MANAGEMENT of MALIGNANT CENTRAL AIRWAY OBSTRUCTION

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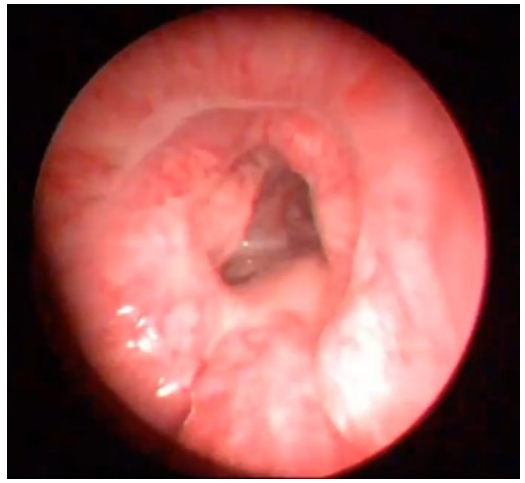
MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS

- >35% of lung cancer patients die due to local disease progression
  - Malignant Pleural/Pericardial Effusions
  - Superior Vena Cava Syndrome
  - Massive Hemoptysis
  - Tracheoesophageal Fistula
  - **Malignant Airway Obstructions**



MALIGNANT CENTRAL AIRWAY OBSTRUCTION

Obstruction of the central airways' lumen

> %50

due to malignancies

MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS

PRIMARY LUNG TUMORS

- Bronchogenic carcinoma
- Carcinoid tumor
- Carcinosarcoma
- Pulmonary sarcoma
- Adenoid cystic carcinoma
- Mucooepiderm. carcinoma

METASTATIC TUMORS

- Renal cell carcinoma
- Breast cancer
- Kolorectal carcinoma
- Sarcoma /Melanoma
- Gynecological tumors
- Testis carcinoma
- Adrenal carcinoma
- Chronic Lymphocytic Leukemia

MEDIASTINAL TUMORS

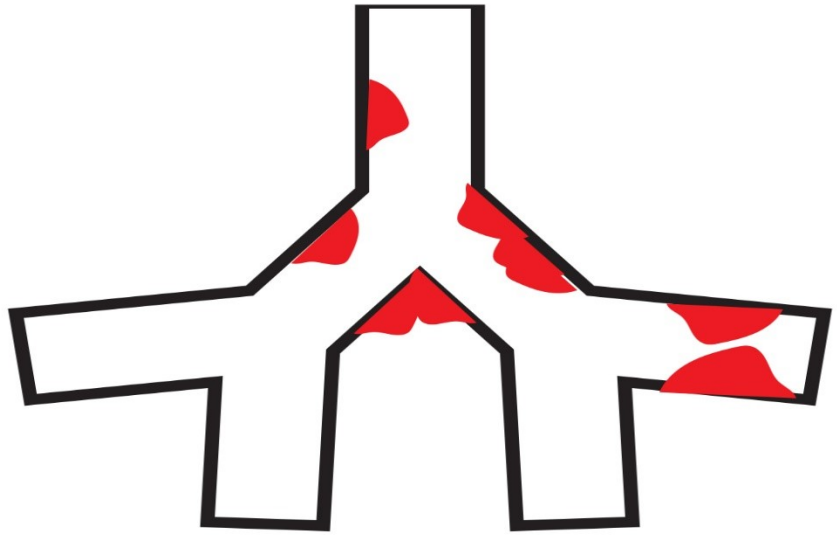
- Thymic carcinoma
- Tyroid carcinoma
- Germ cell tumors
  - Teratoma
  - Seminoma
  - Germinoma
  - Choriocarcinoma

NEIGBORING TUMORS

- Larynx carcinoma
- Pharynx carcinoma
- Eosophagus carcinoma
- Lymphoma
  - Hodgkin
  - Non-Hodgkin
- LAPs of other tumors

MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS SYMPTOMS

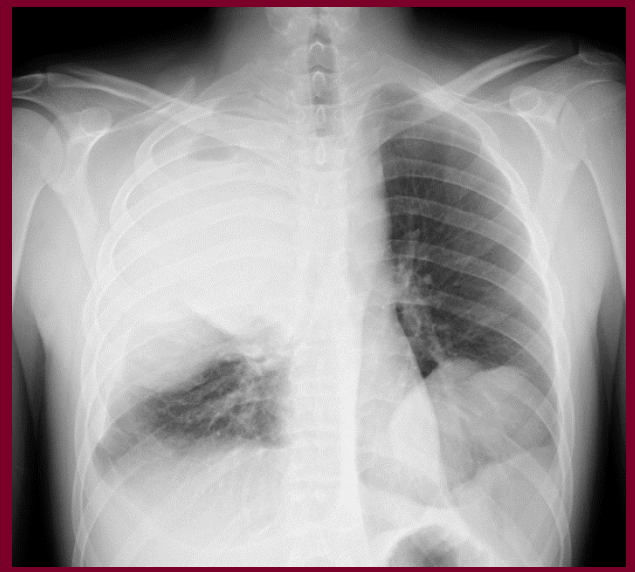
- **Cough:**
  - Advanced stage lung cancer patients ≥ 90%
  - Post-obstructive pneumoniae
- **Dyspnea and stridor:**
  - Advanced stage lung cancer patients %95
  - Obstruction degree
    - < 8 mm (at exercise)
    - < 5 mm (at rest)
  - Obstruction length
  - Dyspnea unresponsive to bronchodilator
- **Hemoptysis:**
  - Advanced stage lung cancer patients %63



MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS DIAGNOSIS

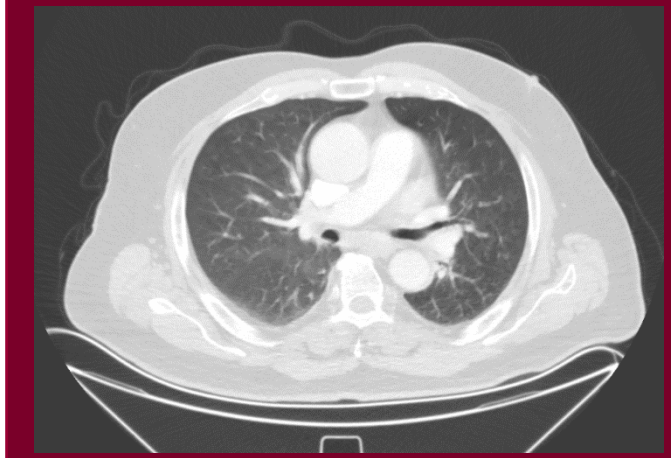
IMAGING- 1st LINE

CHEST X-RAY



IMAGING- 2nd LINE

COMPUTERIZED TOMOGRAPHY



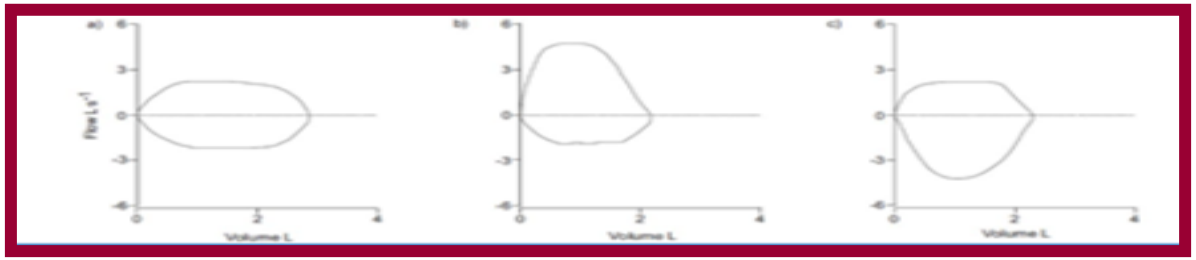
IMAGING- 3rd LINE

BRONCHOSCOPY

MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS DIAGNOSIS

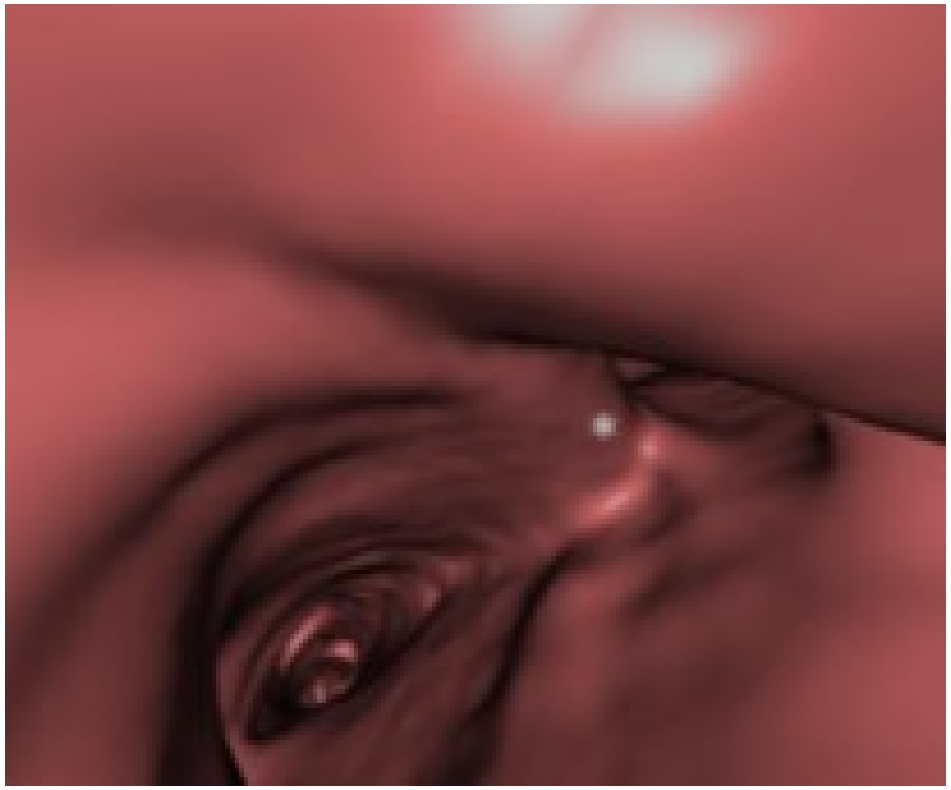
- **IMAGING**
  - PA chest X-ray
    - Total atelectasis (opaque lung)
    - Unilateral hyperinflation

