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Hot Endobronchial Biopsy Forceps: A Forgotten Promising Technique

Shahram Firoozbakhsh, Soroush Seifirad, MD (Corresponding author and Presenting author), Enayat Safavi, Reza Dinparast, Shervin Taslimi, Gholamreza Derakhshandeilami

Introduction/Problem

Traditionally cold biopsy forceps were used for endobronchial biopsy, and recently electrocautery (hot) bronchoscopy biopsy forceps are introduced. It is hypothesized that hot biopsy forceps may decrease procedure related bleeding and also may decrease the quality of obtained samples.

- Plenty of patients have contraindications for endobronchial biopsy because of safety concerns, among them are patients on blood thinners and patients with extremely fragile hyper-vascular mass.
- Sometimes an unpredicted bleeding happens during the endobronchial biopsy procedure and needs immediate intervention.
- Pulmonologist are not familiar with electrocautery and barely use this technique in their bronchoscopy units. There is a major concern that hot biopsy forceps may decrease the quality of obtained samples.

Aim/Goal

The aim of the present study was to evaluate the effect of hot biopsy forceps on the quality and diagnostic value of the samples, and also to compare procedure-related hemorrhage after biopsy with hot and cold biopsy forceps.

The Team

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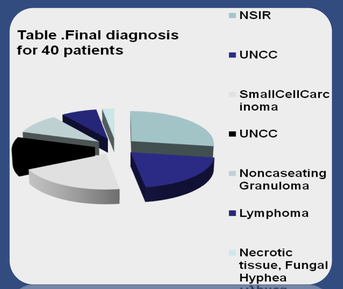
The Interventions

- Patients with different indications for endobronchial biopsy during fiberoptic bronchoscopy underwent three hot and three cold biopsies with a random fashion. All biopsies were obtained with a single biopsy forceps with and without the application of an electrocoagulation current, set on soft coagulation mode (40W). A four point scale was used for quantification of bleeding. A single pathologist blinded to the patients' history was requested to review all samples. A three point scale was used to assess electrocoagulation damage.

Results/Progress to Date

A total of 240 biopsies were obtained from 40 patients. Frequency of positive concordance between the two methods was 85%. The degree of electrocoagulation damage of the samples was as follows: grade 1=52.5%, grade 2=32.5%, and grade 3=15%. The average bleeding score following hot biopsy was significantly lower compared to the cold biopsy (P=.006). The concordance between diagnostic yield of hot and cold biopsies was 85%. There was no significant difference between the diagnostic yields of two biopsy methods (P=.687).

Hot biopsy forceps significantly decreased the procedure related bleeding. The quality of samples was not impaired significantly. Regarding low prevalence of bleeding following endobronchial biopsy, routine use of hot bronchoscopy forceps is not reasonable. However, familiarity of bronchoscopists with this method may improve bronchoscopy safety.



Left .Final diagnosis for 40 patients

Location of lesion	Percentage (%)
Right upper lobe	15%
Right lower lobe	5.0%
Right mainstem	17.5%
Left mainstem	17.5%
Left upper lobe	12.5%
Left lower lobe	27.5%
Bronchus intermedius	5.0%
Total	100%

Right: Biopsies locations

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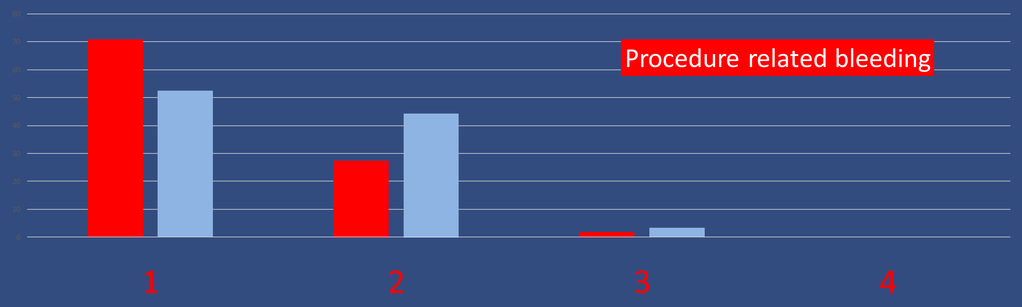
More Results/Progress to Date

➢ **Procedure related bleeding**

- Procedure related bleeding following hot biopsy was as follows: grade 1=70.8%, grade 2=27.5%, grade 3=1.7%, grade 4=0%.
- Procedure related bleeding following cold biopsy was as follows: grade 1=52.5%, grade 2=44.2%, grade 3=3.3%, grade 4=0%.
- The average bleeding score following hot biopsy was significantly lower compared to the cold biopsy (p=0.006).

➢ **Quality of samples**

- Mean ±Standard deviations of electrocoagulation damage grade of the samples were 1.625± 0.74.
- The degree of electrocoagulation damage of the samples was as follows: grade1=52.5%, grade 2=32.5%, and grade3=15%.
- The concordance between diagnostic yield of hot and cold biopsies was 85%. There was no significant difference between the diagnostic yields of two biopsy methods (p=0.687), shows that quality of s



Procedure related bleeding grades (1-4) in hot versus cold biopsies.

Discussion

- Theoretically, and regarding the promising results of two other published studies, hot biopsy forceps may improve the tolerance of the procedure, particularly in patients with complications, such as those with impaired coagulation state (who were excluded from current published studies), or when the biopsy was attained from a very fragile or hypervascularized mass.
- Regarding the results of our recent published study, the quality of the sample obtained with hot biopsy forceps does not significantly impaired. The procedure-related hemorrhage was significantly slighter after hot biopsy compared with the conventional cold biopsy method.
- Results of a similar published study by Tremblay et al. were in accordance with our findings.
- However, in another prospective, randomized, controlled study, Khan et al. fulfilled that the hot biopsy forceps neither impaired the quality of the samples nor lessened the procedure-related bleeding.
- Rather than a pure statistical point of view, since there were no severe bleeding episodes in this study which produced a narrow window between hemorrhage rates of their patients in two groups of hot and cold biopsy, it is not reasonable to conclude that observed decrease in the procedure related bleeding following hot biopsy method was not even clinically considerable. According to another published study by Jabbari et al. hot biopsy significantly decreased hemorrhage, while the qualities of specimens obtained by hot biopsy methods were equal to conventional biopsy.

Lessons Learned

- Concerning low prevalence of hemorrhage following endobronchial biopsy, routine use of hot bronchoscopy forceps is not reasonable (3, 7, 8). However, the experience of the bronchoscopist with this method and availability of equipment in bronchoscopy rooms may improve the safety and tolerability of bronchoscopy and endobronchial biopsy. Feature studies may give the chance of bronchoscopy as a valuable diagnostic method to the patients with current contraindications for endobronchial biopsy (i.e patients treated with anticoagulants).

Next Steps

- First of all, larger clinical trials are warranted to precisely determine whether application of hot biopsy forceps could decrease hemorrhage after endobronchial biopsy or not.
- Second, studies on the patients with contraindications for endobronchial biopsy such as patients on anticoagulants and patients with fragile and hypervascular lesions is crucial to evaluate safety of hot biopsy forceps.
- Finally, availability of hot biopsy forceps in bronchoscopy wards and familiarity of the pulmonologists with this equipment could increase safety of the patients during the procedure.

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