Histopathological study of pleomorphic adenoma of salivary glands

Anca Ştefania Enescu1, Aurelia Enescu2, Maria Bălăsoiu3, Mircea-Sorin Ciolofan4, Alina-Nicoleta Căpătănescu5

1) Research Center for Microscopic Morphology and Immunology, University of Medicine and Pharmacy of Craiova, Romania
2) Department of Emergency Medicine, University of Medicine and Pharmacy of Craiova, Romania
3) Department of Microbiology–Immunology, University of Medicine and Pharmacy of Craiova, Romania
4) Department of ENT, University of Medicine and Pharmacy of Craiova, Romania

Abstract

The pleomorphic adenoma, also known as mixed tumor, presents an epithelial and mesenchymal histological structure, being also called epithelioma with altered stroma. The pleomorphic adenoma has a frequency of 70% of major salivary gland tumors, being located preponderantly at the level of parotid gland (52–84%), at the level of submandibular glands (7–17%) and at the level of the other salivary minor salivary glands (3–8%). The purpose of our study was the histopathological analysis of 45 cases of pleomorphic adenoma. The tumors were characterized by an increased structural pleomorphism, given by the multitude of cytological differences and proliferation patterns, and on the other side by the diversity of stromal component.

Keywords: pleomorphic adenoma, salivary glands, histopathology.

Introduction

Salivary gland tumors, although representing only 3–10% of head and neck neoplasms, represent an important part of the oral cavity pathological [1–3]. Pleomorphic adenosomas are the most frequent benign tumors of the salivary glands, representing 85% of all salivary gland tumors and 60% of parotid gland benign tumors [4]. They may be diagnosed at any age, with a maximum incidence in the 4th life decade [5]. Lack and Upton noticed that 40% of the lesions occur between 20–30 years, the pleomorphic adenoma representing the most frequent tumor of the salivary glands in children and adolescents [6]. Although there is not known up to present the etiology of this tumor, its incidence increases after 15–20 years of exposure to radiations [7]. Usually, this type of tumor is benign, but it may recur after an incomplete excision [8] especially in parotid localization [9] and in 2–8.5% of cases, it may become malignant [10]. The histogenesis process of pleomorphic adenoma of salivary glands continues to stay a controversial subject. Thus, while some authors suggest the origin of the two tumor components (parenchyma and stroma), from different sources, mesenchymal and epithelial [11–13], other support the unicellular origin of these tumors [14].

In the present study, we proposed to re-evaluate some histopathological aspects of pleomorphic adenomas of the salivary gland and to highlight some particular aspects both of the stroma and of the tumoral parenchyma, in order to correlate the histopathological aspects with the possibility of adenoma malignant degeneration.

Materials and Methods

The study was carried out during the years 2010–2013 on a number of 45 cases of pleomorphic adenoma.

The histopathological material came from the case studies within the Laboratory of Pathologic Anatomy, Emergency County Hospital, Craiova, Romania and it was represented by archived paraffin blocks.

At first, it was looking for the blocks and blades of histopathological diagnosis corresponding to the medical history sorted during the clinical-epidemiological study. The diagnosis blades were re-evaluated through the diagnosis criteria of head and neck tumors (2005) [15]. Out of the anatomopathological register of recording the case studies was taken the data regarding the histopathological diagnosis of the disease for cases retroactively studied.

We mention that the histopathological study investigated the main microscopic morphologic characteristics of the salivary gland pleomorphic adenoma. In the morphological study, we have used the classic histological technique by paraffin inclusion.

As staining methods, we have used Hematoxylin–Eosin (HE) for the diagnosis re-evaluation in compliance with the classification criteria of mammary gland tumors established by World Health Organization (2003); also we used Masson’s trichrome–Aniline Blue staining to appreciate the degree of tumor fibrosis; to appreciate the profile of mucins secreted by tumor cells Alcian Blue–Periodic Acid Schiff (AB–PAS) staining was used.