- **PULMONARY FUNCTION TEST**



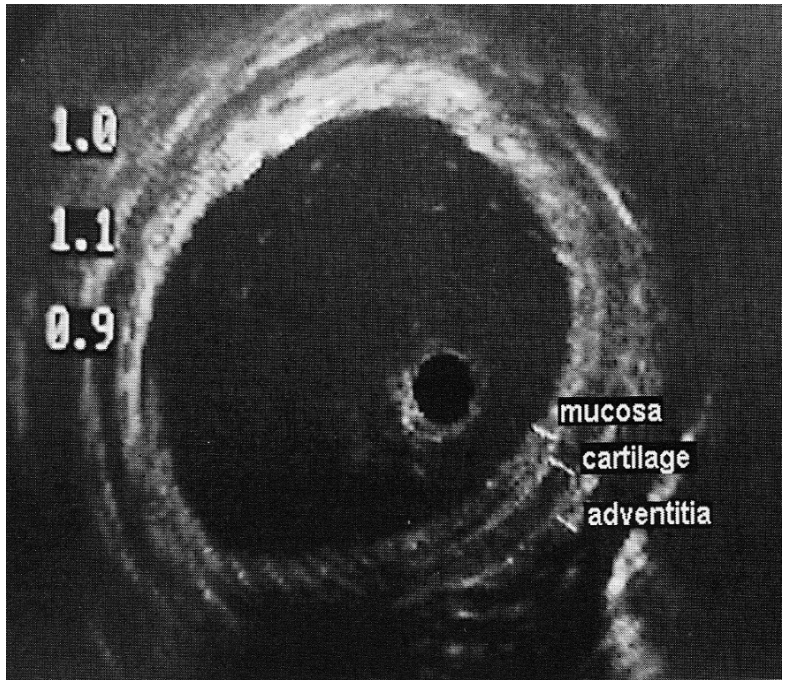
MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS DIAGNOSIS

- **IMAGING**
  - Computerized Tomography
    - Provides information about the type of obstruction
    - Shows parenchymal and vascular structures
    - Helps with planning treatment
  - 2D CT:
    - Axial
    - Coronal
    - Sagittal
  - 3D CT:
    - Virtual bronchoscopy



MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS DIAGNOSIS

- **IMAGING**
  - Bronchoscopy
    - Direct observation
      - Airway mucosa
      - Features of obstruction
      - Distal part of obstruction
    - Can be performed in ICU patients
  - Radial probe EBUS
    - Tracheal and vascular invasion



MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS TREATMENT

AIRWAY PATENCY

>%50

- Relief in symptoms
- Functional recovery
- Infection control
- Preparation for primary treatment (Surgery, RT, CT)

QUALITY of LIFE ↑

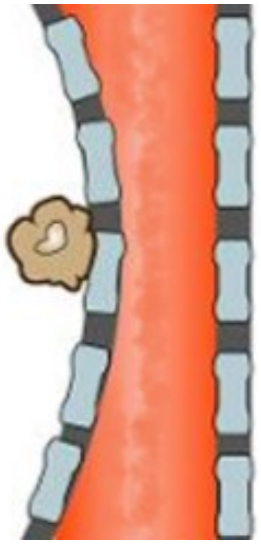
SURVIVAL ↑

MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS FACTORS EFFECTING THE TREATMENT

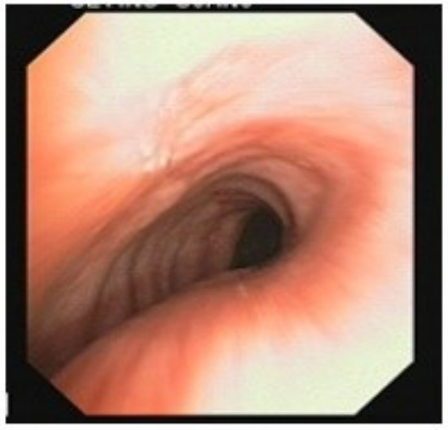
- Ellective conditions
- Bronchoscope should reach the tumor
- Lung behind the obstruction must be functional
- Experience of the physician/center

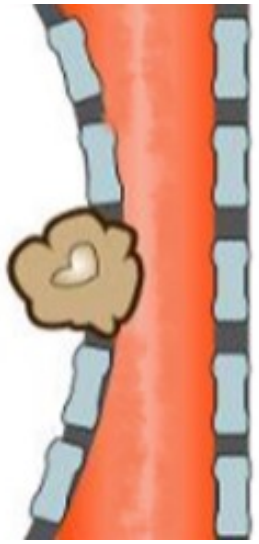
MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS
MECHANISM OF OBSTRUCTION

