The Extemporaneous Exam in Thoracic Pathology: How to Coincide the Pathologist's and the Surgeon's View?

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Abstract

Background: The extemporaneous exam is very challenging especially in thoracic pathology. This is due to the challenges encountered by the surgeon in order to obtain samples of sufficient size in the small space that is represented by the thorax. Samples of sufficient size are mandatory in order to allow the microscopic diagnosis. Extemporaneous exam in thoracic pathology concerns lung pathology, thoracic pathology and mediastinal pathology. Many pitfalls are encountered by pathologists, most of them due to an insufficient collaboration with surgeons. In this article, we wondered about the possibility of coinciding between the pathologists' and the surgeons' view. We tried to do it through a study of the extemporaneous examinations performed in our department by showing its real diagnostic value.
Material and methods: We reviewed the extemporaneous exams performed in our department during a 6-month period. The definite result was considered as the gold standard and was used to define true positive (TP), true negative (TN), false positive (FP) and false negative (FN) tests. We used these parameters to estimate the sensitivity, the specificity, the positive predictive value (PPV), the negative predictive value (NPV) and the diagnostic efficacy (DE).
Results: TP tests accounted for 137, TN tests accounted for 122, FN tests accounted for 6, FP tests accounted for 10. According to these results, the sensitivity reached 95%, the specificity reached 92%, PPV reached 93%, NPV reached 95% and the DE reached 94%. False positive concerned mainly thoracic masses and may be explained by the challenging features of smooth muscles in extemporaneous conditions. False negative results were mainly due to an insufficient sampling due to the surgeons or the pathologists.
Conclusion: Our results highlight the diagnostic efficacy of the extemporaneous exam and put emphasis on the necessity of a narrow collaboration between surgeons and pathologists.

KEYWORDS: Extemporaneous exam, microscopic examination, thoracic pathology.

Introduction: The extemporaneous exam is defined as a per-operative exam which is used to guide the immediate surgeon's strategy. The three major aims of this exam are to evaluate the quality of the material, to furnish an accurate and fast microscopic diagnosis and to evaluate the surgical limits. Fresh specimen are received and cut using cryostat. It was initially described by De Reimer in 1818 and was used by Stelling in 1843 in his study about the central nervous system. The decision of making an extemporaneous exam necessitates a narrow collaboration between pathologists and surgeons. Both have to speak the same language in order to assess the best management of the patient. In many cases, coinciding pathologists' and Thoracic

surgeons' views remains difficult. This fact is due to the challenging surgical procedures that are caused by the small space represented by the thorax which contains contiguous and vital structures and the necessity for pathologists to obtain samples of sufficient size and quality in order to assess the diagnosis. In this article, we tried to report our experience about the extemporaneous exam in thoracic pathology.

Material and methods: We reviewed all extemporaneous exams performed between January 2013 and July 2013. Definite results were used as the gold standard and were compared with the extemporaneous exams.

We tried to assess the diagnostic value of the extemporaneous exam so that we used the indexes of sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and the diagnostic efficacy (DE).

To determine these parameters, we defined true positive (TP) cases as those with an extemporaneous and definite result of malignancy.

The test was considered as false positive (FP) when the extemporaneous exam was positive and the definite result was negative.

The test was considered as true negative (TN) when the extemporaneous exam was negative and the definite one was negative too.

The test was considered as false negative (FN) when the extemporaneous exam concluded to a negative result and the definite one concluded to a malignant disease.

After dealing with the Thoracic surgeons of our hospital, we considered referred results of extemporaneous exams as positive ones according to our surgeons' view.

- Sensitivity is defined by the ratio: TP/(TP+FN)
- Specificity is defined by the ratio: TN/ (TN+FP)
- Positive predictive value is defined as the probability of real malignancy in patients with positive results: PPV: TP/(TP+FP).
- Negative predictive value is defined as the probability of benignity in patients with negative results: NPV: TN/(TN+FN)
- Diagnostic efficacy is defined as the percentage of patients with a correct diagnosis according to the test result.

