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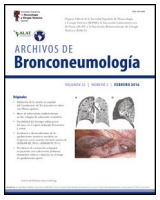

Scientific Letter

[Translated article] Cytologic Contamination of the Sampling Needle in Endobronchial Ultrasound

La contaminación citológica de la aguja de punción en ecobroncoscopia

To the Director,

Linear endobronchial ultrasound is a procedure that has revolutionized the diagnosis and staging of lung cancer. The evidence in favor of this minimally invasive technique have led it to replace mediastinoscopy in many indications.[1,2]

This approach has been recommended by many scientific societies,[3–5] but one of its limitations is the potential for needle contamination by tumor cells. For this reason, consensus was reached[6–8] to start staging at station N3 and then progress to N1.

The IASLC Staging and Prognostic Factors Committee found prognostic differences between patients with single or multiple N1 or N2 station involvement, but decided not to include it in their 8th edition.[9] If the need for multiple station sampling is demonstrated in the future, it will be important to determine the risk of needle contamination and to establish the need to change the needle after the first positive node station.

This study was designed to test whether the risk of contamination of the needle by tumor cells is a real issue.

The secondary objective was to develop strategies that would make this contamination undetectable, in order to avoid false positives in subsequent node stations. Potential contamination was assessed by ThinPrep (a method of filtering and enriching cytological samples in liquid medium).

The study and study documentation were approved by the Basque Clinical Research Ethics Committee.

The design was prospective, multicenter, and non-randomized, and the study objectives did not require a control group. We included patients of both sexes attending the 2 participating hospitals due to suspected primary lung tumor disease requiring linear endobronchial ultrasound for diagnosis or staging, with no contraindications to the procedure, and who gave their consent to participate in this study. Only true ROSE (Rapid On Site Examination) positives were included in the study. The statistical analysis was performed using IBM SPSS v23. The threshold for statistical significance was set at $p < 0.05$. Sixty-two patients met the inclusion criteria.

Mean age was 65.45 years (SD 9.31 years); 47 patients were men (75.8%).

Stations 4 R and 7 were the most frequently aspirated. The mean smallest diameter of the nodes was 18.31 mm (6–46 mm; SD 10.7 mm).

Table 1 shows persistent oncocytological material detectable in the fluid after the needle was flushed 2 and 3 times, as assessed by Thinprep, thus demonstrating the cytological contamination of the needle. Additional volumes of saline serum did not eliminate this contamination.

Recognizable residual cell positivity was found in 43.5% of the combination of both flushes.

There were no significant differences in age, sex, node size, or anatomopathological results. Nor were there any significant differences in variables such as TNM or its isolated descriptors.

After the data obtained from the 2 flushes after normal processing were analyzed, the volume was increased to a single 5 ml flush and then to 10 ml.

In both cases, the fluid obtained with 1 ml of saline after these flushes contained recognizable tumor cells after ThinPrep processing.

A search of the literature in Cochrane on Ovid using the terms “endobronchial ultrasound”, “needle” and “contamination” returned 460 references.

Some of them refer to the potential contamination of samples by material that complicates interpretation, such as bronchial cells or blood[10,11] or by the needle releasing metal particles into tissues,[12] whereas only 2 refer to contamination of aspiration needles by tumor cells in endobronchial ultrasound-guided samples.

Kwong et al.[13] report contamination of the working channel, the endoscope tip, and the needle catheter in endoscopic ultrasound-guided fine needle aspiration in gastrointestinal tumors. This publication drew attention to the possibility that contamination of the aspiration needle may contribute to false-positive findings.

The only reference that mentions tumor cell contamination of the needle in endobronchial ultrasound is a poster published in the 2017 ATS Congress.[14] This study shows that such contamination exists. The authors designed a single strategy to eliminate the problem – flushing the needle with 10 ml saline – but contamination persisted, so they advocate sequential staging. The authors do not state if they used ROSE during the diagnostic procedure.

Our study is unique in that it includes only cases diagnosed by ROSE, and besides false positives were ruled out (negatives in the definitive examination).

Our primary objective was fulfilled, revealing a 43.5% rate of persistent recognizable tumor cells in the combination of flushing procedures.

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Table 1
Residual cell positivity after flushing. Combined flushes.

	Frequency	Percentage	Valid percentage	Cumulative percentage
Valid negative	35	56.5	56.5	56.5
Positive	27	43.5	43.5	100
Total	62	100	100	

The secondary objective was not achieved, since the various needle flushing strategies, the last of which was the same as reported by Berim et al.,[14] failed to eliminate oncocytic contamination.

There was no statistically significant relationship between the variables studied, so we could not determine any factors that would be useful in assessing the likelihood of needle contamination by tumor cells. One of the limitations of this study is the small population studied, which may explain this result.

Our study shows that tumor cell contamination of the endobronchial ultrasound-guided aspiration needle is a real issue and one that can lead to false positives at other stations (particularly if ROSE is not practiced), but we could not define a strategy to eliminate the problem.

If multiple station staging is included in a future edition of the TNM, our results suggest that using a new needle after a first positive node station is advisable.

Conflict of interests

The authors state no conflict of interests.

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