ELASTIC TISSUE IN SALIVARY GLAND TUMOURS

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SYNOPSIS

The incidence and distribution of elastic tissue in ten cases each of pleomorphic adenomas, adenoid cystic carcinoma, adenocarcinoma and mucoepidermoid tumours were studied by conventional light microscopy and fluorescence microscopy. Results showed that elastic tissue was found in all four groups of tumours: pleomorphic adenomas (10%); adenoid cystic carcinomas (20%); adenocarcinomas (30%); and mucoepidermoid tumours (10%). Quantitative assessment of elastic tissue in the 2 cases of adenocarcinomas showed that this may range from 13.3% to 37.6% of the total tumour area. The usefulness of elastic tissue as a diagnostic criteria in distinguishing between some of the salivary gland tumours was also discussed.

INTRODUCTION

Although the histological criteria for the diagnosis of the different types of salivary gland tumours are fairly well-established, considerable difficulties are sometimes encountered in the diagnosis of some of these lesions.

In 1972, Azzopardi and Zayid (1) proposed that the presence and amount of elastic tissue in the stroma may be of use in distinguishing different tumours of salivary glands. They found that elastic tissue occurs in more than 90% of pleomorphic adenomas. The incidence in adenoid cystic carcinoma varies from 30% to 80% in

different studies. It is also present in all malignant "mixed" tumours. Of significance are the findings that these components are absent in mucoepidermoid tumours, acinic cell tumour, oxyphilic adenoma, adenolymphoma and other variants of monomorphic adenoma (1-3).

The present study was designed to test the statement that the presence of elastic tissue is of assistance in the diagnosis of individual salivary gland tumours. The presence and amount of this component in a series of salivary gland tumours of varying type will be determined and the usefulness of this criteria evaluated.

MATERIAL AND METHODS

The material for this study consisted of 10 cases each of pleomorphic adenoma, adenoid cystic carcinoma, adenocarcinoma and mucoepidermoid tumour. These specimens were chosen from the files of the Department of Pathology, Institute of Dental Surgery, Eastman Dental Hospital, London. The specimens consisted of 32 minor and 8 major salivary gland tumours from patients aged between 14 and 89 years (Tables 1-4).

The following diagnostic criteria were applied to the salivary gland tumours for inclusion in the present study:

1. Pleomorphic adenoma

The tumour will be required to contain both epithelial tissue and stromal elements of hyaline, myxoid or chondroid appearance. However, where the latter components are relatively scanty but the epithelial component is very similar to that found in the more typical "mixed" tumour, it is acceptable for inclusion in the present study. The epithelial tissue may be in the form of ducts, sheets of epithelial cells or squamous metaplasia may be seen. The tumour is circumscribed. A capsule may be present though it may be of varying thickness and completeness.

2. Adenoid cystic carcinoma

The cribriform pattern is the predominant pattern though often the cellular pattern of solid sheets, cords and trabeculae of tumour cells may also occur. Two basic tumour cells are recognised: myoepithelial and duct-lining cells. These may form prominent duct-like structures in some cases. The stroma is fibrous and may be hyalinised. Sometimes it acquires a myxoid

TABLE 1
CASES OF PLEOMORPHIC ADENOMA

No.	Age (yrs)	Sex	Site
1.	89	F	Right cheek
2.	17	F	Junction hard and soft palate
3.	14	F	Right parotid gland
4.	43	F	Left parotid gland
5.	37	M	Junction hard and soft palate
6.	35	F	Palate
7.	26	M	Junction hard and soft palate
8.	42	M	Palate
9.	52	F	Left parotid gland
10.	35	M	Hard palate

TABLE 2
CASES OF ADENOID CYSTIC CARCINOMA

No.	Age	Sex	Site
1.	52	F	Right floor of mouth
2.	51	M	Right antrum
3.	48	M	Right cheek
4.	38	M	Palate
5.	45	F	Submandibular salivary gland
6.	61	M	Submandibular salivary gland
7.	41	F	Palate
8.	32	F	Right cheek
9.	63	M	Palate
10.	52	F	Left parotid gland

