,5). Warthin's tumor is the second most common benign salivary gland tumor of parotid gland, it makes up 6-10% of cases of parotid tumors. It is more common in old men, with a male to female ratio of 5:1⁽⁶⁾.

Oncocytomas are rare tumor that constitutes only 2.3% of benign salivary gland neoplasm, and most often encountered after the sixth decade of life with a nearly equal male to female ratio of occurrence. The basal cell adenoma constitutes 1.8% of benign epithelial salivary gland tumors, and the majority occur in the parotid gland of patients of 6th decade of life. The canalicular adenoma most commonly involves the minor salivary glands of patients in the 7th decades of life with female predominance. Mucoepithelioma account for less than one percent of all salivary gland tumors, most commonly involves the minor salivary glands of patients in the 5th decades of life with female predominance⁽⁷⁾.

The malignant tumors are rare and usually occur between 50 to 60 years. Mucoepidermoid carcinoma is the most common (5-9%) of all salivary neoplasms. It develops commonly in the major salivary glands, and more common in women, while adenoid cystic carcinoma develops most commonly in the submandibular glands, and occurs equally in men and women. Acinic cell carcinoma account for about 1% of all salivary gland tumors and is more common in women. Undifferentiated carcinomas are uncommon, and have poor prognosis, men are affected more

frequently than women and the parotid is the most common site. The other malignant tumors are rare and represent very low percentages of all salivary gland tumors⁽⁸⁾.

Hindy (2002) studied (40) cases of epithelial salivary glands tumors, the result showed that 45%(18/40) were benign tumors, and 55%(22/40) were malignant tumors, and (55%) seen associated with the minor salivary glands (10 benign and 12 malignant), and 45% were seen associated with the major salivary glands (8 benign and 10 malignant), and the most common benign tumor was pleomorphic adenoma (35%), and the most common malignant tumor was mucoepidermoid carcinoma (22.5%) followed by adenoid cystic carcinoma(20%)⁽⁹⁾. Al Tememi (1992) found that the benign tumors forms 43.77% only, and the most common benign tumor was pleomorphic adenoma (38.1%), followed by Warthin's tumor (3.75%), and the most common malignant tumor was adenoid cystic carcinoma (12.71%), followed by mucoepidermoid carcinoma⁽¹⁰⁾.

The aim of this study to find the most common age group, sex affected location, and types of salivary gland tumors in Erbil City.

Materials and method

A retrospective analysis was done for all the cases of salivary gland tumors received, in the Department of Histopathology, Rizgari Teaching Hospital, for the years 2006, 2007 and 2008, and four histopathological laboratories in different area of Erbil city. All the cases were analyzed for age, sex, site, and type of the tumor; the slides of all cases under the study were re-examined for the histopathological presence or absence of invasion of perineural spaces and / or small blood vessels. This was

searched for in all slides available for each case.

Results

The results showed that the number of the salivary gland tumors was (44) case. The age range of the patients from (15-69) years, with a mean age of (42.05) years for the males, and (41.54) years for the females. The highest number of patients was seen above (54) years (36.36%), followed by the age group (28-40) years (34.09%). The total male to female ratio was 0.76:1 (Table-1).

Most of the salivary gland tumors were seen associated with the parotid gland (70.45%), with a male to female ratio of 0.82:1, followed by the submandibular gland (15.91%), and the minor salivary glands (13.64%), no tumors were seen associated with the sublingual glands in this study (Table-2).

The highest percentage of parotid tumors (31.82%) was seen within the age group (28-40) years. While the highest percentage of submandibular gland tumors (6.82%) was seen within the age group (15-27) years, and above (54) years, and most minor salivary gland tumors (6.82%) occurs above (54) years of age (Table-3).

The result also showed that the number of males with pleomorphic adenoma was less than that of females (Table-4) with male to female ratio of 0.85: 1, and the highest number seen within the age group (28-40) year as seen in (Table-5).

Histopathological study showed that the most common benign tumor was pleomorphic adenoma (59.09%), followed by Warthin's tumor (6.82%), oncocytoma (2.27%), and lastly canalicular adenoma (2.27%). Figure-1 and Figure-2 showing the histopathological pictures of

pleomorphic adenoma and Warthin's tumor.

