DIAGNOSTIC YIELD OF BRONCHOSCOPY IN PATIENTS WITH HEMATOLOGICAL MALIGNANCIES

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Background

Patients with hematologic malignancies often develop pulmonary infections and radiographic lung abnormalities. While bronchoscopy can lead to a definitive diagnosis, its utility remains unclear in the setting of empiric antimicrobial therapy and advanced noninvasive testing.

Methods

- Retrospective review of adult patients with hematologic malignancies
- Included patients underwent inpatient bronchoscopy between 2021 and 2024 for total of 89 bronchoscopies
- Extracted data included:
  - Clinical characteristics
  - Laboratory results
  - Microbiologic findings
- Statistical analysis:
  - Chi-square test for categorical variables
  - Two-tailed t-tests for continuous variables

Patient Characteristics

Variable	Leukemia (n=26)	Lymphoma (n=24)
Age (median)	49.5	55.7
Female sex (n, %)	10 (38%)	4 (17%)
Hematologic diagnosis	AML (16), ALL (9), MDS (2)	Follicular (4), DLBCL (5), Hodgkin (5), Mantle cell (3), Burkitt (1), AITCL (1), CNS (2), Marginal zone (1), CLL (1), NOS (1)
History of allo-HSCT	4	—
History of auto-HSCT	—	4
History of CAR-T	0	4
Days from last treatment to bronchoscopy, median (range)	17	2824.5
ANC at bronch, median (range)	10	2730
Platelets at bronch, median (range)	36	168
Use of prophylactic antimicrobials, n (%)	72.7%	63.3%
Duration of therapeutic antibiotics before bronch, median (range)	13	5

Table 1. Baseline Characteristics of Patients
Patient demographics and treatment history are shown by disease type

Results

Variable	PB (n=31)	NB (n=58)	p-value
Time from admission to bronch (days)	17.4	14.1	0.366
Time from pulm consult to bronch (days)	7.3	10.2	0.292
Positive noninvasive test pre-bronch	16 (51.6%)	23 (39.7%)	0.28
Therapeutic antibiotics >3 days	18 (58.1%)	39 (67.2%)	0.39

Table 2. Pre-bronch factors of patients with positive versus negative bronchoscopy findings (n=89).
Continuous variables are reported as means; categorical variables as counts and percentages. p-values were calculated using chi-square tests for categorical variables and t-tests for continuous variables. PB= positive bronchoscopy, NB= negative bronchoscopy

Variable	PB (n=31)	NB (n=58)	p-value
Diagnostic yield	31 (34.8%)	—	—
Changed diagnosis or management	19 (61.3%)	7 (12.1%)	—
↳ De-escalated antimicrobials (within 48h)	9 (29.0%)	18 (31.0%)	—
Mean LOS post-bronch (days)	6.9	15.3	0.0025
30-day mortality	2 (6.5%)	14 (24.1%)	0.038

Table 3. Clinical Outcomes Following Bronchoscopy
Bronchoscopy was diagnostic in 34.8% of cases and influenced management in 29.2% of all cases, including antimicrobial de-escalation in 30.3%. Positive results were significantly associated with a shorter post-procedure hospital stay (6.9 vs 15.3 days, $p = 0.0025$) and lower 30-day mortality (6.5% vs 24.1%, $p = 0.038$).

Results

Variable	30-day Mortality: Yes	30-day Mortality: No	p-value
Time from pulm consult to bronch (days)	3.3	10.5	0.05
Post-bronch increase in O_2 requirement	36.4%	—	—
LOS post-bronch (days)	6.9	15.3	0.0025
LOS by O_2 increase (days)	8.0	14.9	0.0577

Table 4. Subgroup analysis comparing clinical parameter by 30-day mortality.
Patients who died post-bronchoscopy had shorter time from pulmonary consult to procedure and shorter post-bronch LOS suggesting procedures were performed during rapid clinical decline. O2 requirement increased in 36.4% of these patients. Those with post-bronch O_2 escalation had a trend toward shorter LOS possibly reflecting decompensation or more severe baseline illness.

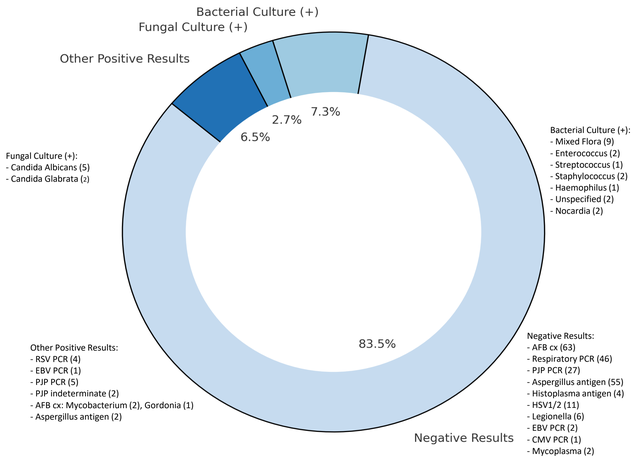


Figure 1. Diagnostic findings from 89 bronchoscopies

Summary

Diagnostic Yield

- 35% of bronchoscopies yielded at least one positive test (positive bronchoscopy, PB)
- 81% of these findings were not identified by concurrent noninvasive testing

Antibiotic duration

- Longer antibiotic exposure prior to bronchoscopy not associated with negative bronchoscopy
- Patients with PB had longer mean antibiotic exposure (16 days vs 13 days, $p = 0.39$)
- Prophylactic antibiotic use was similar across groups

Procedural safety:

- 13% experienced transient oxygen requirement increase
- 1% required intubation
- No cases of pneumothorax or procedure-related bleeding

Conclusions

Bronchoscopy in patients with hematologic malignancies provides diagnostic information not captured by noninvasive testing and can influence management. While overall yield is modest, the procedure appears safe and does not appear to be affected by antibiotic duration or latency to the procedure. However, a negative bronchoscopy may be a negative prognosticator. They were associated with longer hospital stays and significantly higher 30-day mortality, which may indicate sicker patients or diagnostic uncertainty. These findings support bronchoscopy as a valuable diagnostic tool amongst inpatients with hematologic malignancies.

References

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