TABLE 3
CASES OF ADENOCARCINOMA

No.	Age (yrs)	Sex	Site
1.	44	F	Left cheek
2.	23	F	Lower right third molar region
3.	62	M	Palate — right side
4.	31	F	Soft palate — right side
5.	73	F	Left submandibular gland
6.	61	F	Hard palate
7.	74	F	Left maxilla
8.	56	F	Right cheek
9.	37	F	Parotid
10.	50	M	Soft palate

TABLE 4
CASES OF MUCOEPIDERMOID TUMOUR

No.	Age (yrs)	Sex	Site
1.	67	M	Floor of mouth — right side
2.	54	F	Left tuberosity
3.	30	F	Junction hard and soft palate
4.	80	M	Lower right third molar region
5.	40	F	Left retromolar region
6.	45	F	Lateral border of tongue — right side
7.	48	M	Left palate and antrum
8.	26	M	Palate
9.	54	F	Palate — left side
10.	23	F	Left faucial region

appearance but no cells should be found within this area. It is not encapsulated and shows a highly invasive pattern with special tendency for perineural spread.

3. Adenocarcinoma

The tumour is non-encapsulated, frankly malignant, exhibiting invasion of normal tissue and showing recognisable neoplastic ducts or tubules. The cells lining the ducts exhibit pleomorphism. Tumours showing adenocarcinomatous elements but also exhibiting residues of recognisable "mixed" tumour are acceptable for inclusion in the present study.

4. Mucoepidermoid tumour

For inclusion in the present study, the tumour must be shown to contain mucous-secreting cells and squamous cells with demonstrable intercellular bridges. It must not be encapsulated, and cyst formation is a commonly seen feature. Intermediate cells as described in the literature cannot be identified with certainty and their presence is not considered essential for inclusion. The stroma is fibrous and there is no evidence of myxoid or myxochondroid material.

For all the 40 cases, paraffin sections of approximately 5 micron thickness were prepared. These were stained with Erhlich's haematoxylin and eosin, and modified Taenzer-Unna orcein method.

A. Qualitative Histology:

Conventional light microscopy and fluorescence microscopy were used to study the incidence and relative distribution of elastic tissue within the various types of salivary gland tumours. Elastic fibres were identified as those tissues that show positive staining with the modified Taenzer-Unna orcein method and exhibit autofluorescence.

For fluorescence microscopy, an epi-fluorescence condenser III RS (Zeiss) was mounted on a Zeiss Photomicroscope I. An HBO 50 W light source was used. For examination of autofluorescence of elastic tissue unstained sections were used. A filter set for blue excitation comprising a primary blue interference set 455-490 and a barrier set 510-560 was used.

B. Quantitative Histology:

For the quantitative assessment of the elastic tissue component in the salivary gland tumours, a

method of point counting was used (4). A 7X calibrated eyepiece with a square-ruled network consisting of 55 intersection points and a 5x objective were employed. The grid was superimposed on an orcein-stained section and the number of points falling on the elastic tissue or tumour component were counted. The entire section was systematically sampled.

A subjective assessment of the amount of elastic tissue was also carried out. The increased amount of elastic tissue was graded as 1+ to 3+. When only few strands of elastic fibres were visible the amount was graded as 1+. If elastic fibres were seen in more than half of the tumour examined, a grading of 3+ was given. Any tumour containing elastic fibres intermediate in amount between the two was graded as 2+.

RESULTS

A. Qualitative Histology

1. Incidence

Elastic tissues were found in 7 tumours. They consisted of 1 case of pleomorphic adenoma, 2 cases of adenoid cystic carcinoma, 3 cases of adenocarcinoma and 1 case of mucoepidermoid tumour.

2. Distribution

In the pleomorphic adenoma, elastic tissue of varying thickness was seen closely apposed to and outlining some of the ducts. Fine and coarse elastic fibres forming a meshwork was also observed in the myxoid and chondroid areas. Very little elastic tissue was found in the cellular areas.

