Correlations between the results of the histological and cytological examination in the diagnostic of the broncho-pulmonary cancer

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Abstract

Introduction. Within the last years one discusses more and more about the association of the cytological examination with the histological one, becoming an important complementary examination. Casebook record. 163 patients were taken in the study, age between 37–79 years old, who showed clinical and radiological signs of broncho-pulmonary cancer. At all the patients a fibro-bronchoscopic examination was performed, with harvesting of material for histological and cytological examination. Material and methods. The histological examination was performed on biopitic pieces, fixed with 10% formalin and colored with Hematoxylin–Eosin, Masson and Van Gieson. The cytological examination was performed on material harvested by aimed bronchial brushing and/or on stamps from biopitic material, coloured Giemsa. Results. By histological examination (in the 163 cases) the diagnostic of broncho-pulmonary cancer was given with the establishing of the histological type of cancer in 87.12% of the cases, at 17 patients (10.42%) dysplasia was diagnosed and in 2.45% (4 cases) the examination was negative. Out of the 163 cytologically examined cases, in 66.25% (108 patients) diagnose of broncho-pulmonary cancer could be given and the histological type could be established. In 11.66% of the patients the cytological examination was negative and in 22.08% of the cases the cytology was strongly suggestive for broncho-pulmonary cancer, but one could not determine the histological type. According to the current classification of the broncho-pulmonary cancer by histological examination, we diagnosed the NSCLC type (non small cell lung carcinoma) by 123 patients (75.41%) and by cytological examination, by 124 (76.07%); the type SCLC (small cell lung carcinoma) was identified by histological examination in 18 cases (11.04%) while the cytological examination allowed the highlighting of this type of cancer in 5 cases (3.06%). Conclusions. Our data indicate the fact that the cytological examination on stamps from biopitic material or on that obtained by bronchial brushing offers a very high percentage of positive results, close to the histological one, but the establishing of the histological type of broncho-pulmonary cancer is more difficult by cytological examination, due to the heterogeneous structure of the NSCLC tumors. Despite this, the cytology may be extremely useful in diagnose of the small, necrotic tumors as well as in that of the carcinomas with non-small and small cells.

Keywords: cytology, histology, dysplasia, lung carcinoma.

Introduction

Many studies that appeared in the medical literature within the last years observe the importance of the cyto-histological examination in the diagnosis of the broncho-pulmonary cancer, but there are only a few those that recommend the combined cytological and histological examination of biopitical fragments obtained through fiber bronchoscopy, in parallel with the cytodiagnosis on material harvested through bronchic brushing [1–3].

It was observed that the efficiency of these methods as well as the bronchoscopic exam depends on the localization and extension of tumors [4].

Material and methods

Cases

163 patients were taken into study from whom 14.11% (23) women and 85.89% (140) men, aged between 37 and 79 years. On all of the patients that presented clinical and radiological signs of broncho-pulmonary cancer, was performed a fibro-bronchoscopic exam with harvesting of material for histological and cytological exam.

The histological examination was performed on biopitic pieces, fixed with formalin 10% and colored with Hematoxylin–Eosin, Masson and Van Gieson.

Cytological examination

The cytological examination was performed on material harvested by aimed bronchial brushing and/or on stamps from biopitic material. The material was rapidly fixed (in the very first minutes after harvesting) with methylic alcohol and then colored with Giemsa.

The examination of the stamps was made on an optic microscope with a ×40 objective, and the expression of the results was made both conclusively and descriptively.

Results

By histological examination (in 163 cases) the diagnostic of broncho-pulmonary cancer was given with the establishing of the histological type of cancer in 87.12% of the cases, at 17 patients (10.42%) dysplasia was diagnosed and in 2.45% (4 cases) the examination was negative (Figure 1).

Out of the 163 cytologically examined cases, in 66.25% (108 patients) diagnose of broncho-pulmonary cancer could be given and the histological type could be established (Figures 2–8). In 11.66% of the patients, the cytological examination was negative and in 22.08% of the cases, the cytology was strongly suggestive for broncho-pulmonary cancer, but one could not determine the histological type (Figure 9).
According to the current classification of the broncho-pulmonary cancer by histological examination, we diagnosed the NSCLC type (Non Small Cell Lung Carcinoma) by 123 patients (75.41%), and by cytological examination, by 124 (76.07%); the type SCLC (Small Cell Lung Carcinoma) was identified by histological examination in 18 cases (11.04%), while the cytological examination allowed the highlighting of this type of cancer in five cases (3.06%) (Figure 10, Table 1).

Table 1 – Comparative results of the histological and cytological exam

<table>
<thead>
<tr>
<th>Type of exam</th>
<th>Histological</th>
<th>Cytological</th>
</tr>
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<tbody>
<tr>
<td>SCLC</td>
<td>18 (11.04%)</td>
<td>5 (3.06%)</td>
</tr>
<tr>
<td>Displasy / III Class</td>
<td>18 (11.04%)</td>
<td>15 (9.20%)</td>
</tr>
<tr>
<td>Negative</td>
<td>4 (2.45%)</td>
<td>19 (11.65%)</td>
</tr>
<tr>
<td>NSCLC</td>
<td>123 (75.46%)</td>
<td>124 (76.07%)</td>
</tr>
<tr>
<td>Total</td>
<td>163</td>
<td>163</td>
</tr>
</tbody>
</table>

In what the concordance between the histological and the cytological exam are concerned in the establishing of the type of broncho-pulmonary cancer, we have observed that there is a harmony of 84.14% between the two models in the diagnosis of epidermoid cancer and it is decreasing for the diagnosis of non-differentiated carcinoma and adenocarcinoma (Figure 11).