Histopathological study also showed that the most common malignant tumor was adenoid cystic carcinoma (9.09%), and mucoepidermoid carcinoma (9.09%), and (4.55%) of the tumors was diagnosed as undifferentiated carcinoma. One case only (2.27%) was diagnosed for each of the following acinic cell carcinoma, sebaceous lymph adenocarcinoma, and lastly the myoepithelial carcinoma (Table-6), which is a very rare tumor, and the patient showed recurrence of the tumor after its surgical removal. Figure-3, Figure-4, and Figure-5 showing the histopathological picture of adenoid cystic carcinoma, mucoepidermoid carcinoma, and myoepithelial carcinoma.

The microscopical picture of all benign salivary gland tumors showed no perinural or vascular invasion, and the highest numbers of the malignant salivary gland tumors showed no perinural or vascular invasion (Table-7).

The result also showed that (25.81%) of parotid tumors are malignant, (28.57%) of submandibular gland tumors are malignant, and (50%) of minor salivary gland tumors are malignant (Table-8).

Statistical analysis showed no significant differences present between the benign and the malignant tumor regarding the age, sex, and the invasion (Table-9).

Discussion

The parotids are the salivary glands most often affected by tumors and represent (70.45%) of all the tumors in the present study, while the submandibular salivary gland showed (15.91%), and (13.64%) for minor salivary glands. The total male to

female ratio was 0.76:1. Calabrese and Frey (2006) found that approximately 80% salivary tumors diagnosed are in a parotid gland, 10% is in a submandibular gland, and the remaining is diagnosed in other salivary glands, and men and women are at equal risk⁽⁴⁾. In 1977, Skolnik et al found that 90% of salivary glands tumors occurred in the parotid gland⁽¹¹⁾, while Langdon (1985) found that 85% occurred within the parotid⁽¹²⁾.

The results also showed that the most common tumor of parotid gland was pleomorphic adenoma 66.66% (20/30), followed by Warthin's tumor 6.66% (2/30). Langdon (1985) found that (56%) of parotid tumors were benign pleomorphic adenoma and (20%) were Warthin's tumor⁽¹²⁾, this later figure seems excessive, as most authors suggest an incidence of 4.7 to 16.9 %⁽¹³⁾. Only Kennedy (1983) has reported a higher incidence of Warthin's tumor (30%)⁽¹⁴⁾.

In the submandibular and minor salivary glands, the benign pleomorphic adenoma was the most common tumor and represent 42.85% (3/7), which is comparable to other reported studies⁽¹¹⁾. By contrast, in South Africa, Isacson and Shear found an incidence of 72.5% benign tumors, 70% being benign pleomorphic adenoma⁽¹⁵⁾, and Owens and Calcaterra, reporting from United States, an incidence of 80% benign tumors, 67% being benign pleomorphic adenoma⁽¹⁶⁾.

Most authors point out that there is an approximately equal incidence of pleomorphic adenoma in male and female patients⁽¹¹⁾. This was nearly seen in the present study with male to female ratio of 0.76:1. Warthin's tumor is usually regarded as a disease of males as seen in the present study. Skolnik et al (1977) reporting an 83% male incidence⁽¹¹⁾. Langdon (1985) found 3:1 male predominance⁽¹²⁾.

It is consistently reported that benign pleomorphic adenoma occurs at an average of one decade earlier than Warthin's tumor. Other study quote ages of 37.7 to 48 years for pleomorphic adenoma, and 55.6 to 60 years for the Warthin's tumor⁽¹¹⁾, this come in agreement of the present result, that most cases of pleomorphic adenoma occur at younger age than that of Warthin's tumor. The mean age of patients with malignant tumors in the present study was of (49.38) years, and the highest number seen associated with the females, most cases seen localized in the parotid gland, the adenoid cystic carcinoma and mucoepidermoid carcinoma represent the highest number, The present results were agree and disagree in some points with the results of Hindy (2002), and the results of Al Tememi (1992)^(9,10).