Results

Histopathologically, the pleomorphic adenomas were...
characterized by glandular and myoepithelial epithelial neoplastic proliferations covering a multitude of increase patterns to which were associated a series of their stromal component alteration, which led to a real lesional polymorphism.

The basic cell components of this type of tumor were represented by luminal cell of ductal type and the abluminal cells of myoepithelial type. The ductal neoplastic cell as typically presented under the shape of a columnar or cuboidal cell, with pale eosinophil cytoplasm, granulary and with a cantered oval-shaped nucleus (Figure 1).

In three cases of pleomorphic adenoma, with predominance of the epithelial component, we have met differentiations of squamous type of ductal luminal cells. Thus, we have emphasized the presence of some nests of squamous cells in the wall of neoplastic tubular proliferations or of some small cystic areas, delimited of squamous cells full of keratin placed among the ductal neoplastic proliferations (Figure 2).

In other case, the neoplastic epithelial component covered the oncocytic morphology. Thus, we have noticed the presence of ductal structures of which lumen was delimited of tall cylindrical cells, with nuclei placed in palisade in the centre of the cell or towards the lumen of cystic areas, with fine granulary cytoplasm and intensely eosinophil (Figure 3).

The myoepithelial cell represented the major cell neoplastic population of the pleomorphic adenoma. Typically, the myoepithelial cells that are comprised in the composition of ductal proliferations had cuboidal or oval-shaped cell morphology, with a reduced eosinophilic cytoplasm, with flattened and tachychromatic nucleus, placed in one single row, encircling the luminal epithelial layer (Figure 4).

In four cases, we emphasized the presence of myoepithelial cells with plasmocytary morphology. These had an oval-shaped aspect, homogenous, eosinophilic, hyaline cytoplasm, round nucleus, eccentrically placed, but the perinuclear halo is absent (Figure 5).

The most frequent cytoarchitectonic pattern met in our study was the tubular one and the solid one. The neoplastic tubes are delimited at the interior by one single row of ductal epithelial cells, and at the exterior by a layer of variable thickness of myoepithelial cells, which are placed with the long axis perpendicular on the axis of the tube and are dispersed in a radial manner in the adjacent stroma (Figure 6).

Other types of patterns covered by the epithelial neoplastic proliferation were insular (17 cases), trabecular (eight cases), fascicular (three cases), microcystic-cystic (five cases), pseudoangiomatous (one case) and cribriform (two cases).

The main types of stroma met in the study of the 45 pleomorphic adenomas were myxoid, chondroid, chondromyxoid, hyaline, fibrous, sclerohyaline and bone. Usually, these are associated in variable percentages to the predominance of one of them. Most frequently, the stromal component had a myxoid aspect. Thus, in all 45 cases of typical pleomorphic adenoma, we have emphasized the presence of such stromal component, but in variable amounts from one case to another. The myxoid aspect of stromal component was preponderantly in 77.7% of the investigated cases (Figure 7).

The chondroid-like stroma was met in 31 cases, occupying variable percentages in the composition of these tumors. The most frequently met chondroid aspect was that with immature hyaline cartilage, where the fundamental substance has an acidophilic aspect, the chondroplasts are rare, usually containing small, oval-shaped chondroblasts, with slightly basophilic cytoplasm and a round, hypochromic nucleus, centrally located, with clear nucleoli (Figure 8).

Another aspect of the tumoral stroma, met by us in 15 cases, was the fibrous one or fibro/sclerohyaline, represented by the presence of fascicles of collagen fibers of variable thickness, placed among epithelial proliferations, which often suffer hyaline dystrophy and even calcifications (Figure 9).

Figure 1 – Typical pleomorphic adenoma with predominance of epithelial component – mycrocystic tubular pattern, tubular luminal epithelium. HE staining, ×200.

