

Cytologic and histopathologic diagnosis in bronchopulmonary squamous cell carcinoma

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Abstract

The classification of squamous cell carcinomas, based on cellular differentiation features, includes the poorly differentiated epidermoid carcinomas and well-differentiated epidermoid carcinomas. The histogenetic cytologic data clarify conventional cytodiagnosis of poorly differentiated epidermoid carcinomas and poorly differentiated adenocarcinoma, and also eliminate other categories such as large cell carcinoma and small cell anaplastic carcinoma. We conducted a study for evaluating the degree of differentiation of pulmonary squamous cell carcinoma in 620 patients – 551 men (88.8%) and 69 women (11.1%) who had lung cancer confirmed by cytologic, histologic and bronchoscopic examination. The cytologic examination was performed on slides with samples obtained by bronchial brushing and prints of bronchial biopsy stained with the Giemsa method. Histopathologic examination was performed on samples obtained by bronchial biopsy and stained with Hematoxylin–Eosin. At cytologic examination we found: poorly differentiated epidermoid carcinomas in 66 cases (33.8%), moderately differentiated epidermoid carcinomas in 22 cases (11.2%) and well differentiated epidermoid carcinomas in 107 cases (54.8%). Histological examination revealed: poorly differentiated epidermoid carcinomas in 133 cases (45.7%), moderately differentiated epidermoid carcinomas in 32 cases (10.9%), and well differentiated epidermoid carcinomas in 126 cases (43.2%). Our results suggested the importance of the association between cytologic and histopathologic examinations in the diagnosis of lung cancer.

Keywords: lung epidermoid carcinoma, cytologic examination, histologic examination, bronchial brushing.

Introduction

The majority of lung tumors can be classified within the first six groups of the WHO classification: squamous cell carcinomas (epidermoid carcinomas), adenocarcinomas, large cell carcinomas, small cell carcinomas, combined epidermoid and adenocarcinomas and carcinoid tumors [1]. Typing is based largely on descriptive high-microscopic, cytologic and histologic criteria, with little consideration given to patterns of differentiation at the cellular level. For example, squamous cell carcinoma, or epidermoid carcinoma are subtyped into papillary form, clear cell squamous carcinoma, small cell squamous carcinoma and basaloid carcinoma [2].

The majority of classifications of human respiratory tract tumors utilize light-microscopic descriptions based largely on cellular growth pattern, size and shape, with little reference to the differentiation at the cellular level. Histogenetic classification of respiratory tract carcinomas utilizes specific features of cytoplasmic differentiation as observed on histologic sections and cytologic preparations to differentiate and subtype the tumors [3].

The purpose of this paper is to report the results of cytologic and histologic studies of the squamous cell carcinoma subtypes in patients who showed clinical signs, radiographic and bronchoscopic findings suggestive for bronchopulmonary cancer.

Materials and Methods

Six hundred and twenty patients were included in

our study, aged between 32–84 years. There were 551 men (88.87%) and 69 women (11.12%). Most of them, 86.27% (535 cases) were smokers. All these patients underwent bronchoscopy to obtain samples for the cytologic and/or histopathologic examination.

The cytologic examination was performed on smears obtained by bronchial brushing and on the stamps of the past bioptic material that was stained with Giemsa method. Histological staining was performed on formalin fixed, paraffin embedded bioptic tissues and Hematoxylin–Eosin, Masson or Van Gieson stained.

Results

In 195 of the 342 patients (57.02%) with cytologic examination we found squamous cell carcinomas. In 291 cases of the 491 patients (60.08%) with histologic examination the diagnosis was squamous cell carcinoma (Table 1).

Table 1 – Squamous cell carcinoma (epidermoid carcinoma) types diagnosed in lung cancer

Tumor type	Cytologic No. of cases (%)	Histologic No. of cases (%)
Poorly differentiated	66 (33.8)	133 (45.7)
Moderately differentiated	22 (11.2)	32 (10.9)
Well differentiated	107 (54.8)	126 (43.3)
Total cases	195 (99.9)	291 (99.9)

The results of the cytologic study for the squamous cell carcinoma subtypes proved that: in 66 cases (33.84%) we found poorly differentiated cells of

epidermoid carcinoma (Figure 1a), in 22 cases (11.28%) moderately differentiated cells (Figure 2a) and in 107 cases (54.87%), well differentiated cells (Figure 3a).

Histologically, poorly differentiated epidermoid

carcinoma was found in 133 cases (45.71%) (Figure 1b), moderately differentiated tumors in 32 cases (10.99%) (Figure 2b) and well differentiated squamous cell carcinoma in 126 cases (43.29%) (Figure 3b).

