Malignant Central Airway Obstruction

MCAAN

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Markey Cancer Center

An NCI Comprehensive Cancer Center

Disclosure

- Intuitive Surgical

  -proctor new pulmonologist new to Ion robotic bronchoscopy

Objective

- Assess patients who may benefit from airway stent
- Discuss advantage & disadvantage of airway stents
- Describe modalities for tumor ablation
- Outline post-airway stent care

Case Presentation

- 67 smoker , male , with syncope
- Chest Xray after pacemaker insertion mentioned a right paratracheal opacity and a CT chest was recommended in 6/2023 .
- Patient presents in 1/2025 with Hemoptysis and shortness of breath.
- On 4 liters oxygen saturating 94 %.

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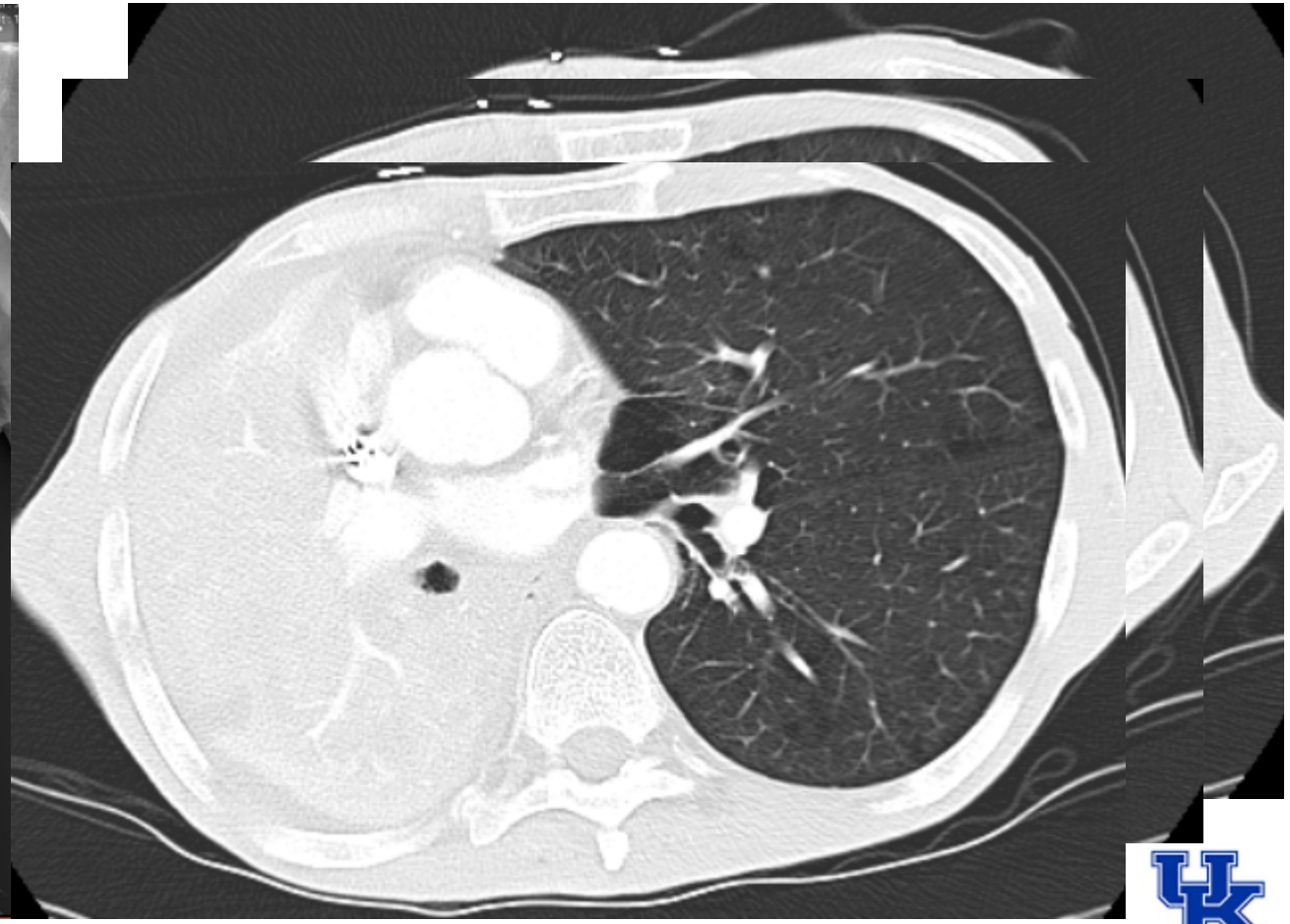
Case Presentation



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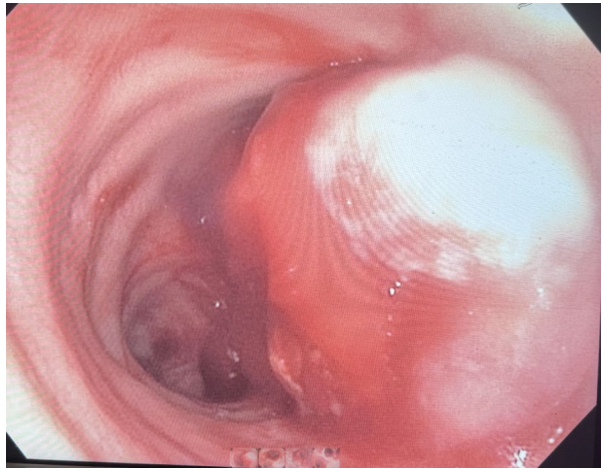
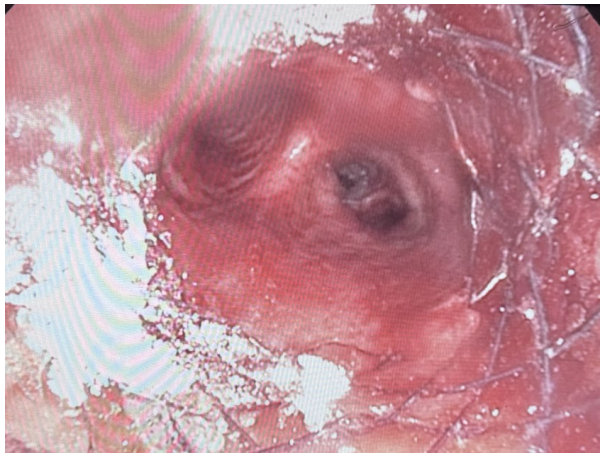
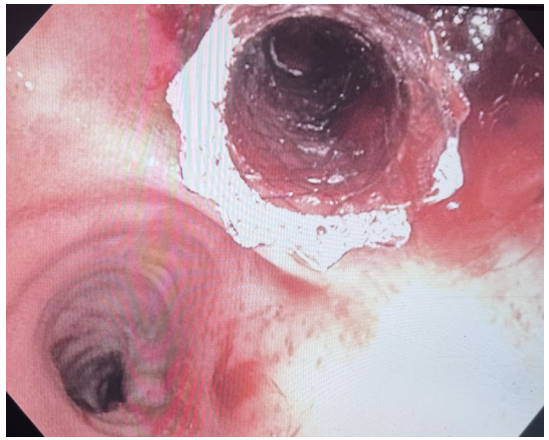
Management