ENDOLUMINAL OBSTRUCTION

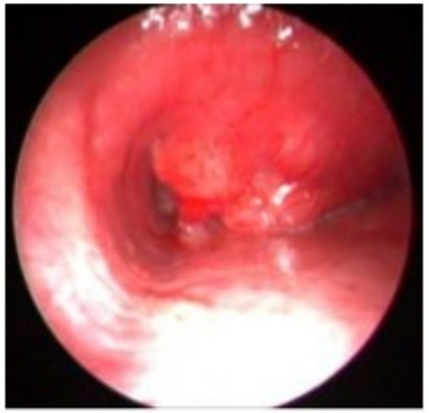


EXTRALUMINAL OBSTRUCTION





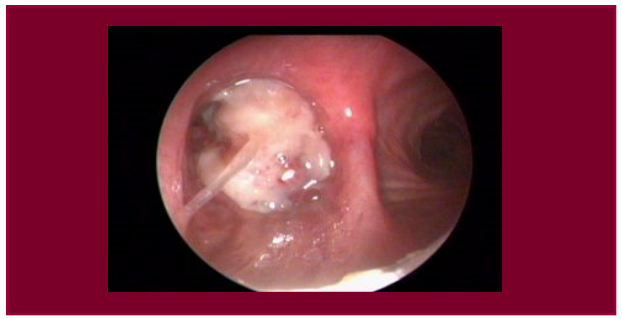
MIXED TYPE OBSTRUCTION

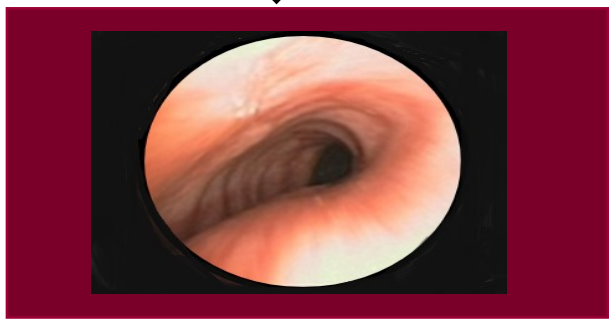


MALIGNANT CENTRAL AIRWAY OBSTRUCTIONS MANAGEMENT

EMERGENT
RIGID
BRONCHOSCOPY

NON-EMERGENT
FLEXIBLE or RIGID
BRONCHOSCOPY





THERMAL METHODS and MECHANICAL RESECTION

AIRWAY STENTS

BRONCHOSCOPIC TREATMENT MODALITIES

MECHANICAL METHODS

- MECHANICAL DILATION
- MECHANICAL RESECTION
- AIRWAY STENTING

THERMAL METHODS

- ABLATIVE METHODS
- CRYO METHODS

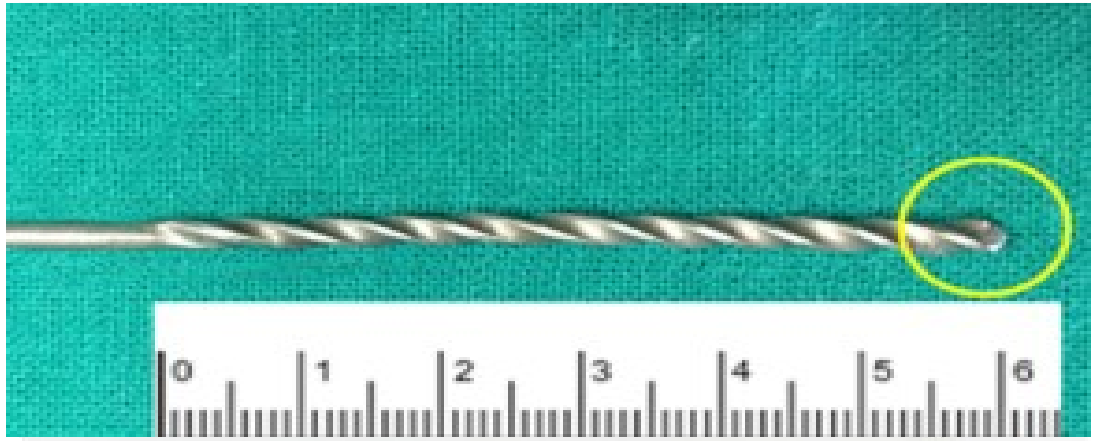
OTHER METHODS

- PHOTODYNAMIC TREATMENT
- BRACHYTHERAPY
- OTHER APPLICATIONS

BRONCHOSCOPIC TREATMENT MODALITIES

MECHANICAL METHODS

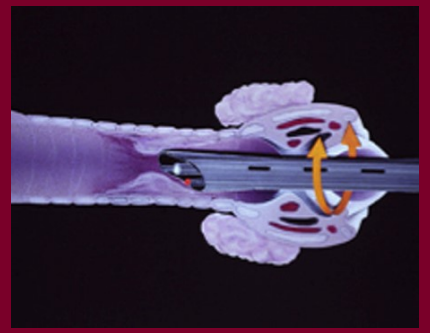
- Rigid tube
- Balloon
- Bougie
- Incision scissors
- Drill
- Airway stents