A retrospective analysis were done by Kulaksiz et al (2002) to study the malignant tumors of the major salivary glands in (15) cases, (11) tumors were localized in the parotid glands and only (4) were localized in submandibular glands, and the most common malignant tumor was adenocarcinoma followed by undifferentiated carcinoma⁽⁶⁾.

Some studies found that the mucoepidermoid carcinoma represents 29% to 34% of malignant tumors originating in both major and minor salivary glands^(17,18,19). Adenoid cystic carcinoma was the second most common malignant tumor with an incidence or relative frequency of approximately 20%. Acinic cell carcinoma is the third most common salivary gland epithelial neoplasm and comprised 17% of primary malignant salivary gland tumors or about 6% of all salivary gland neoplasm; more than 80% occur in the parotid gland; women were affected more than men; and the mean age was 44 years^(20,21,22).

Sebaceous lymph adenocarcinoma represents carcinomatous transformation of sebaceous lymphadenoma. One case only (2.27%) had been found associated with the parotid gland in 65 years old female. Other studies also found that most cases occurred in the parotid gland, and all patients were in their sixth or seventh decade of life^(23,24,25).

The study also showed that one case only of myoepithelial carcinoma comprises (2.27%) of all salivary gland neoplasms and seen associated with the parotid gland in 36 years old female. Others also found that it is predominantly a tumor of the parotid gland, but the mean age of patients is about 60 years and about (60%) of the patients are females^(26,27,28), or it occur with equal frequency between the sexes⁽²⁹⁾.

Conclusions

The results showed that the number of the salivary gland tumors was (44) case. The age range of the patients from (15-69) years. The highest number of patients was seen above (54) years. The total male to female ratio was 0.76:1. Most of the salivary gland tumors were seen associated with the parotid gland, followed by the submandibular gland, and the minor salivary glands.

The highest percentage of parotid tumors was seen within the age group (28-40) years. While the highest percentage of submandibular gland tumors was seen within the age group (15-27) years, and above (54) years, most minor salivary gland tumors occurs above (54) years of age.

The number of males with pleomorphic adenoma was less than that of females with male to female ratio of 0.85: 1, and the highest number seen within the age group (28-40) year.

Histopathological study showed that the most common benign tumor was pleomorphic adenoma, followed by Warthin's tumor, and the most common malignant tumor was adenoid cystic carcinoma and mucoepidermoid carcinoma.

The result also showed that (25.81%) of parotid tumors are malignant, (28.57%) of submandibular gland tumors are malignant, and (50%) of minor salivary gland tumors are malignant. Statistical analysis showed non significant differences present between the benign and the malignant tumor regarding the age, sex, and the invasion.

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Table-1: Age and sex distribution of the salivary gland tumors.

Age group	Male No.	Female No.	M/F ratio	Total No.&%
(15-27) Year	2	4	1:2	6(13.64%)
(28-40) Year	7	8	0.88:1	15(34.09%)
(41-53) Year	1	6	1:6	7(15.91%)
Above (54) Year	9	7	1.29:1	16(36.36%)
Total	19	25	0.76:1	44(100%)

Table-2: The location and sex distribution of the salivary gland tumors

Salivary gland tumor location	Male No.	Female No.	M/F ratio	Total No.&%
Parotid gland	14	17	0.82/1	31(70.45%)
Submandibular gland	3	4	0.75/1	7(15.91%)
Sublingual gland	0	0	0	0(0%)
Minor salivary glands	2	4	½	6(13.64%)
Total	19	25	0.76:1	44(100%)

Table-3: The location and age distribution of the salivary gland tumors.

Salivary gland tumor location	(15-27) Year (No.&%)	(28-40) Year (No.&%)	(41-53) Year (No.&%)	Above (54) Year (No.&%)	Total (No.&%)
Parotid gland	3(6.82%)	14(31.82%)	4(9.09%)	10(22.72)	31(70.45%)
Submandibular gland	3(6.82%)	0(0%)	1(2.27%)	3(6.82%)	7(15.91%)
(Sublingual gland)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
(Minor salivary gland)	0(0%)	1(2.27%)	2(4.55%)	3(6.82%)	6(13.64%)
Total	6(13.64%)	15(34.09%)	7(15.91%)	16(36.36%)	44(100%)

Table-4: Sex distribution for each salivary gland tumor.