- 1. Refer for Ct Guided biopsy.
- 2. Refer for bronchoscopy biopsy.
- 3. Refer to Radiation oncology.
- 4. Refer to Interventional Pulmonary for biopsy and stenting.
- 5. Consider hospice as he is too sick.

Procedure







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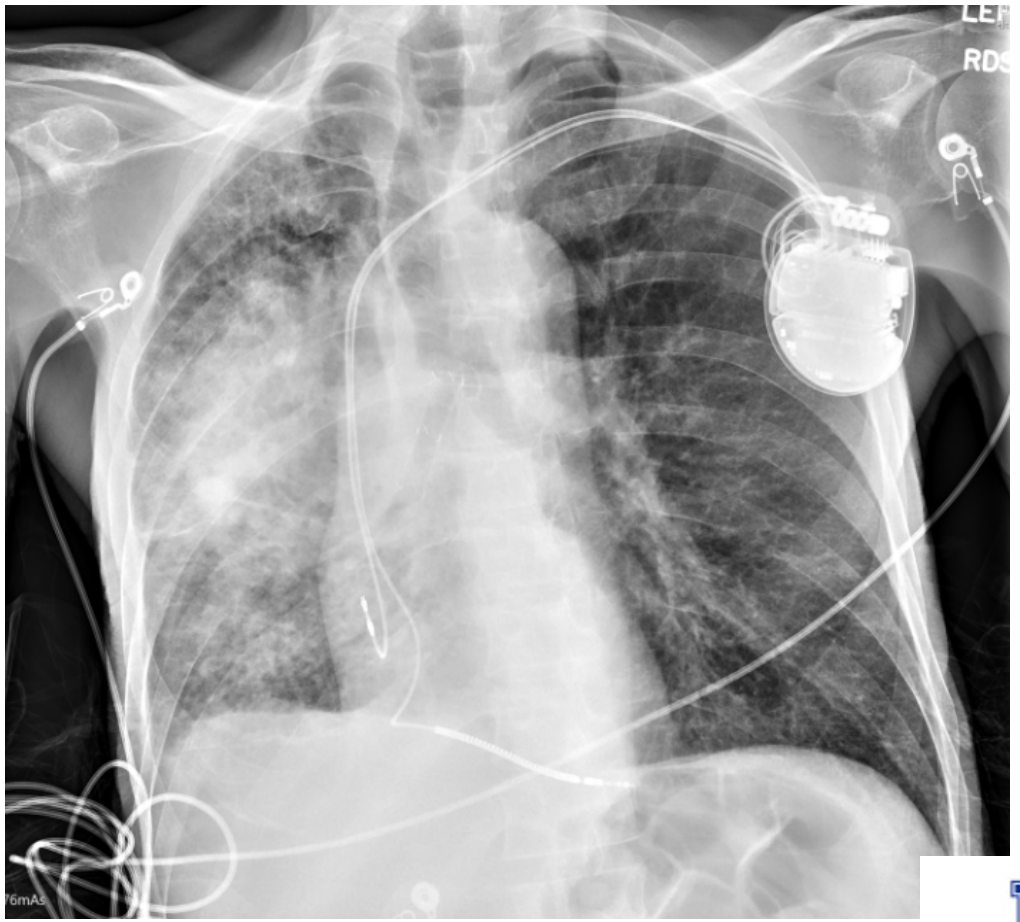
Procedure

Post Procedure



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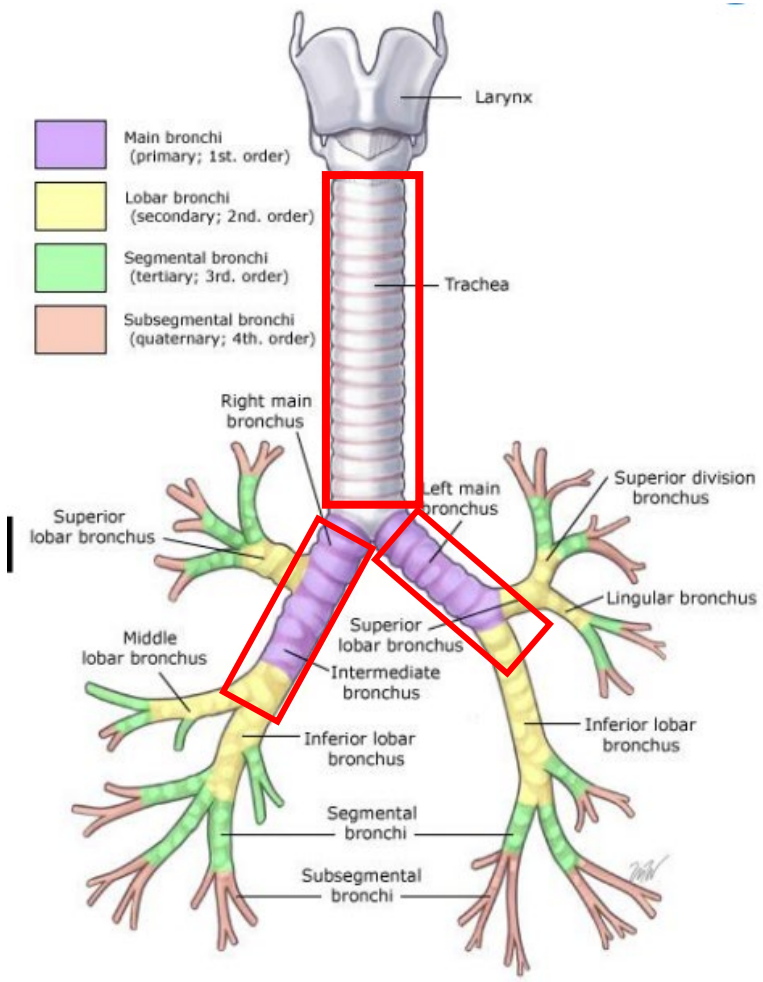
Malignant Central Airway Obstruction (MCAO)