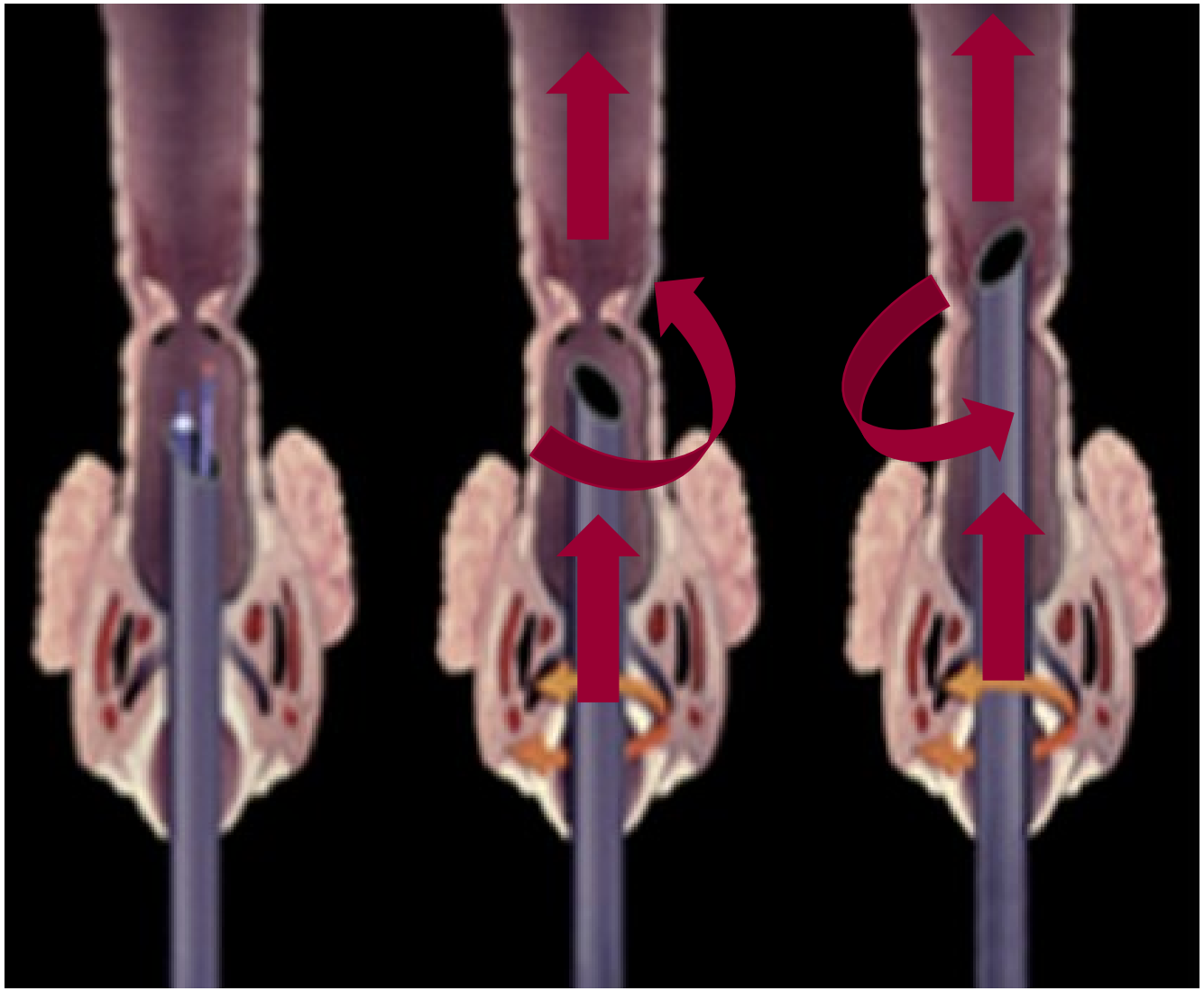


MECHANICAL METHODS

RIGID TUBE

- **MECHANICAL DILATATION**
- **MECHANICAL RESECTION**
  - Fastest/dramatically effective
  - Requires experience
  - Requires attention



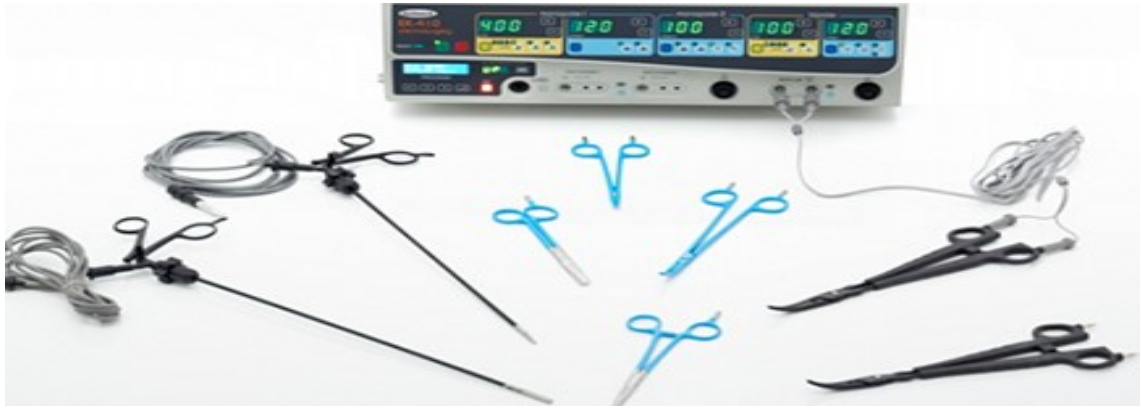


BRONCHOSCOPIC TREATMENT MODALITIES

THERMAL METHODS

- **Ablative Methods:**

  Argon Plasma Coagulation
  LASER
  Electrocautery



- **Cryo Methods:**

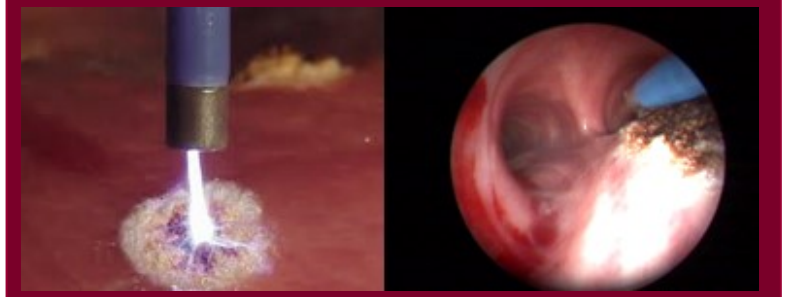
  Cryotherapy
  Cryo extraction

THERMAL METHODS

ARGON PLASMA COAGULATION

- Non-contact; coagulates tissue and provides hemostasis, low cost
- Power:40-120 W

  Application time>2 seconds
  Penetration depth>3 mm
- Homogeneous and superficial
- Less tissue damage and risk of bleeding
- Achieving airway patency or hemostasis control success rate 67-92%



ELECTROCAUTERY

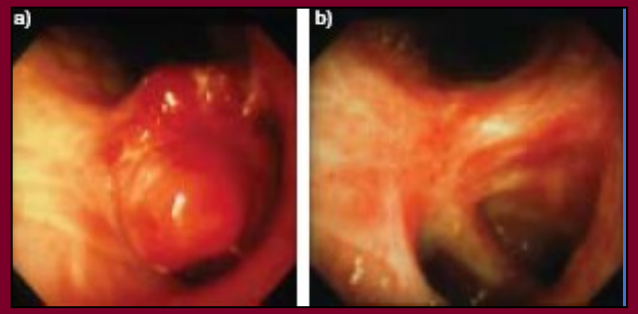
- Contact; coagulates, carbonizes and cuts the tissue, low cost
- Monopolar/Bipolar