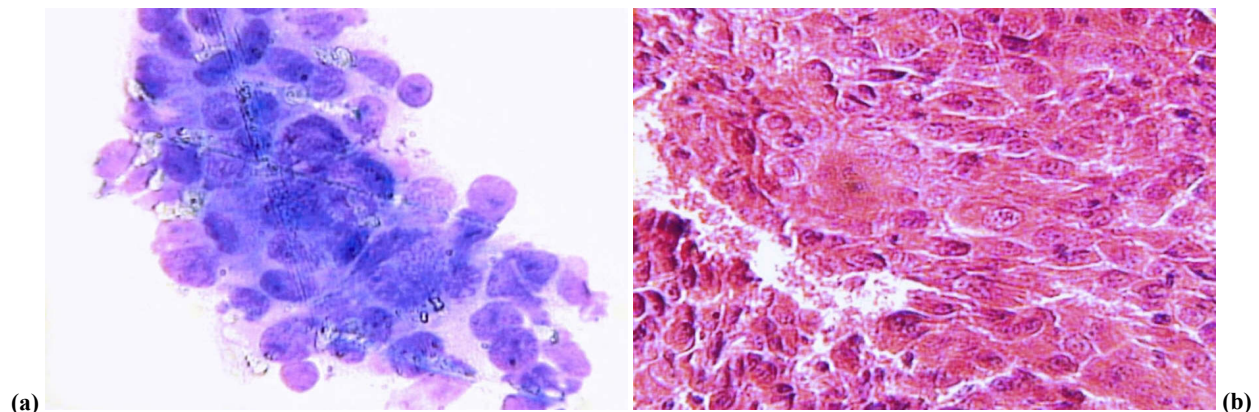


Figure 1 – (a) Poorly differentiated cells (non-keratinized) of epidermoid carcinoma of the lung (cytological examination, ×40); (b) Poorly differentiated squamous cell carcinoma of the lung (HE stain, ×40).

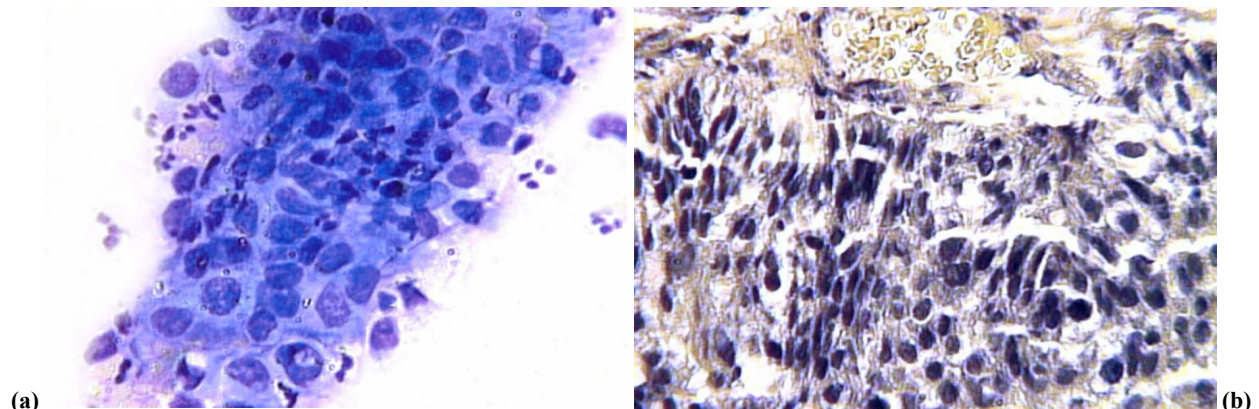


Figure 2 – (a) Moderately differentiated cells of epidermoid carcinoma (non-keratinized) of the lung (cytological examination, ×40); (b) Moderately differentiated squamous cell carcinoma of the lung (Van Gieson stain, ×40).

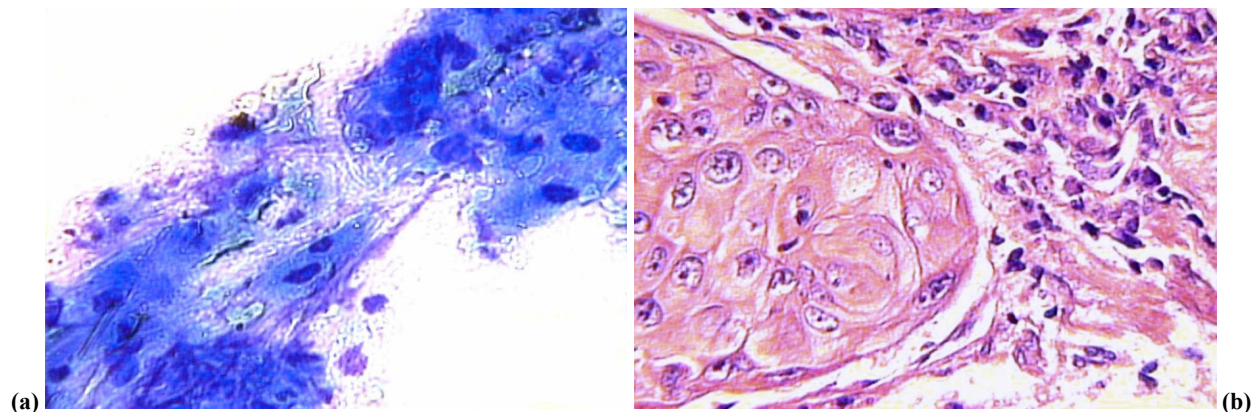


Figure 3 – (a) Well-differentiated cells (keratinized) of the epidermoid carcinoma of the lung (cytological examination, ×40); (b) Well-differentiated squamous cell carcinoma of the lung (HE stain, ×40).