- Definition
- Classification
- Etiology
- Extent and severity of the obstruction
- Physiological impact
- Parameters for decision-making/ management

Malignant Central Airway Obstruction (MCAO)

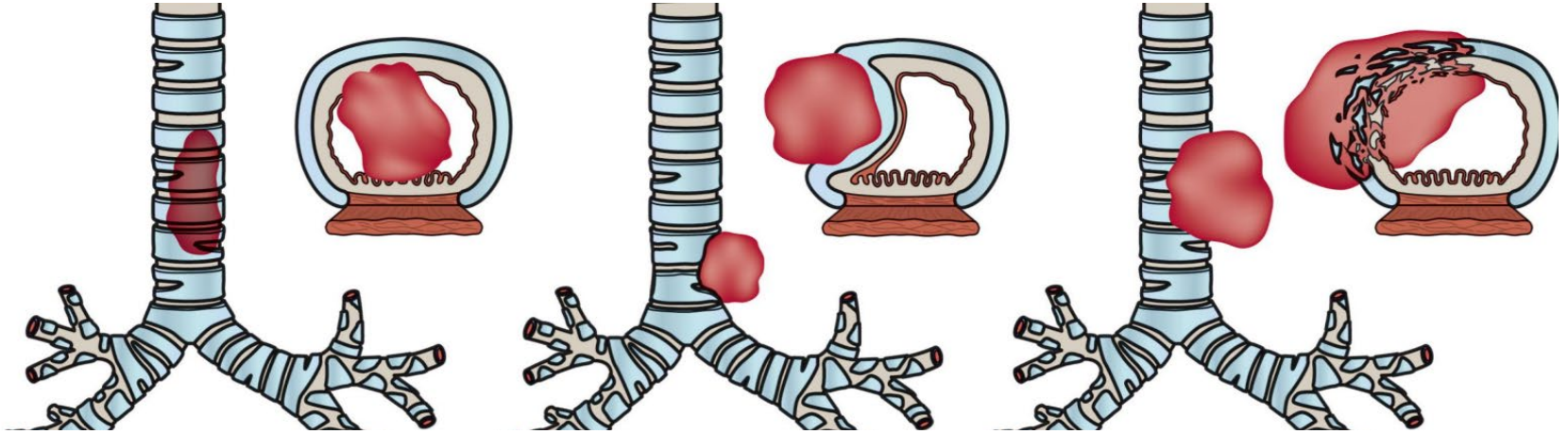
- **Definition**
  - Occlusion of > 50 % of the trachea, main stem bronchus, bronchus intermedius and lobar bronchus.

- Facts
  - 30 % lung cancer develop MCAO
  - Survival decreases,
    - untreated 2-3 months ,
    - intervention 6-8 months