  20-30 W: Coagulation

  40-60 W: Fulguration

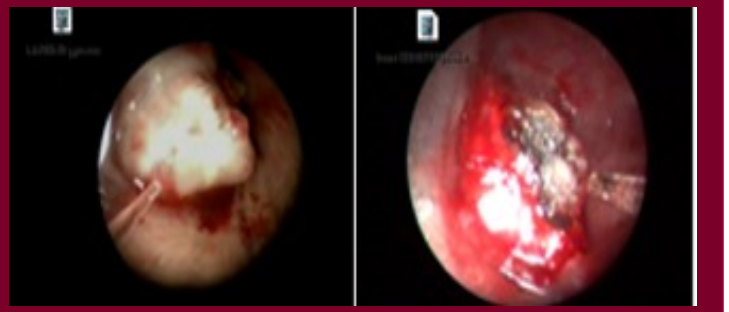
  20-40 W: Blend-cut

  60-100 W: Pure cut
- Effectiveness in massive hemoptysis 75-100%



LASER

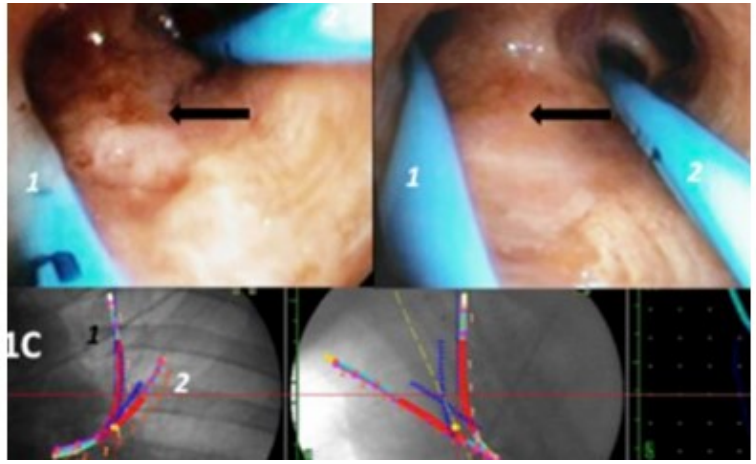
- Creates thermal energy in the tissue and leads to coagulation, vaporization, cutting, and devascularization
- Rapidly effective, can be applied in emergency treatment
- Effectiveness in massive hemoptysis 67-97%
- High cost, requires experience
- Can reach deeper layers of tissue



BRONCHOSCOPIC TREATMENT MODALITIES

OTHER METHODS

- Photodynamic Treatment
- Brachytherapy



- Other Applications
  - Management of Hemoptysis / Fistula

BRONCHOSCOPIC TREATMENT MODALITIES

COMPLICATIONS

- **EARLY**
  - Massive hemorrhage
  - Endobronchial burns
  - Tracheal or bronchial perforation
  - Cardiac arrhythmia
  - Respiratory insuffiency
- **LATE**
  - Recurrence
  - Asphyxia
  - Tracheoesophageal fistula
  - Stent related
    - Mucostasis
    - Migration
    - Halithosis

Istanbul

CASE 1

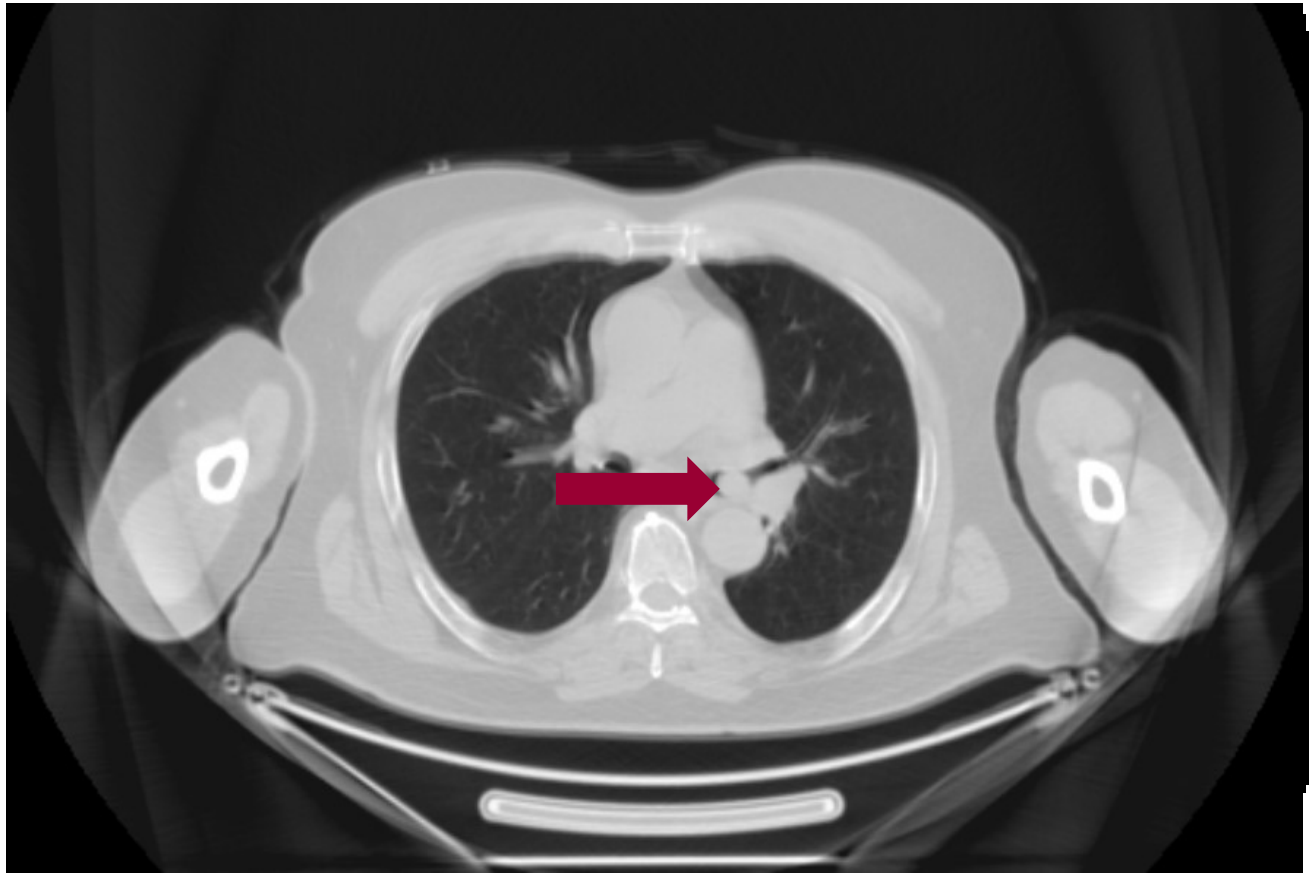
- 76 y/o, male
- Complaints: Dyspnea
- History: The patient was referred to our center after a non-diagnostic flexible bronchoscopy
- History of present illnes: HT, DM, Panic disorder(?)