DE: TP+TN/Total of patients.

Results: During a 6-month period we performed 275 extemporaneous exams of 214 patients. This represented approximately 1 extemporaneous exam/patient and 13% of our activity during the same period.

The specimen received dealt with pulmonary pathology, thoracic pathology and mediastinal pathology.

In mediastinal pathology, we received mainly mediastinal lymph nodes resected during the lymph node curettage for lung cancer, mediastinal cysts, malignant mediastinal processes and intrathoracic goiter.

Pulmonary pathology included irregularly circumscribed centimeter masses, excavated masses and bronchial limit.

Thoracic pathology included thoracic masses or permeation nodules and surgical pleural biopsy in patients with pleural effusion and stage III or IV lung carcinoma.

TP tests accounted for 137, TN tests accounted for 122, FN tests accounted for 6, FP tests accounted for 10 (Table 1). According to these results, the sensitivity reached 95%, the specificity reached 92%, PPV reached 93%, NPV reached 95% and the DE reached 94%.

The major pitfalls in FP cases concerned parietal masses whose extemporaneous exam concluded in some cases to a malignant process because of a suspect aspect of reactive skeletal muscle cells. FN cases included one patient with a Hodgkin

lymphoma whose extemporaneous exam concluded to a reactive lymph node. The lack of the extemporaneous exam was due to the insufficient sampling made by the pathologist. In one case, the extemporaneous exam of a mediastinal lymph node was negative and the definite examination showed an infiltration of the sinuses which is hardly observed in extemporaneous conditions. One case of bronchiolitis obliterans (BOOP) was differed in the extemporaneous exam and considered as malignant by the surgeons. The diagnosis of BOOP in extemporaneous conditions is very confusing. In one patient, the extemporaneous exam of the bronchial limit misdiagnosed an infiltrating focus revealed by the definite exam. Another dilemma encountered during the extemporaneous conditions is distinguishing between small cell and non small cell carcinomas. The distinguishing features may be evident but the small size of the cells and the artifact of crowding of the cells may be unclear in the extemporaneous exam because of the improvement of the surgical techniques.

Discussion: Our results showed a sensitivity of 95%, a specificity of 92%, a PPV of 93% and a NPV of 95%. They are similar to other results reported in the literature concerning thoracic pathology and mammary lesions (1, 2, 3).The diagnostic value of the extemporaneous exam reached 94% in our study. The major pitfalls may be summarized in the artifact of crowding in mediastinal tumors or parietal tumors dealing with FP results. The deficient sampling due to insufficient samples justifies many FN cases. We should also notice that despite of the apparent facility to distinguish small cell carcinoma from non small cell carcinoma, in the extemporaneous conditions this difference may be not evident and the size of the cells may seem quite large because of the improvement of the surgical techniques. The delay of the answer of an extemporaneous exam must be as short as possible and a mean delay of 10 to 15 minutes seems to be acceptable. In our department which is located near the department of Thoracic surgery, the mean delay is 10 minutes. This exam must be decided by both surgeons and pathologists. The latter have to be informed of the clinical and radiological findings. The medico-legal responsibility of each one can't be assessed unless all the conditions of narrow collaboration are present. In our department, a narrow collaboration exists between pathologists and surgeons. Inspite of that fact, some dilemma is still encountered. Multi-disciplinary consultations are mandatory in order to coincide the pathologists' and the Thoracic surgeons' view.

Conclusion: Our result puts emphasis on the diagnostic relevance of the extemporaneous exam whose efficacy is closely related to the relationship between Thoracic surgeons and pathologists.

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TABLE

Results of extemporaneous exam	TP	FP	TN	FN	Total
	137	10	122	6	275

Sensitivity: 95%, specificity: 92%, PPV: 93%, NPV: 95%, DE: 94%