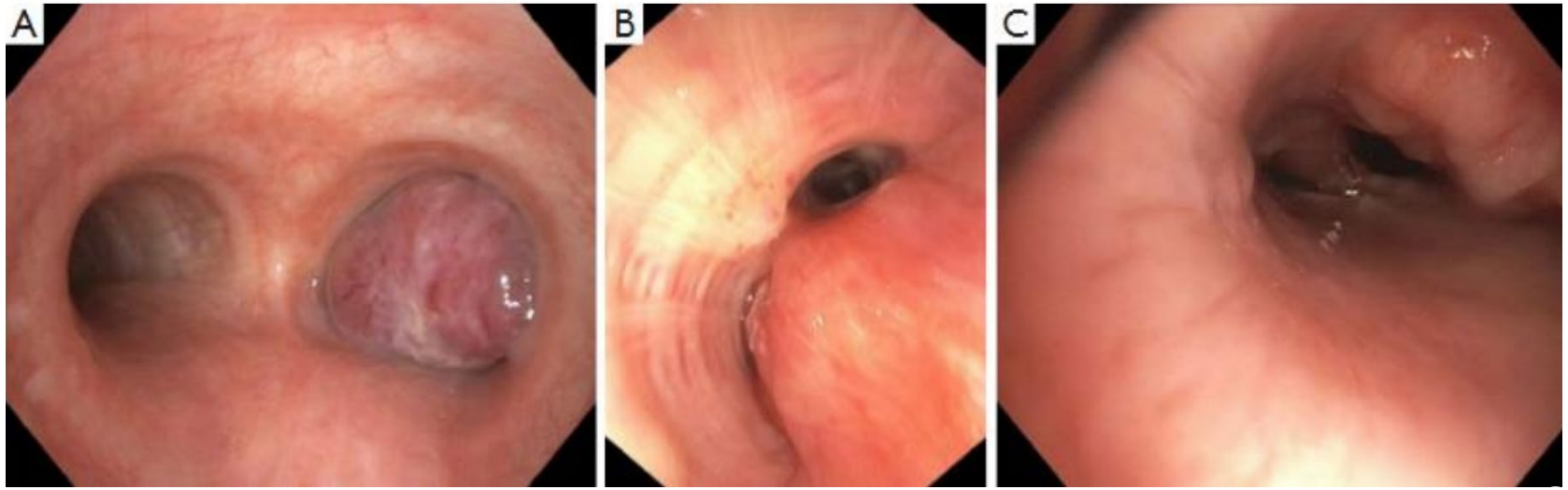


CAO/ Classification

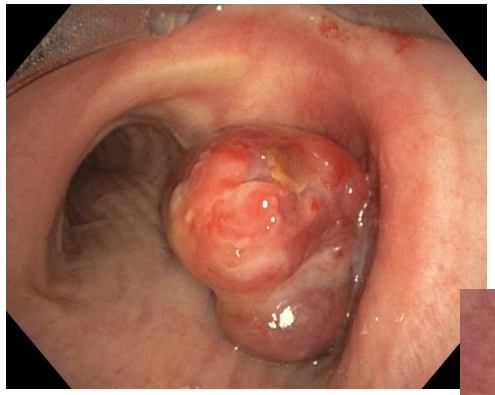
Types of Malignant Obstruction

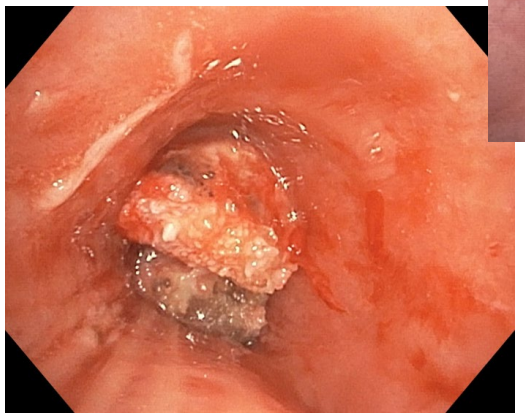


Intrinsic Extrinsic Mixed



CAO etiology





Malignant

Primary endoluminal malignancy

- Bronchogenic
- Adenoid cystic
- Mucoepidermoid
- Carcinoid
- Plasmacytoma

Metastatic carcinoma to the airway

- Bronchogenic
- Renal cell
- Breast
- Thyroid
- Colon
- Sarcoma
- Melanoma

Laryngeal and nasopharyngeal carcinoma

Esophageal carcinoma

Mediastinal tumors

- Thymic carcinoma
- Thyroid carcinoma
- Germ cell tumors (eg, teratoma)

Lymphadenopathy

- Associated with any of the above malignancies
- Lymphoma

Extent and Severity of Obstruction

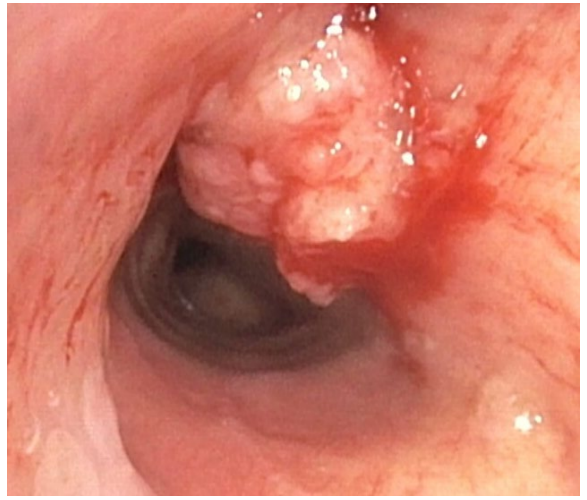
- **Degree of obstruction**
  - **(cross section)**
  - <50 % Mild
  - 50-75 % Moderate
  - >75 % Severe
  - 100 % Complete