Type of tumor in the study	Male	Female	Total (No.&%)
1.Pleomorphic adenoma	12	14	26(59.09%)
2.Warthin's tumor	3	0	3(6.83%)
3.Oncocytoma	0	1	1(2.27%)
4.Canalicular adenoma	0	1	1(2.27%)
5.Adenoid cystic carcinoma	1	3	4(9.09%)
6.Mucoepidermoid carcinomas	1	3	4(9.09%)
7. Undifferentiated carcinoma	1	1	2(4.55%)
8. Acinic cell carcinoma	0	1	1(2.27%)
9.Sebaseous adenocarcinoma	0	1	1(2.27%)
10. Myoepithelial carcinoma	0	1	1(2.27%)
Total (No.&%)	18	26	44 (100%)

Table-5: Age distribution for each salivary gland tumor.

Type of tumor in the study	Age group (15-27) year	Age group (28-40) Year	Age group (41-53) Year	Age group Above 54 Year	Total
1.Pleomorphic adenoma	4	11	4	7	26(59.09%)
2.Warthin's tumor	0	0	0	3	3(6.83%)
3.Oncocytoma	1	0	0	0	1(2.27%)
4.Canalicular adenoma	0	0	0	1	1(2.27%)
5.Adenoid cystic carcinoma	0	1	2	1	4(9.09%)
6.Mucoepidermoid carcinomas	0	0	1	3	4(9.09%)
7. Undifferentiated carcinoma	0	1	0	1	2(4.55%)
8. Acinic cell carcinoma	0	1	0	0	1(2.27%)
9.Sebaseous adenocarcinoma	0	0	0	1	1(2.27%)
10. Myoepithelial carcinoma	0	1	0	0	1(2.27%)
Total (No.&%)	5(11.37%)	15(34.09%)	7(15.90%)	17(38.64%)	44(100%)

Table-6: The number and percentage of the salivary gland tumors in each salivary gland.

Type of tumor in the study	Parotid gland (No.&%)	Submandibular gland (No.&%)	Sublingual gland (No.&%)	Minor salivary gland (No.&%)	Total (No.&%)
1.Pleomorphic adenoma	20(45.45)	3(6.82%)	0(0%)	3(6.82%)	26(59.09%)
2. Warthin's tumor	2(4.55%)	1(2.27%)	0(0%)	0(0%)	3(6.82%)
3.Oncocytoma	0(0%)	1(2.27%)	0(0%)	0(0%)	1(2.27%)
4.Canalicular carcinoma	0(0%)	0(0%)	0(0%)	1(2.27%)	1(2.27%)
5.Adenoid cystic carcinoma	1(2.27%)	1(2.27%)	0(0%)	2(4.55%)	4(9.09%)
6.Mucoepidermoid carcinomas	3(6.82%)	0(0%)	0(0%)	1(2.27%)	4(9.09%)
7. Undifferentiated carcinoma	1(2.27%)	1(2.27%)	0(0%)	0(0%)	2(4.55%)
8. Acinic cell carcinoma	1(2.27%)	0(0%)	0(0%)	0(0%)	1(2.27%)
9.Sebeaceous adenocarcinoma	1(2.27%)	0(0%)	0(0%)	0(0%)	1(2.27%)
10.Myoepithelial carcinoma	1(2.27%)	0(0%)	0(0%)	0(0%)	1(2.27%)
Total (No.&%)	30(68.18%)	7(15.91%)	0(0%)	7(15.91%)	44(100%)

Table-7: Perinural and/or vascular invasion in each tumor.

Type of tumor in the study	With invasion (No.&%)	With out invasion (No.&%)
1.Pleomorphic adenoma	0(0%)	26(59.09%)
2.Warthin's tumor	0(0%)	3(6.82%)
3. Oncocytoma	0(0%)	1(2.27%)
4.Canalicular adenoma	0(0%)	1(2.27%)
5.Adenoid cystic carcinoma	1(2.27%)	3(6.82%)
6.Mucoepidermoid carcinoma	0(0%)	4(9.09%)
7.Undifferentiated carcinoma	1(2.27%)	1(2.27%)
8.Acinic cell carcinoma	0(0%)	1(2.27%)
9.Sebeaceous adenocarcinoma	0(0%)	1(2.27%)
10.Myoepithelial carcinoma	1(2.27%)	0(0%)
Total	3(6.82 %)	41(93.18%)

Table-8: The number and percentage of benign and malignant tumors in each salivary gland.