Discussions

The results of various studies concerning the cytodiagnostics of broncho-pulmonary cancer are contradictory especially the value of the cytological exam of sputa and of the bronchic aspirates as methods of screening broncho-pulmonary cancer, is today disputable [5].

From the data of this study, as well as from the very few appeared in literature, comes out that the association of the two methods, cytological and histological in the diagnosis of broncho-pulmonary cancer, it has a justification determined by the fact that, generally, the obtained material through bronchic biopsy is reduced and does not always contain tumoral fragments. On the other hand, some of the biptic pieces are fragile and are being easily broken during processing, decreasing the possibility of histologic diagnosis. In exchange, the biopsied material or the one harvested through bronchitic brushing displayed on blades and Giemsa colored may be rapidly and totally examined, facilitating through the establishing of a diagnosis of broncho-pulmonary neoplasm.

Other studies accentuate the fact that, even though cytology may find out some small malignant lesions, it has limits tied to multiple causes, among them being able to count besides the experience of the cytologist, the way of using the cytological method, of pointed or random harvesting of the pathologic material and the times of processing of the harvested material [6, 7].

That could also explain the discordance between the results of different studies concerning the cytological exam yield and the establishing of a pulmonary carcinoma diagnosis through this method. Our study had a similar yield to that of various papers [8].

The incidence of different histological forms of broncho-pulmonary carcinoma is important, first of all, for the prognosis of the disease that depends on the histological type and the degree of cellular differentiation. The heterogeneity of tumoral cells and the more frequent presence of non-differentiated and of the combined carcinoma make difficult the interpretation of some cyto-histological results and suggest the necessity of introducing some new methods of cytological and molecular diagnosis [9–11].

Some studies had shown that there is a big frequency of mixed tumors, in which can be associated neuroendocrine and non-endocrine differentiations [12].

On the other hand, malignant tumors (due to the transformation of a single stem cell) have a great phenotypic diversity that sustains the idea of an epithelial origin, commune to some malignant cellular subpopulations and thus the presence of a tumoral heterogeneity that comes together with a non-favorable diagnosis.

Invasive carcinoma, especially the epidermoid ones have presented a very large variety of cellular modifications, with an accentuated pleomorphism, making difficult the diagnosis of histologic type, between the epidermoid carcinoma, adenocarcinoma and non differentiated carcinoma with big cells, fact that might explain some signaled discordances and, in the same time, they come to support the idea that comes from the present classification of broncho-pulmonary cancer, of the existence of two major groups of pulmonary carcinoma: with small cells (SCLC) and others than the small ones (NSCLC).

Conclusions

The cytologic exam of the material obtained through bronchic brushing and stamps from biotic material offer a law percentage of positive results, close to the one obtained through histological exam, but the establishing of the of the histologic type of broncho-pulmonary cancer is more difficult through cytological exam, due to the heterogeneous structure of the NSCLC structures.

The results of this study suggest that the cytodiagnostics has a complementary value of histopathological exam both in the evidentiating of malignant tumoral cells as well as in the appreciation of the incidence of some types of pulmonary carcinoma, especially in the cases in which, bronchic biopsy is limited or in the absence of some obvious tumoral formations. Even though bronchic biopsy allows only the harvesting of a small part of the tumor or bronchic mucous, through the histological method we can diagnose the type of broncho-pulmonary carcinoma in over 87% of the cases.

The discordances pointed out in this study, especially those concerning the type of pulmonary carcinoma may be due to tumoral heterogeneity and to the pluri-differentiation of tumoral cells that make the interpretation of histological and cytological results obtained on small fractions harvested through fibronscopy.
Correlations between the results of the histological and cytological examination in the diagnostic...

Figure 1 – Comparative results of the histological and cytological exam

Figure 2 – Types of bronchopulmonary cancer established through histological and cytological exam

Figure 3 – Concordances and discordances between the cytological and the histological examination in the establishment of the type of broncho-pulmonary cancer: (1) epidermis carcinoma; (2) non-differentiated carcinoma; (3) adenocarcinoma; (4) IVth class; (5) IIIrd class

Figure 4 – Bronchial cells with marked atypias, powerfully suggestive for malignity (bronchic brushing, ×400)

Figure 5 – Carcinomatous cells of epidermoidal type, slightly differentiated, non keratinized (print from a bronchic biopsy, ×400)
Figure 6 – Tumoral cells of epidermoidal carcinoma with slightly keratinization (print from a bronchic biopsy, ×400)

Figure 7 – Tumoral cells of well-established epidermoid carcinoma with powerful keratinization (bronchic brushing, ×400)

Figure 8 – Tumoral cells of non-differentiated carcinoma with big cells (print from a bronchic biopsy, ×400)

Figure 9 – Tumoral cells of non-differentiated carcinoma with small cells (bronchic brushing, ×400)

Figure 10 – Tumoral cells of adenocarcinoma (bronchic brushing, ×400)

Figure 11 – Tumoral cells of bronchio-alveolary carcinoma (bronchic brushing, ×400)
Correlations between the results of the histological and cytological examination in the diagnostic...

References


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