



Review

Pleural lavage cytology: Where do we stand?



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ABSTRACT

Although a malignant pleural effusion is considered a manifestation of an advanced stage disease not amenable to curative resection in patients with non-small cell lung cancer, the same is not true in the case of the presence of malignant cells in the pleural cavity without an accompanying effusion, discovered incidentally during the operation with pleural lavage cytology (PLC). PLC is a diagnostic technique used to detect tumor cells and translate this finding to a prognostic index. Various reports have attempted to utilize the results of PLC and draw inferences regarding the origins of malignant cells in the pleural cavity, the association of these results with various disease characteristics and, most importantly, their impact on disease recurrence and survival. However, due to non-consistent techniques and protocols used to acquire the samples for cytological evaluation and assess their significance, results are inhomogeneous. Nevertheless, the entrance of malignant cells in the pleural cavity follows the rules posed by the natural disease process when discovered before pulmonary resection takes place, while surgical manipulations certainly play an important role in the case malignant cells are checked over after pulmonary resection. In addition, although the prognostic significance of a positive PLC result is indisputable and significantly decreases long-term survival in the majority of studies, this factor has not yet been incorporated into the TNM staging system. Lastly, some authors have advocated the use of some form of adjuvant treatment for those patients found with positive PLC results, based on the assumption that a curative resection followed by multiple pleural washings will not remove the entirety of the population of malignant cells present in the pleural space.

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1. Introduction

With the advent of the 7th update of non-small cell lung cancer (NSCLC) staging system [1], malignant pleural effusions have been upgraded from T4 to M1a disease with a dismal long-term prognosis. However, although the preoperative finding of a malignant effusion in the pleural cavity will preclude surgical resection, intraoperative pleural lavage cytology (PLC), a technique for detecting subclinical dissemination of malignant cells in the pleural cavity, is not regarded as a decisive factor of whether or not to proceed with a resection with a curative intent. Indeed, a positive PLC, which, according to various authors, may be considered as early-stage pleural dissemination and has been shown to have a negative impact on prognosis in a multitude of studies, does not upgrade tumor stage according to the current TNM staging system and will

not preclude further surgical therapy in a patient with an otherwise resectable tumor.

Spjut [2] was the first to report a correlation between intraoperative detection of cancerous cells in the pleural cavity and the occurrence of pleural recurrences. Since his initial report in 1958, various researchers have attempted to address the issue of subclinical existence of malignant cells in the pleural cavity in lung cancer patients, both from a prognostic and a pathophysiologic point of view. Although the boundaries between a malignant pleural effusion and a positive PLC have not been adequately defined, most reports agree on the fact that a positive PLC portends a comparatively poor prognosis. However, controversy still remains regarding the incidence and the mechanism of entry of malignant cells into the pleural space, the correlation of positive PLC with various characteristics of the malignant disease process and the stage-specific prognostic impact of a positive PLC. Furthermore, since numerous studies performed during the last two decades agree on the fact that cancerous cells in the pleural cavity consist an unfavorable prognostic indicator, the question of why not incorporate PLC into the official staging system still remains, thus keeping the prognostic significance of positive PLC undetermined in terms of staging. Finally, although not yet an official prognosticator embodied in the

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