Salivary gland tumor location	Benign tumor (No.&%)	Malignant tumor (No.&%)
Parotid gland	23(74.19%)	8(25.81%)
Submandibular gland	5(71.43%)	2(28.57%)
Sublingual gland	0(0%)	0(0%)
Minor salivary glands	3(50%)	3(50%)
Total	31(70.45%)	13(29.55%)

Table-9: A comparison between benign and malignant tumors by all parameter.

Parameter	Benign tumor	Malignant tumor	Level of significance
Mean age (years)	41.29	49.38	0.071(NS)
Sex			
Male	15	3	0.108(NS)
Female	16	10	
Perinural & / or vascular invasion	0	3	0.165(NS)

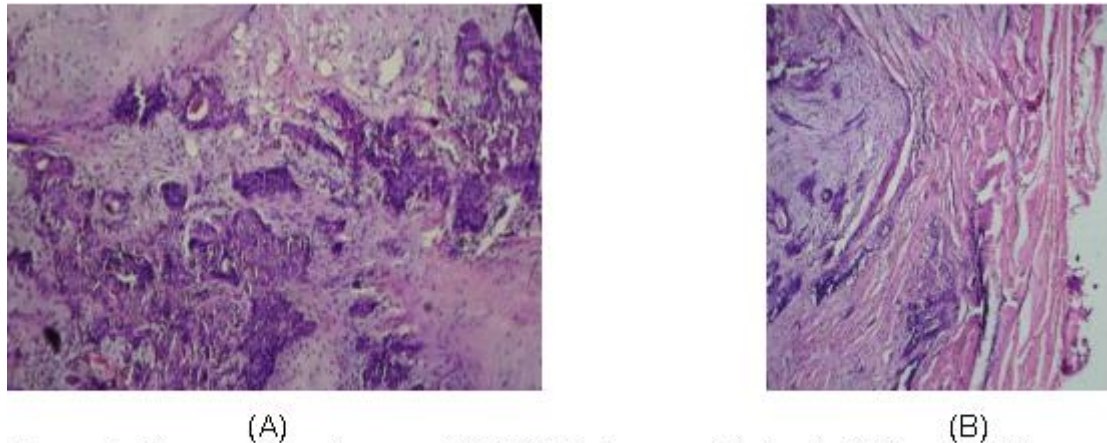


Figure-1: Pleomorphic adenoma (H&E10X) in the parotid gland of 35 years old female, showing (A) both mesenchymal and an epithelial component, (B) the tumor ingrowths into the capsule .

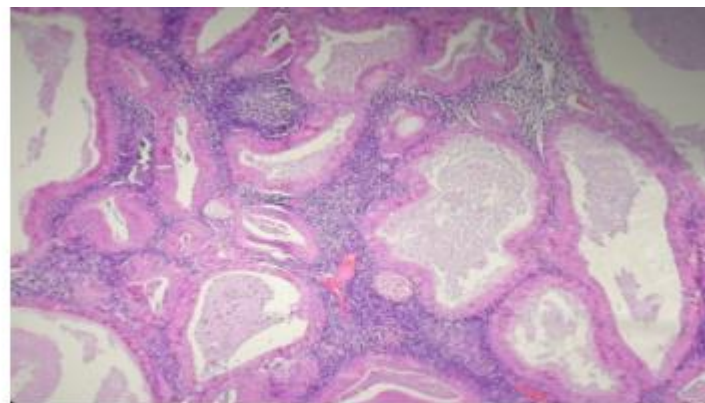


Figure-2: Warthin's tumor (H&E10X) in the parotid gland of 63 years old male, note the cystic spaces lined by columnar cells supported by lymphoid tissues.