CASE 1

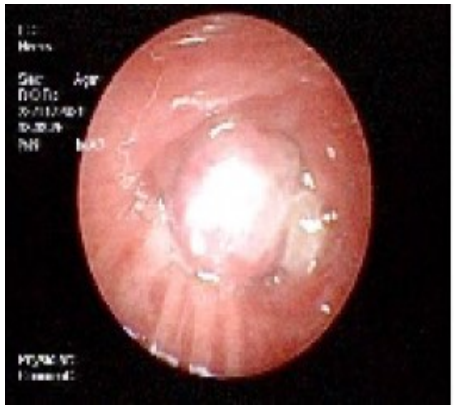
- Habits: None

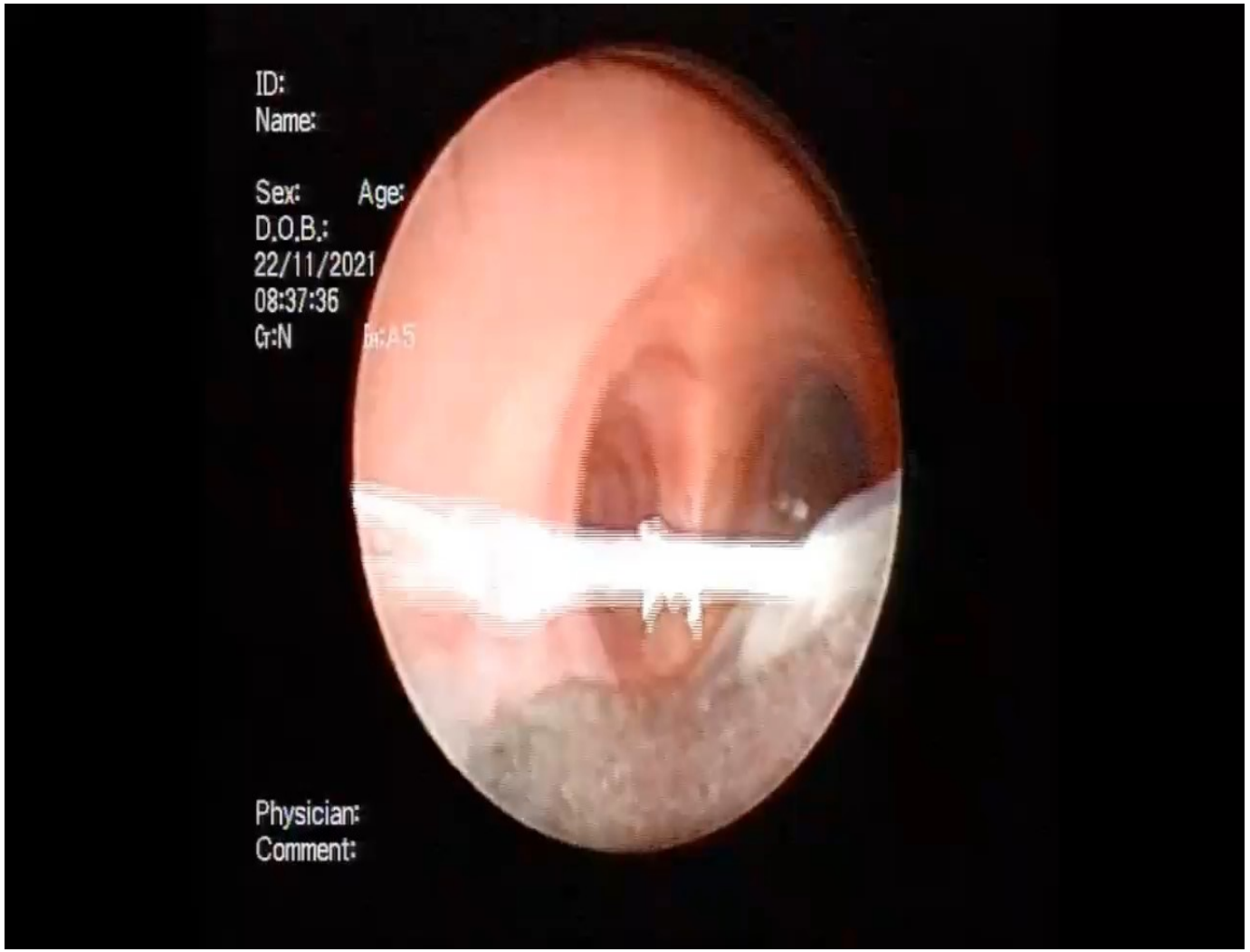
- Physical examination:
  TA: 120/85 O_2 Sat: %93(oda)
  Respiratory rate: 22/min
  Respiratory system: Coarse respiratory sounds on the left lung