In the adenoid cystic carcinoma, elastic tissue may outline tumour masses, form irregular meshwork or nodular foci (Figs. 1 and 2).

Similarly in the adenocarcinoma, the elastic tissue may also outline tumour masses (Fig. 3) or form scattered nodular foci (Fig. 4). In one case, abundant elastic tissues were identified separating cords and clumps of tumour cells.

In the mucoepidermoid tumour, the elastic tissue was in the form of fine strands intimately related to the tumour (Figs. 5 and 6).

Fig. 1 Adenoid cystic carcinoma — small groups of tumour cells with formation of duct-like structures and invading into an area of normal mucous glands. (Haematoxylin and eosin. Original magnification, × 120)

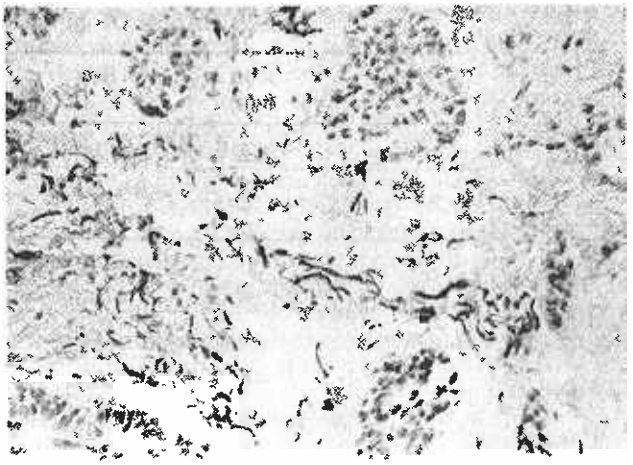

Fig. 2 Adenoid cystic carcinoma — an area from the same tumour in Fig. 1 showing fine elastic fibres in an irregular meshwork. (Orcein. Original magnification, × 300)

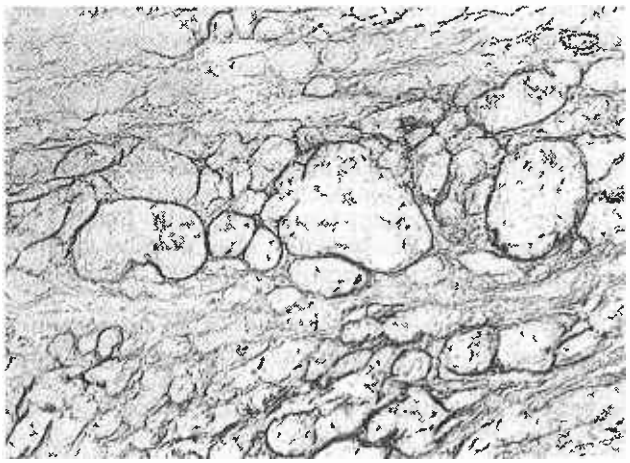

Fig. 3 Adenocarcinoma — masses of tumour cells are outlined by elastic fibres. (Orcein. Original magnification × 120)

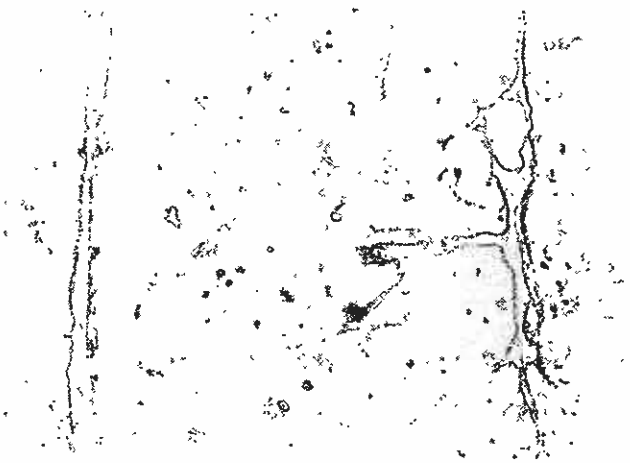

Fig. 4 Adenocarcinoma — elastic tissue is seen outlining ductal structures sectioned longitudinally. Scattered elastic nodular foci are also present. (Orcein. Original magnification × 120)