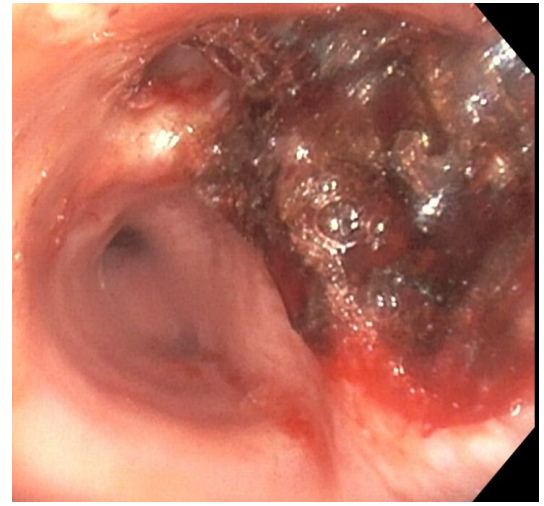
- **Length of obstruction**

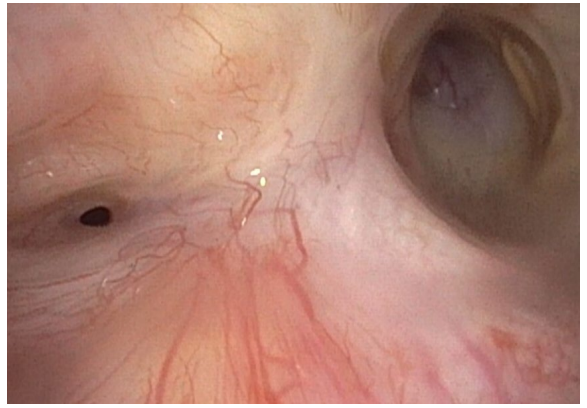
  Favorable < 4 cm > unfavorable

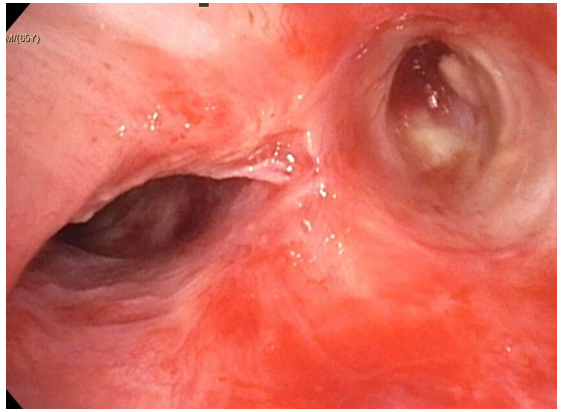
- **Timing**

  < 2 months

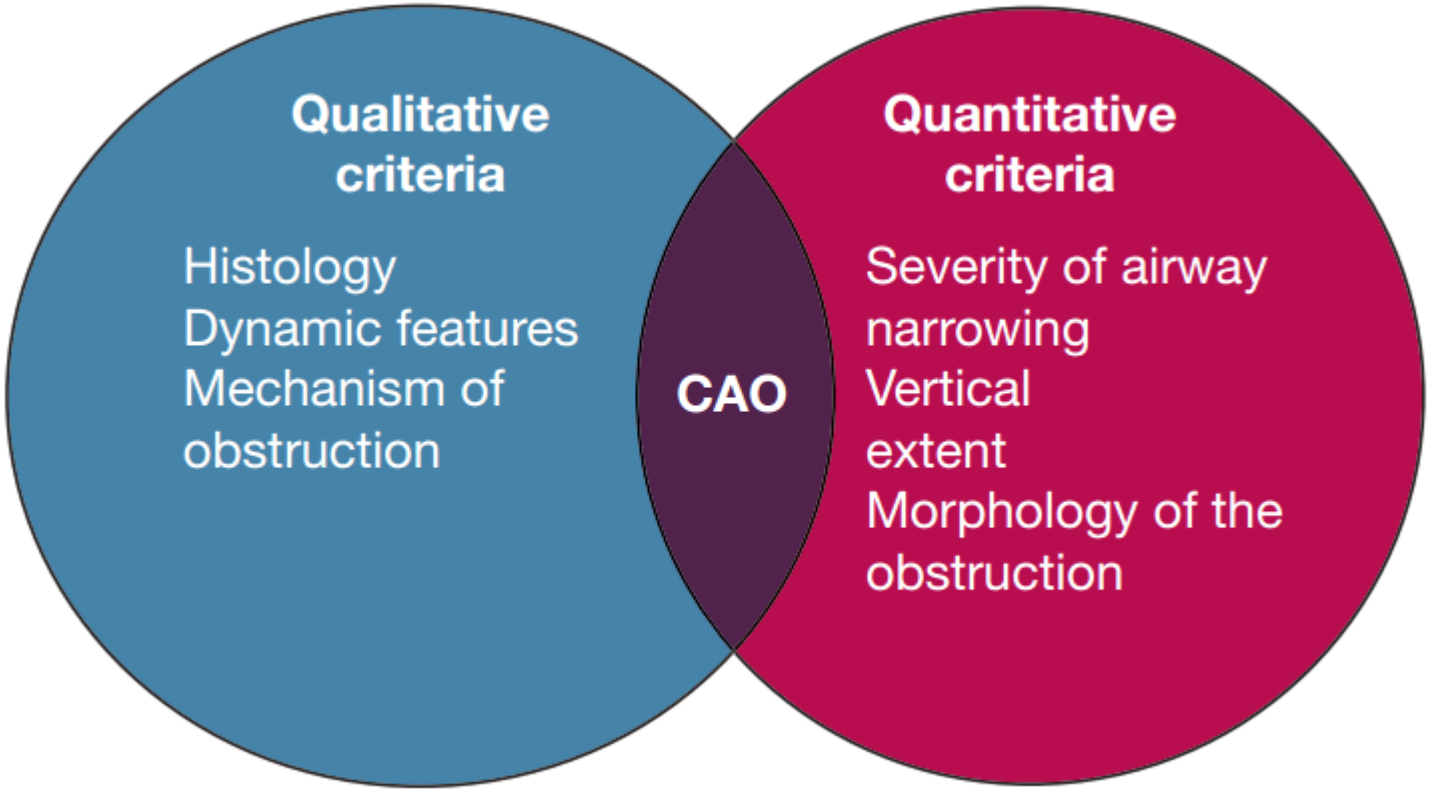








Decision Making



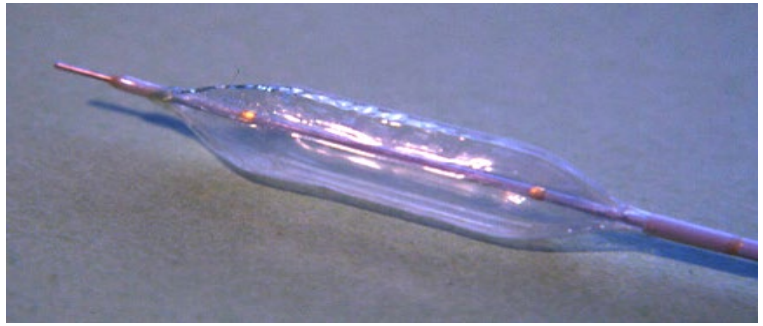
Indication for Bronchoscopy in CAO

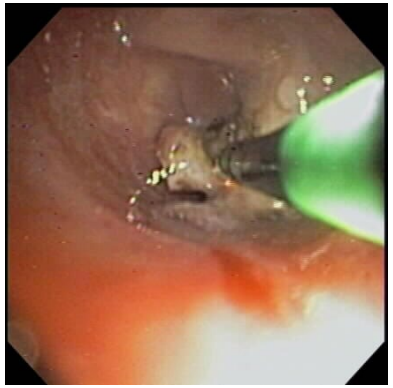
- Relief for obstruction causing dyspnea/ respiratory failure
- Clinically significant bleeding, infection
- Palliation of symptoms, may prolong life as a bridge to therapy
- Consider probability of technical success and ability to maintain patency of at least 50 % of normal.
- **If you suspect it, probably worth looking.**

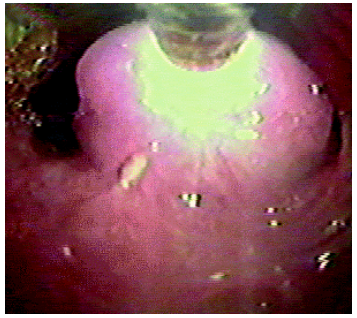
Indication for endoscopic therapy in the treatment of the three basic types of endobronchial stenosis

Procedure	Endobronchial lesion	Extrinsic lesion	Mixed lesion
Laser	+	-	+
Electrocautery	+	-	+
Cryotherapy	+*	-	+*
Brachytherapy	+*	-	+*
APC	+	-	+
PDT	+*	-	+*
Stents	-	+	+¶

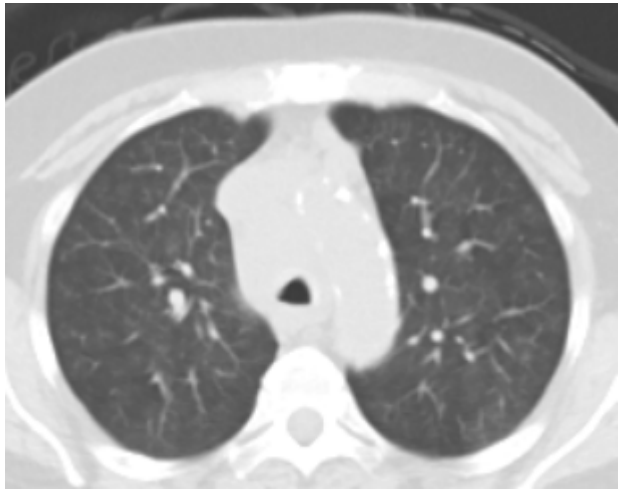
- Microwave
- Radiofrequency
- Pulsed Electrical Field