Discussion

Bronchopulmonary cancer is one of the most wide spread malignant diseases, which has a continuous increase of incidence in most of the countries, this being the main cause of death in men. Many studies have shown that 80% of the deaths caused by bronchopulmonary cancer in men and 75% of the deaths caused by this type of cancer in women are caused by smoking, which is considered the main risk factor for pulmonary neoplasm.

In this study, the incidence of the bronchopulmonary cancer in men was 88.87% and in women 11.12%, the ratio of 8/1 being similar to the one reported in the literature. This report can vary depending on more factors and thus it can be generally situated between 4/1 and 8/1 [4].

It is obvious that the main risk factor for pulmonary neoplasm is smoking, as it can be established in our data as well, which shows that 86.27% of the patients taken under observation for study are smokers, confirming the

findings of other authors that 85–90% of the pulmonary cancers can be the result of smoking cigarettes [5, 6].

The poorly differentiated epidermoid carcinoma is diagnosed in a significant percent especially in smokers, after the malignant transformation of metaplasia and dysplasia present in this risk group [7, 8].

The observation of this study regarding the differentiation of tumor cells concur with those from the literature which points the high frequency of poorly differentiated epidermoid carcinoma in smokers.

Establishing the type of pulmonary carcinoma is very important especially for the therapy and the prognostic of the disease, which depend on the histological type and the grade of cellular differentiation. In the case of well differentiated epidermoid carcinoma, the tumor increases slowly, it tardily metastasizes and the prognostic is more favorable [4].

Lung carcinoma may possess morphologic features of epidermoid differentiation (keratinization) and/or adeno-differentiation (secretion) and may be subdivided into epidermoid carcinomas, combined squamous cell carcinoma and adenocarcinomas, but the histogenetic cytologic data clarify conventional cytodiagnoses of poorly differentiated epidermoid carcinomas and poorly differentiated adenocarcinomas as well as large cell carcinomas, giant cell carcinomas or small cell anaplastic carcinomas [9, 10].

The heterogeneity of tumor cells of the lung cancer was frequently observed [11]. According to fundamental concepts concerning the carcinogenesis of lung cancer, field cancerization, and the multistep carcinogenic process, the pathogenesis of these heterogeneous tumor cells would be explained by various carcinogenic stages involving monoclonal or polyclonal expansion [12].

In our study, these are probably a great number of mixed tumor types such as combined adenosquamous carcinoma associated with the multistep development of squamous cell carcinoma of the lung. The cytologic data clarify poorly differentiated epidermoid carcinomas and poorly differentiated adenocarcinomas as well as eliminated vague categories such as large cell carcinomas [13, 14].

The revised cytologic criteria have been demonstrated to be more reliable and accurate in matching the histologic diagnosis, as compared with conventional cytologic criteria. A greater number of matching correlations was obtained for histogenetic cytodiagnoses versus histogenetic histologic evaluations than were achieved for conventional cytodiagnoses [9, 15].

The data from the literature, as in our data too, points the tendency for an increased percentage of cases with poorly differentiated epidermoid carcinoma, which have a not so good prognostic [16]. Besides, the tumor cells heterogeneity and the more frequent presence of undifferentiated and adenosquamous carcinomas make difficult the interpretation of some cyto-histological results and suggest the necessity of introducing some new cytological and molecular diagnostic methods [12].

The invasive epidermoid carcinomas were found in this study as having a very large variety of cellular changes, and those poorly differentiated or with low keratinization had an accentuated polymorphism, fact

that was appreciated in most of the authors as being present in some adenocarcinomas or carcinomas with big cells. This fact makes sometimes difficult the cytological as well as histological diagnosis of the type of carcinoma.

Many pulmonary tumors contain tumor cellular sub-populations, their presence complicating the diagnosis. Thus, the poorly differentiated epidermoid carcinoma can take many more different morphological shapes together with epidermoid tumor cells with moderate differentiation [17]. This fact was observed by us as well in this study.

☐ Conclusions

Our data showed an increased number of cases with poorly differentiated epidermoid carcinoma, many of them having been typed probably as poorly differentiated adenocarcinomas or large cell carcinomas. The heterogeneity of tumor cells of lung cancer was frequently observed in cytologic and histologic diagnoses. There is a matching correlation between cytologic and histologic diagnoses in lung cancer on specimens obtained through bronchial biopsy or bronchial brushing.

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