Figure 2 – Typical pleomorphic adenoma with predominance of epithelial component – squamous differentiation of tubular epithelium. HE staining, ×100.
Figure 3 – Typical pleomorphic adenoma with predominance of epithelial component – oncocytic differentiation of tubular luminal epithelium. HE staining, ×200.

Figure 4 – Typical pleomorphic adenoma with predominance of epithelial component – typical aspect of myoepithelial component. HE staining, ×200.

Figure 5 – Typical pleomorphic adenoma with predominance of epithelial component – plasmacytoid aspect of neoplastic myoepithelial component. HE staining, ×200.

Figure 6 – Typical pleomorphic adenoma with predominance of epithelial component – tubular predominant pattern of neoplastic cells. HE staining, ×100.

Figure 7 – Typical pleomorphic adenoma with predominance of stromal component – classic myxoid stromal areas with basophilic aspect. HE staining, ×40.

Figure 8 – Typical pleomorphic adenoma stroma/parenchyma balanced proportion – chondroid stromal areas of immature hyaline cartilage type. AB–PAS staining, ×40.
The pleomorphic adenoma is the most frequent tumor of salivary glands, representing between 45–75% of the total of salivary glands tumors [7]. In specialized literature it is reported an age-adjusted annual incidence of about 3.5 per 100,000 inhabitants [8].

Histopathologically, the pleomorphic adenoma represents an increased lesional pleomorphism [16]. This pleomorphism is due to tumor growth pattern and differentiation of epithelial component and also by various aspects of morphism is due to tumor growth pattern and differentiation.

The abluminal component in the investigated pleomorphic adenomas is quantitative variable and is characterized by the presence of numerous differentiations, characteristic being the chondromyxoid one [23]. Most of the studies in the literature show the mucoid-type stroma as being the dominant and characteristic type of this type of tumor of salivary glands [24]. The dominant type of mucopolysaccharides in the stromal areas of pleomorphic adenomas investigated by us has been the acid mucopolysaccharides.

A myxoid stromal or edematous component may be present in variable amounts in other tumors too, such as: canalicular adenoma, polymorphous low-grade adenocarcinoma or soft tissue tumors, which have an important myxoid component.

The studies in the literature show the presence in the pleomorphic adenoma of two major types of mucins, one of epithelial nature, characterized by an increased content of neutral glycoproteins and other of mesenchymal nature, with an increased content of sulfated and nonsulfated glycosaminoglycans [25, 26]. Other types of stroma met in our study were: chondroid (68.8%), fibrohyaline (33.3%) and osteoid (2.2%). These were not exclusive presences, but were associated, in variable proportions, to the predominance of one of them. Also, shall be noted that in some studies the presence of hyaline areas were associated with the risk of malignant transformation of pleomorphic adenomas [27]. The tumors of the stromal component of chondroid type require the carrying out of a differential diagnosis with tumors of cartilaginous type, like chondroma or chondroblastoma type. Pleomorphic adenoma cartilaginous areas may be the result of mucopolysaccharides action on the stellate cells from the tumor myxoid areas [20]. The specialty literature quotes very few cases of pleomorphic adenoma with differentiations of osteoid type of the stromal component [28, 29].

Conclusions

Pleomorphic adenoma represented the most frequent type of salivary gland tumor. The tumor was characterized by a marked structural pleomorphism, the most frequent increasing patterns being the insular and the ductal ones. On restrained areas, were also associated other types of patterns: macro and microcystic, fascicular, trabecular, angiomatous. The myxoid and chondromyxoid stroma were by far the dominant types of tumor stroma. In small proportions were present also differentiations of fibrosclerous, hyaline and osteoid type.

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Author contribution
All authors have equally contributed to the manuscript.

References

Corresponding author
Aurelia Enescu, Associate Professor, MD, PhD, Department of Emergency Medicine, University of Medicine and Pharmacy of Craiova, 2 Petru Rareş Street, 200349 Craiova, Dolj County, Romania; Phone +40723–415 938, e-mail: ancaenescu@yahoo.com

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