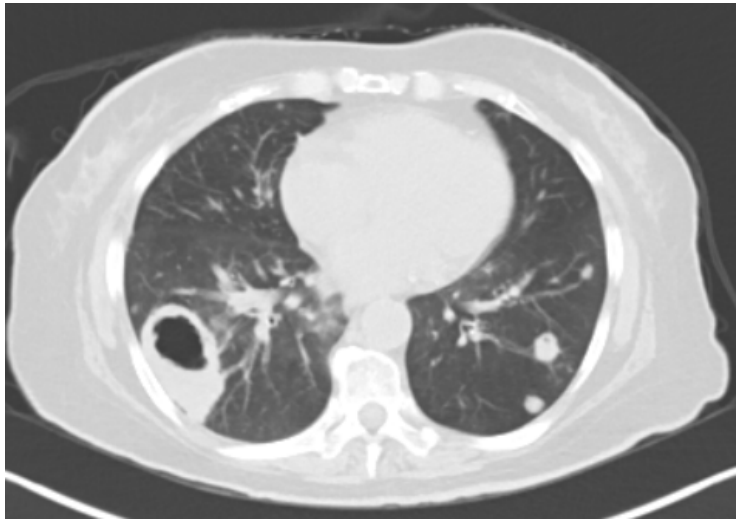






Case Presentation





- 64 F, smoker
- NCLSC (Squamous cell cancer)
- Clinical stage from 7/22/2024: Stage IVB (cT3, cN3, pM1c)

CT Angio 12/20/24

FINDINGS: There are vascular calcifications of the aorta. There is no aneurysm or dissection. There are significant multivessel coronary artery calcifications. The pulmonary arteries are well-enhanced. There is no pulmonary embolism. There is extensive adenopathy. The thoracic inlet is somewhat difficult to define. There is a 15 mm lymph node on the right and an 18 mm lymph node on the left. There is confluent mediastinal adenopathy with an apparent right paratracheal 28 mm lymph node. There is significant narrowing of the trachea at this level. There is a superior mediastinal 23 mm lymph node between the innominate artery and left common carotid artery. There is a 2.5 cm AP window lymph node. There is a 2.3 cm subcarinal lymph node. There is a 16 mm right hilar lymph node. There are no pleural or pericardial effusions. There is underlying emphysema. There is a large, thin-walled lung cyst in the right lower lobe measuring up to 5.1 cm. There is a noncalcified 12 mm

