Therapeutic Rigid Bronchoscopy Improves Functional Status and Systemic Treatment Eligibility of Patients with Malignant Central Airway Obstruction

The clinical question

Can airway recanalization performed via rigid bronchoscopy make poorly functional patients with malignant central airway obstruction (MCAO) ineligible for systemic therapy into eligible candidates?

AABIP take home message

Therapeutic rigid bronchoscopy can alleviate symptoms and improve functional status of patients with MCAO, which may make previously ineligible patients eligible for systemic and targeted therapies. The benefit was more pronounced in those with poorer baseline, Eastern Cooperative Oncology Group Performance Status (ECOG PS) scale of 3-4 but present in all patients with baseline ECOG PS of 0-4.

Background

Patients with MCAO often have life-threatening symptoms and co-morbidities such severe dyspnea, hemoptysis and post-obstructive pneumonia causing great and abrupt functional decline. From a management perspective, those with ECOG PS scale of 3-4 are considered ineligible for systemic therapy as per the American Cancer Society of Clinical Oncology (ASCO) guidelines. This study evaluates how therapeutic interventions using rigid bronchoscopy to treat MCAO affected the functional status, and further eligibility for systemic treatment of these patients.

Study Design

Study design:

- Retrospective Observational Continuous Case Series

Primary outcome:

- ECOG PS improvement after therapeutic rigid bronchoscopy in patients with MCAO

Secondary outcome:

- Impact of the ECOG PS change on patient's eligibility for systemic therapy modalities

Intervention:

- Therapeutic rigid bronchoscopy for management of a malignant obstructing airway lesion (mechanical debulking/dilatation with or without stent insertion for airway recanalization)

Population

Inclusion Criteria:

- All patient who underwent rigid bronchoscopy for the management of MCAO between March 2015 and November 2019

Exclusion Criteria:

- All patients who underwent the intervention during the above timeline were included in the retrospective analysis

Baseline Characteristics:

- **Total subjects:** 77
- **Study duration:** 56 months
- **Age (mean ±SD):** (y) 63± 11.3
- **Males:** 55 (71.4%)
- **Females:** 22 (28.6%)
- **Cancer subtype**
    - NSCLC—adenocarcinoma: 8 (10.4%)
    - NSCLC—squamous cell: 27 (35.1%)
    - NSCLC—other: 6 (7.8%)
    - Small cell lung cancer: 15 (19.5%)
    - Carcinoid—typical and atypical: 7 (9.0%)
    - Other cancer—metastatic disease, nonlung subtype: 9 (11.7%)
    - Mesothelioma: 2 (2.6%)
    - Hematological malignancy: 3 (3.9%)
- **Prediagnosis:** 32 (41.5%)
- **Diagnosis already established 45 (58.5%)**
- **ECOG PS preprocedure:**
    - 0: 3 (3.9%)
    - 1: 22 (28.6%)
    - 2: 25 (32.5%)
    - 3: 23 (29.9%)
    - 4: 4 (5.2%)

Outcomes

Primary outcome: Significant improvement was seen in ECOG PS post-rigid bronchoscopy for management of MCAO regardless of the baseline performance status. The benefit was more

pronounced in those with higher baseline score, i.e., lower baseline performance. In patients presenting with ECOG PS 3 to 4, the median (interquartile range), ECOG PS improved from 3 (3 to 3) preprocedure to 2 (1 to 3) postprocedure (P<0.0001).

Secondary outcomes:

- 27/77 (35%) patients with baseline ECOG 3-4 would have been ineligible for systemic therapy. Post-intervention, 19/27 (70%) of these patients went onto to receive a combination of chemotherapy, immunotherapy/directed therapies, and radiotherapy.
- Overall, 8/27 (30%) post-intervention patients only received the best supportive care (5), unreported "other" care (2) or unknown care (1) suggesting the patient was lost to follow-up.

Adverse events:

- Complications of rigid bronchoscopy procedure
    - Bleeding controlled bronchoscopically: 53 (68.8%)
    - Catastrophic bleeding: 1 (1.3%)
    - Airway perforation: 2 (2.6%)
    - Damage to teeth/oral structures: 2 (2.6%)
    - Hypoxia <80%, > 1 min: 3 (3.9%)
    - Hypoxia <50%: 3 (3.9%)
    - Failed procedure: 1 (1.3)
    - Deterioration in respiratory status: 8 (10.4)
    - Pneumothorax: 2 (2.6)
    - Death: 0 (0.0)
- Complications of stent insertion
    - Failed stent insertion: 2 (5.4)
    - Obstruction due to retained secretions: 3 (8.1)
    - Obstruction due to granulation tissue: 1 (2.7)
    - Migration: 3 (8.1)
    - Infection: 18 (48.6)

Commentary

It has been established for a few years that therapeutic airway interventions improve symptoms, quality of life, functional status, and perhaps mortality in patients with malignant central airway obstruction. However, this study highlights the importance of how these supposed benefits translate into eligibility versus ineligibility for systemic, as well as targeted and immuno-therapies at the very outset. Seventy percent of previously ineligible patients received treatment after therapeutic interventions in this study, and that is a significant finding worth taking home. Purely for an inferential argument, if we consider the reported average survival of 1-2 months of an untreated MCAO patient, all these 70% ineligible patients would have followed this natural course to death roughly in the said timeline. That said, this is an inferential trend at best and a true measure of mortality benefit is a complex derivation beyond the scope of a retrospective case series.

A major limitation of the study is its retrospective continuous case series design. The lack of prospective data with predefined endpoints and randomization (albeit, it would be ethically challenging to randomize MCAO patients to non-intervention arm) or at least a comparator arm (with patients who chose no interventions) brings in several statistical biases beyond the scope of this review. Continuous case series may also imply that all eligible patients received the intervention but that is subject to the case eligibility selection bias of the proceduralist. The study also does not specify how many proceduralists performed these cases, or their training background. Lastly, the single center experience will need to be replicated at other centers to validate these findings. Availability of rigid bronchoscopy expertise and instruments may be a limiting factor at several institutions.

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Suggested Reading

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Article citation

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