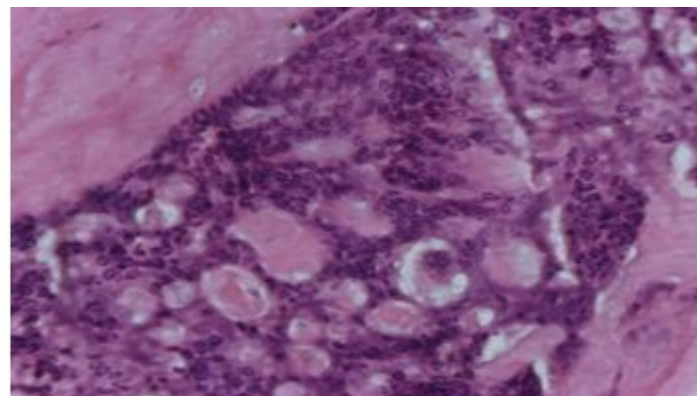


Figure-3: Adenoid cystic carcinoma (H&E40X) in the minor salivary gland of 55 years old female. The small darkly staining cells form a cribriform of cylindromatous pattern related to the formation of pseudocystic spaces that contain acellular substances

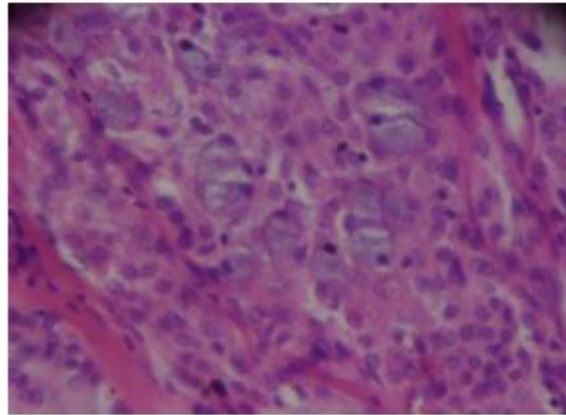
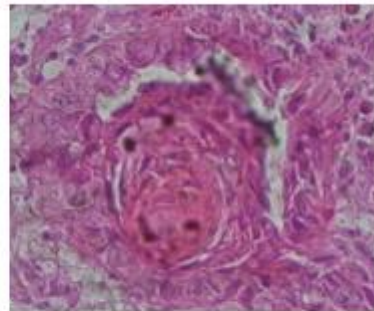
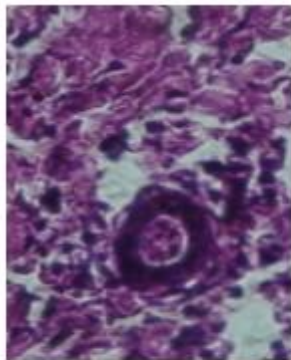


Figure-4: Mucoepidermoid carcinoma (H&E40X): in the parotid gland of 59 years old male , Both the mucous and epidermoid cells are seen.



(B). Myoepithelial carcinoma. The malignant cells surround the blood vessel and invade the wall .

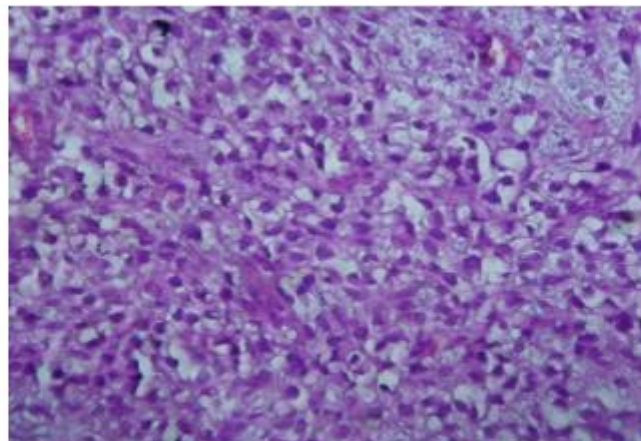


Figure-5: (A). Myoepithelial carcinoma (H&E40X) in the parotid gland of 36 years old female, biopsy specimen showing Clear cells and myoepithelial tumor cells .