CT Angio 1/5/2024

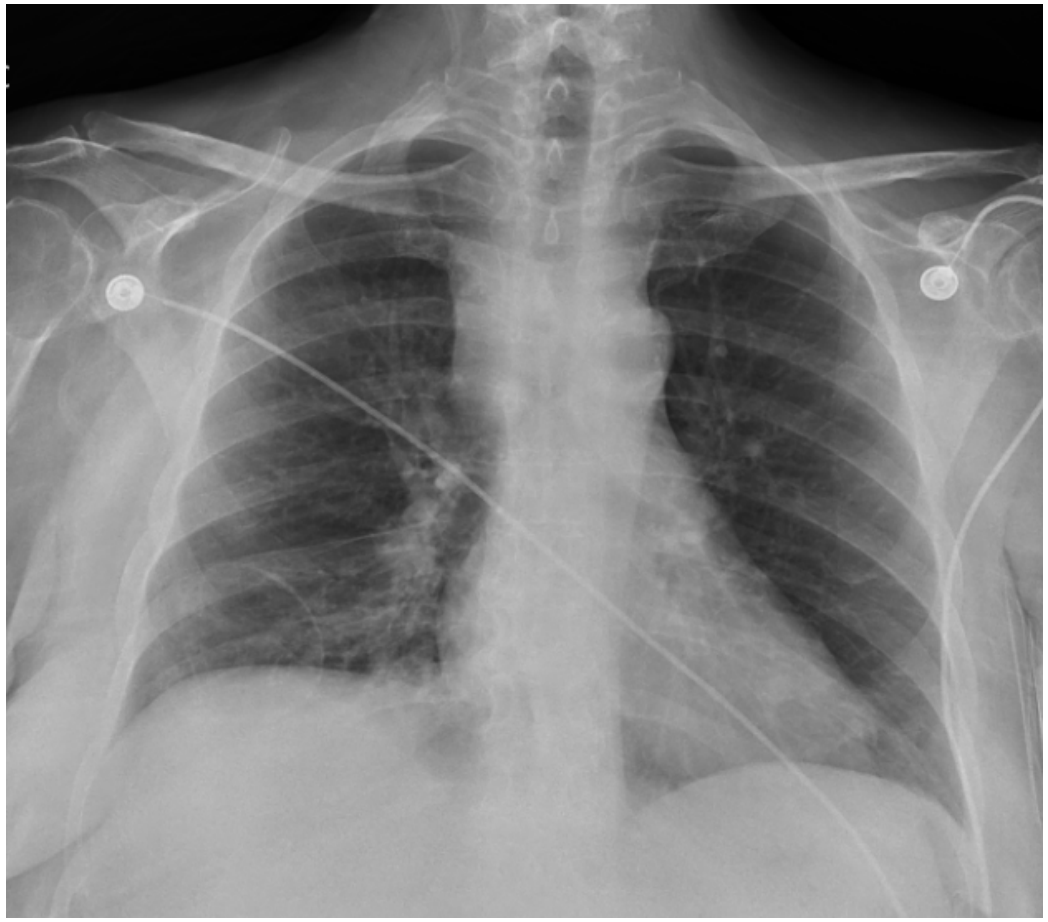
Impression

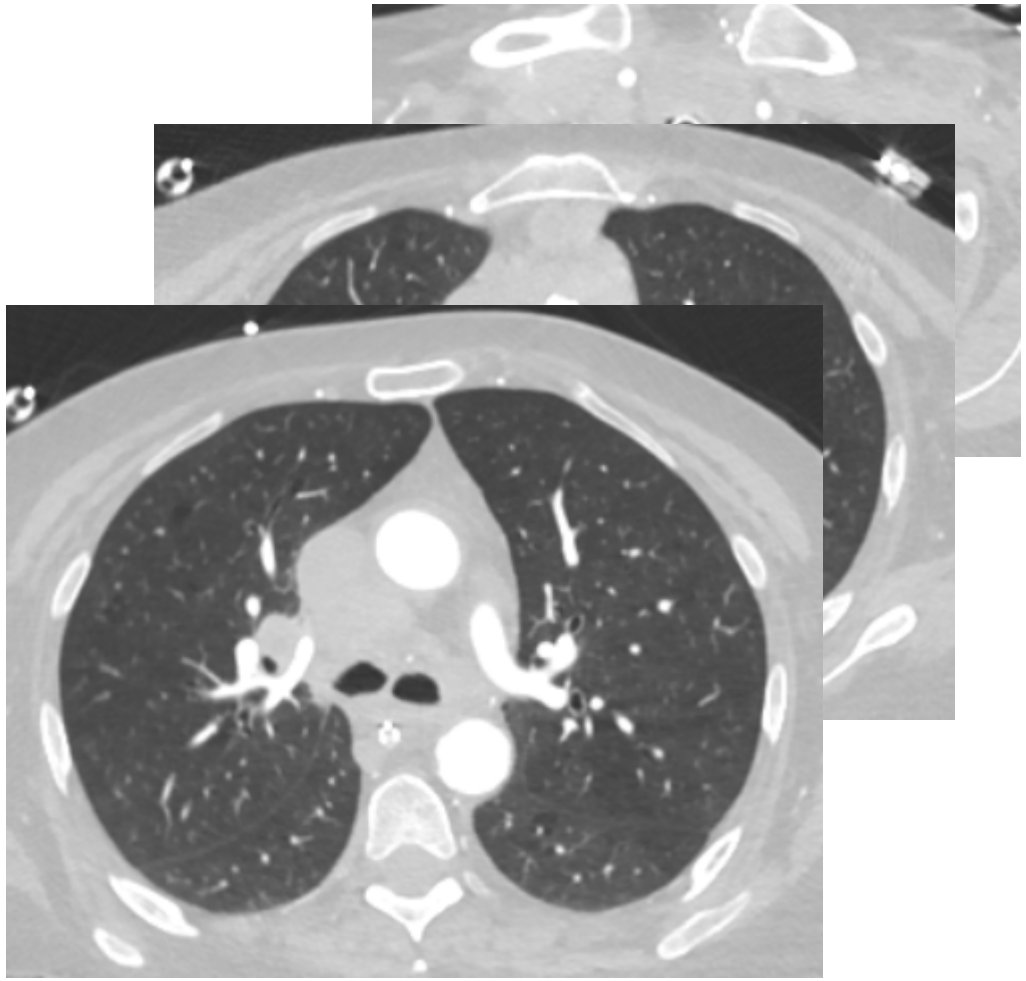
1. Extensive, bulky thoracic inlet and mediastinal adenopathy, as described. There may be slight increase in size of the right paratracheal nodal conglomerate.
2. Mass effect on trachea, slightly more evident than previous.
3. No evidence of pulmonary embolism.
4. Noncalcified nodules at left lung base.

Discharged 1/6/2025

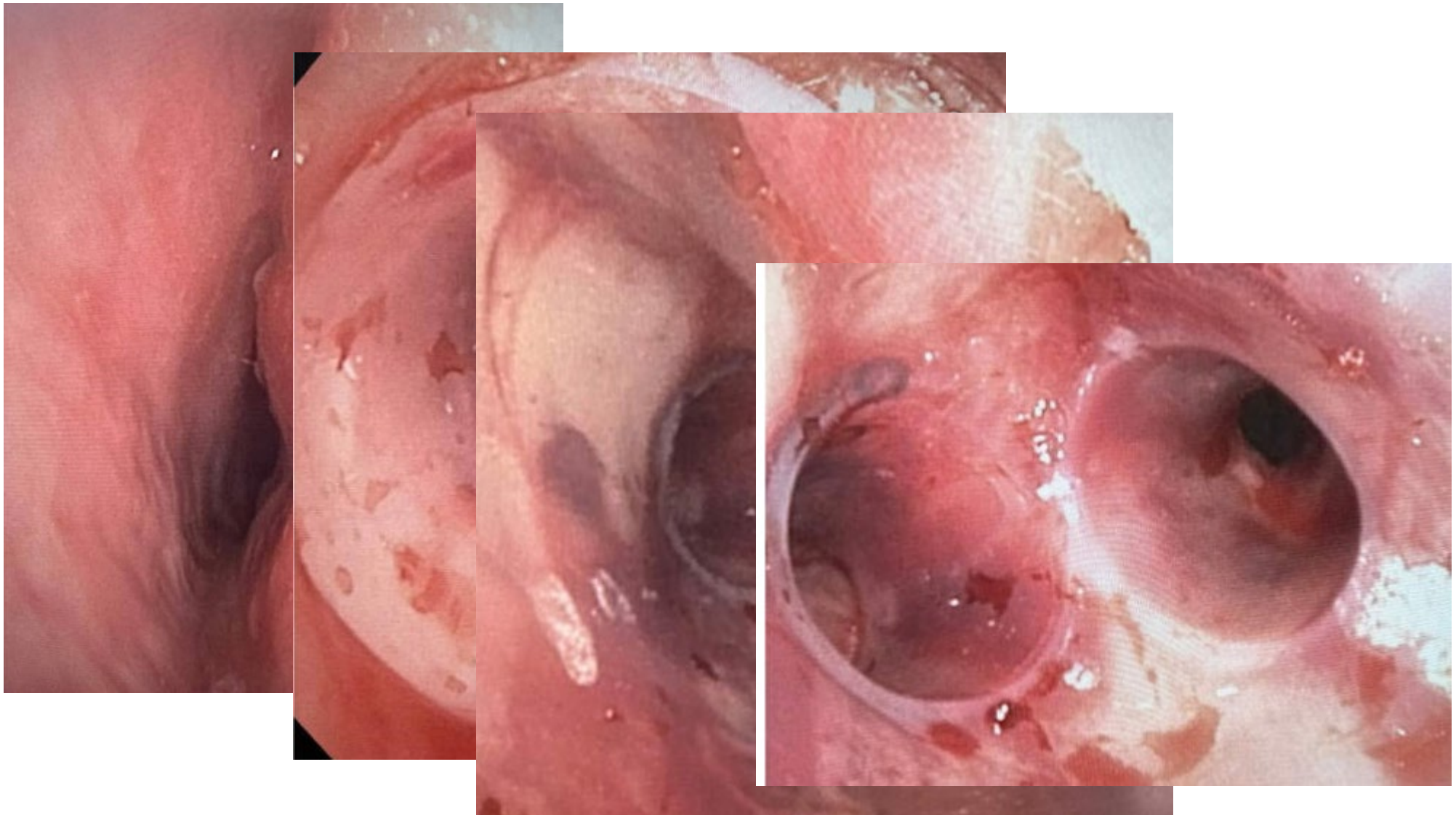
Heart cath for NSTEMI, no stent placed ,
Takotsubo cardiomyopathy EF 40 %
Rad onc consult as outpaint.