Fig. 5 Mucoepidermoid tumour — mucous-secreting cells and epidermoid cells in a predominantly cystic area. (Haematoxylin and eosin. Original magnification x 120)

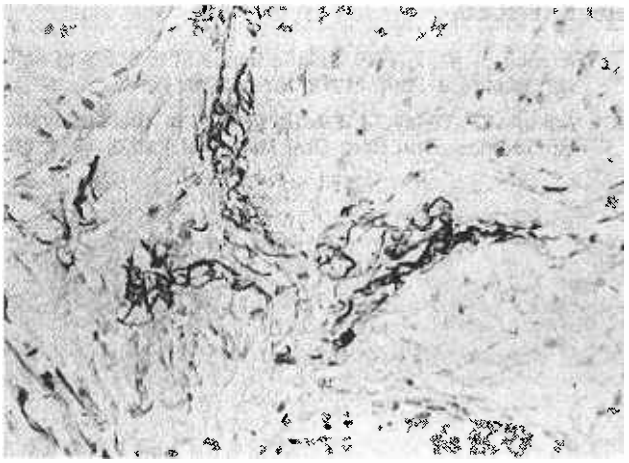

Fig. 6 Mucoepidermoid tumour — an area from the same tumour in Fig. 5 showing fine strands of elastic fibres intimately related to the tumour. (Orcein. Original magnification x 300)

B. Quantitative Histology

Subjective assessment of the amount of elastic tissue in each case showed that the majority of the cases contained scattered areas of elastic tissue with a subjective assessment grading of 1+. Only two cases of adenocarcinoma were given a grading of 2+ and 3+ respectively. These two cases alone contained substantial amount of elastic tissue for quantitation. The scores obtained are shown in Table 5.

they were not able to detect any elastic tissue in this tumour. On the basis of these observations it may be suggested that the mucoepidermoid tumour could possibly be included amongst the list of salivary gland tumours with elastic tissue though their incidence and amount may be small.

In the present study the incidence of elastic tissue in adenoid cystic carcinoma was comparable with the findings of Azzopardi and Zayid (30%) (1) but was at variance with those of Adkins and Daley (80%) (2), and

TABLE 5
SCORE FOR ELASTIC TISSUE

Adenocarcinoma	Subjective Assessment	Elastic Tissue (point hits)	Tumour area (point hits)	%
Case No. 9	3+	502	1334	37.6%
Case No. 6	2+	167	1287	13.0%

DISCUSSION

Certain variations in findings were observed in the study of the elastic tissue content in salivary gland tumours in previous reports and the present investigation. For pleomorphic adenomas, the incidence of elastic tissue was 92% in the study by Azzopardi and Zayid (1), and 97% in David and Buchner's series (3). In contrast only one out of the 10 cases of pleomorphic adenomas in the present report contained elastic tissue. It may be significant to note that in the two previous studies (1,3) the pleomorphic adenomas were predominantly from the major salivary glands. However, in the present study, only 3 out of 10 cases of pleomorphic adenomas were from the major salivary gland, and one of them was shown to contain elastic tissues. It therefore may be speculated that the site of origin and possibily the size of the tumour may also influence the incidence of elastic tissue in pleomorphic adenomas.

The present study also noted the presence of elastic tissue in one case of mucoepidermoid tumour. The elastic tissue was found closely related to the neoplastic cells. This is at variance with the findings of Azzopardi and Zayid (1), and David and Buchner (3), for David and Buchner (82%) (3). The reasons for the differences in these findings are not known.

The identification of elastic tissue in substantial amounts in two cases of adenocarcinomas in the present study also indicate that salivary gland tumours other than the pleomorphic adenoma, adenoid cystic carcinoma and malignant "mixed" tumour, can also elaborate elastic tissue. As no previous studies have provided for this group of lesions, no direct comparison can be made on the subjective and quantitative assessment of this component within these tumours.

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