AABIP JOURNAL CLUB

The clinical question

How does the estimated diagnostic yield of bronchoscopy change when different definitions for a diagnostic biopsy are used?

Take home message

Diagnostic yield is highly dependent on cancer prevalence in the study population and the specific definition of diagnostic yield that is used.

Background

The diagnostic yield for bronchoscopy is influenced by lesion characteristics and procedural tools. However, cancer prevalence and the definition used to define a diagnostic procedure can also impact the estimated yield of bronchoscopy.

Recently, a meta-analysis of navigational bronchoscopy described that diagnostic yield estimates ranged broadly from 40% to 90%, which could be from a lack of standardization of what is considered a "true negative" in nonmalignant biopsy results.

Study Design

- **Type of trial:** simulation-based cohort study
- **Randomization, blinding, controls:** N/A
- **N:** 1000
- **Study groups:** 4 groups with different definitions of diagnostic yield
- **Settings:** simulated patient environment
- **Enrollment:** simulation framework based in literature
- **Treatment period:** N/A
- **Follow up:** assumed 10% lost to follow up for calculations
- **Primary outcome:** Diagnostic yield using each definition. A change in yield >10% was considered clinically meaningful

Population

- **Inclusion criteria:** hypothetical cohort of patients who underwent diagnostic bronchoscopy
- **Exclusion criteria:** cases who were randomly determined as lost to follow up (LTFU) in follow-up phase
- **Baseline Characteristics:** derived averages from literature: sensitivity for malignancy at index bronchoscopy of 80%, total cancer prevalence of 60%, distribution of specific benign (SPB), nonspecific benign (NSB), and nondiagnostic (ND) of 10%, 35%, and 55% respectively, and LTFU rate of 10%

Outcomes

Primary outcomes:

- Diagnostic yield differed >10% amongst methods in 76.7% of cases.
- With base assumptions for 1,000 simulated patients undergoing bronchoscopy in a population with 60% cancer prevalence, diagnostic yield estimates were 53.2% for method 1, 71.4% for method 2, 66.8% for method 3, and 89.2% for method 4

Secondary outcomes:

- Variation in cancer prevalence had largest effect on DY. Changing cancer prevalence from 40% to 80% had following impact
- Method 1 – 38.8% to 67.6%
- Method 2 – 62.6% to 80.2%
- Method 3 – 58.5% to 74.8%
- Method 4 – 92.4% to 87.2%. (Inverse relation)
- Categorization of nonmalignant findings had the second largest effect on DY

Adverse events: N/A

Commentary

Strengths

- Shows how cancer prevalence and definitions of diagnostic bronchoscopy can dramatically change estimates on utility of bronchoscopy
- Shows how biased definitions may alter expected yield of procedure
- Propose standardized definitions for future studies

Study Limitations and Potentials for Bias:

- Many of the standardized estimates used in the calculations were based on expert opinion which may not be representative of the entire population
- Considered 4 different definitions and 3 classifications of benign diagnoses
- Simulation model may not capture all variables and relationship between them

Funding

Suggested Reading

(References in Vancouver style)

1. Nadig TR, Thomas N, Nietert PJ, Lozier J, Tanner NT, Wang Memoli JS, et al. Guided bronchoscopy for the evaluation of pulmonary lesions: an updated meta-analysis. CHEST 2023;163:1589–1598.

2. Ost DE, Ernst A, Lei X, Kovitz KL, Benzaquen S, Diaz-Mendoza J, et al.; AQuIRE Bronchoscopy Registry. Diagnostic yield and complications of bronchoscopy for peripheral lung lesions. Results of the AQuIRE Registry. Am J Respir Crit Care Med 2016;193:68–77.

3. Kops S, Heus P, Korevaar D, Damen J, Idema D, Verhoeven R, et al. Diagnostic yield and safety of navigation bronchoscopy: A systematic review and meta-analysis. Lung Cancer 2023:180:107196

Article citation

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