1/18/2025



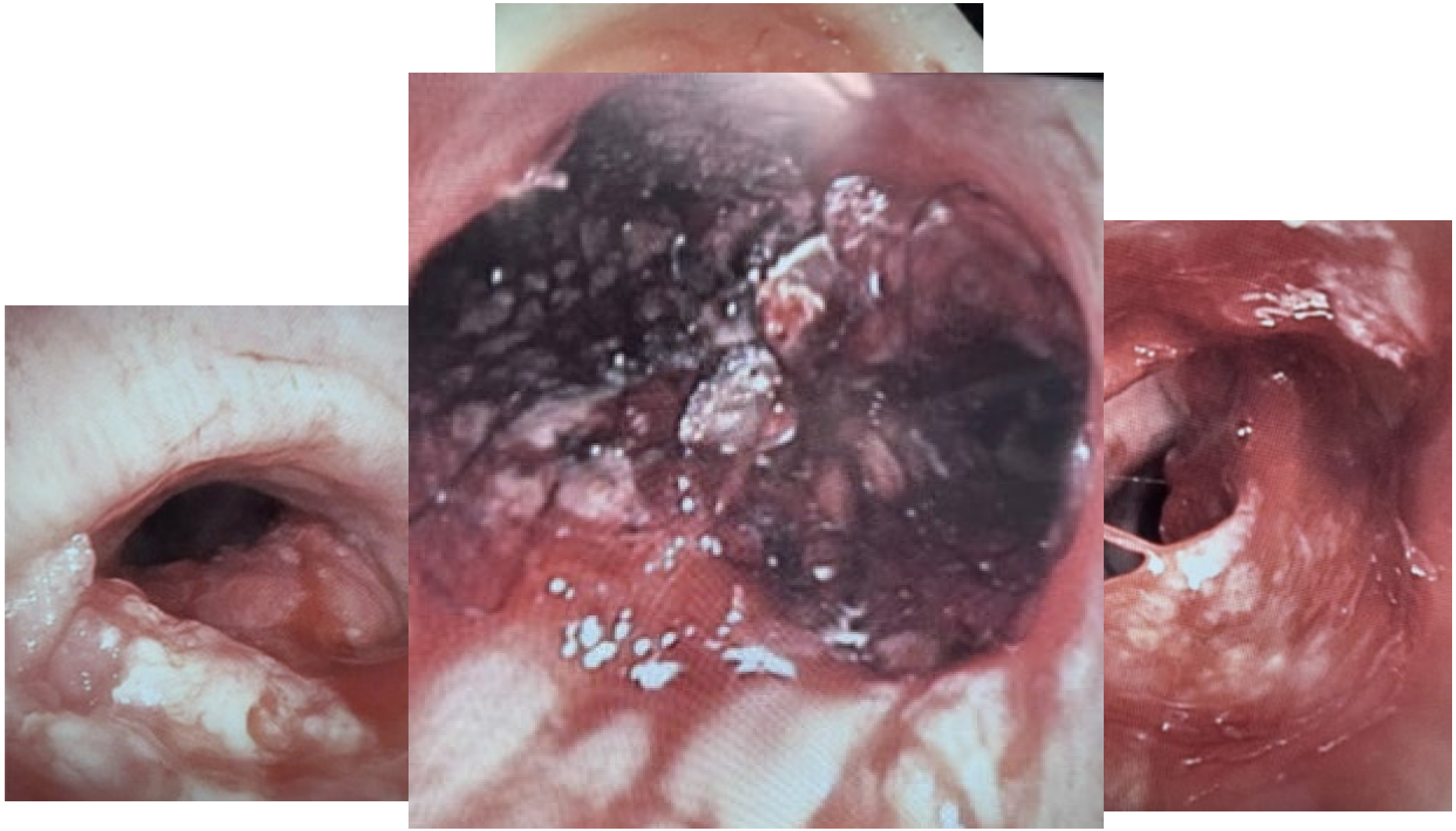


Procedure



Case 3

- 12/19/24 admitted for obstructive pneumonia. Ct reports a large lung mass, near complete occlusion of the RMS.
- 12/21/24 bronchoscopy. Carinal Mass with extension in the LMS and RMS causing 20 percent occlusion.
- 1/10/25 readmitted for pneumonia.
- 1/20/25 follow up to discuss bronchoscopy biopsy results.
- 2/7/2025 bronchoscopy, resp failure, intubated and on a ventilator, and sends the patient for a stent.
- 2/8/25 Rigid bronchoscopy , stent placement at UKHC



Opening airways , does it help

- Technical success 93%
- Improvement of dyspnea 48%
- Central airway with greater baseline dyspnea 42%
- HRQOL improvement
- Less effective for lobar obstruction, smokers, and multiple cancer.
- 6 (3.9%) deaths in 1,115 procedure

Stent Complications

- Migration
- Mucous plugging
- Infection/ pneumonia
- Bleeding
- Pneumothorax

Post Stent Care

- Mycolytics
  - Mucinex
  - Hypertonic saline nebulizer
  - Mucomyst nebulizer
- Antibiotics if bronchitis or pneumonia are suspected
- CXR if suspicion for stent migration
- Post cancer treatment
  - CT chest
  - Remove stent 6 weeks post treatement

Interventional Pulmonary

- Relatively new upcoming field
- American association of Bronchology and Interventional Pulmonary (AABIP)
- 40 training programs in the USA, formalized since 2012
- Limited Interventional pulmonologists in Kentucky
- **Diagnosis/ Staging/ airway/ pleural fluid management**

Conclusion

Most CT chest reads do not comment on degree of airway narrowing.

Think beyond just a biopsy, consider staging, and airway management. One procedure to do it all.

Airway > 50 % narrowing

will most likely need intervention and not just a biopsy.

Central Airways

trachea, main stems, bronchus intermedius, possibly lower lobe bronchus benefit from stenting.

Earlier the better

to maintain airway patency. > 2 months will not open

Very high risk of bleeding with procedures within 6 weeks of radiation.