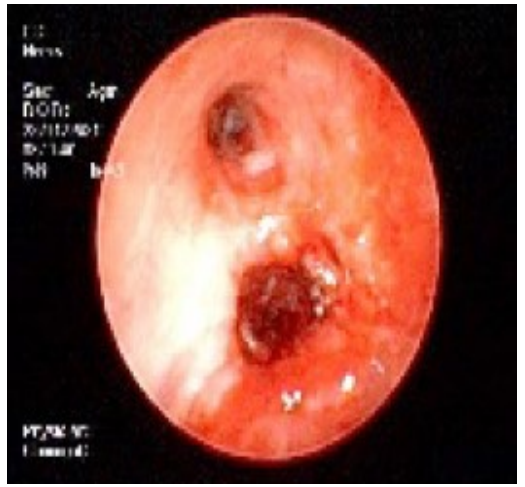
- Laboratuary: Normal



CASE 1



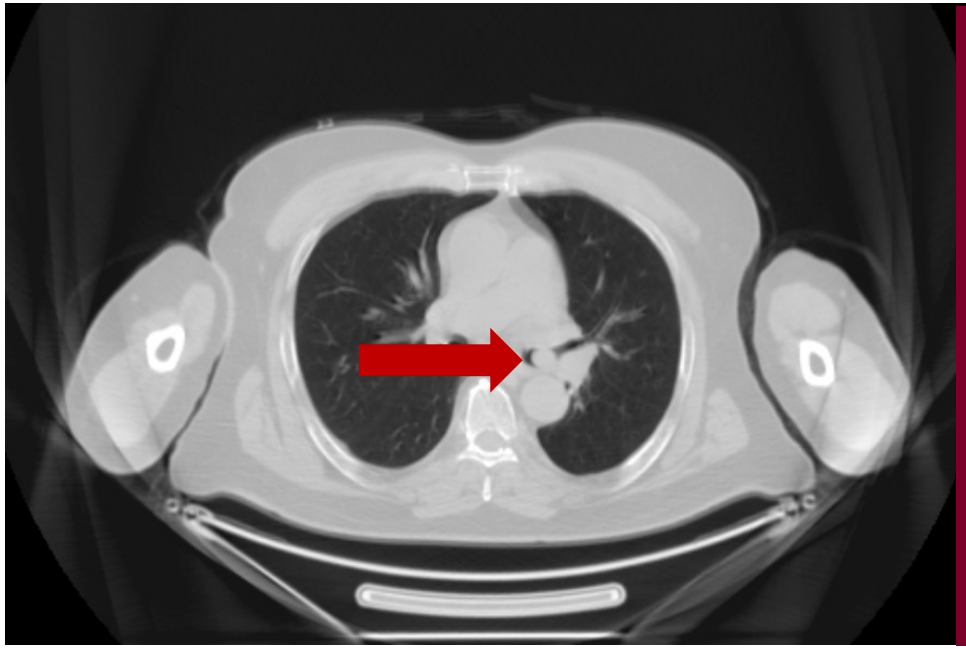


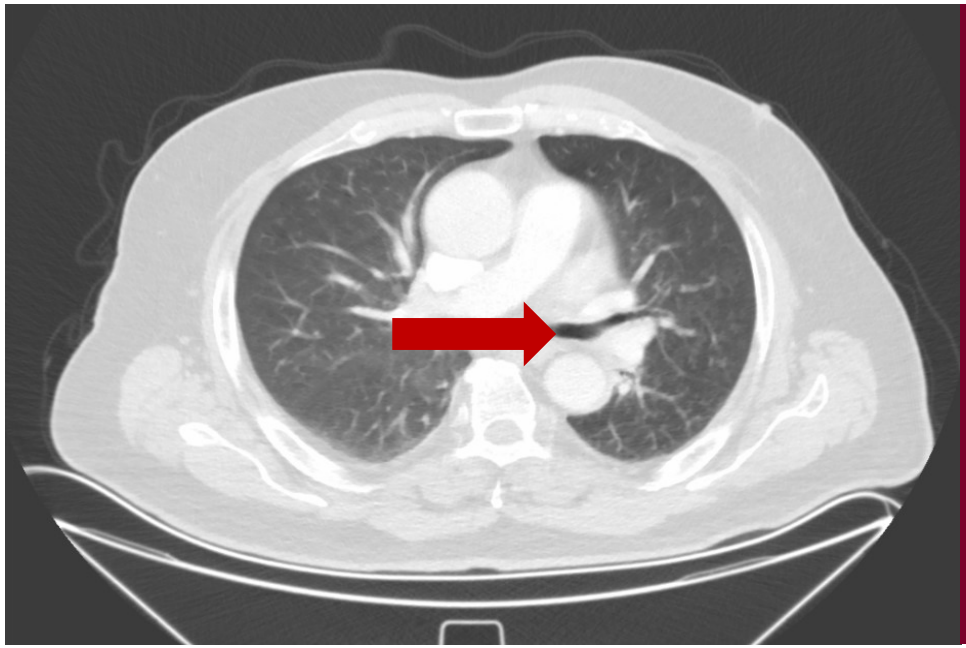


CASE 1

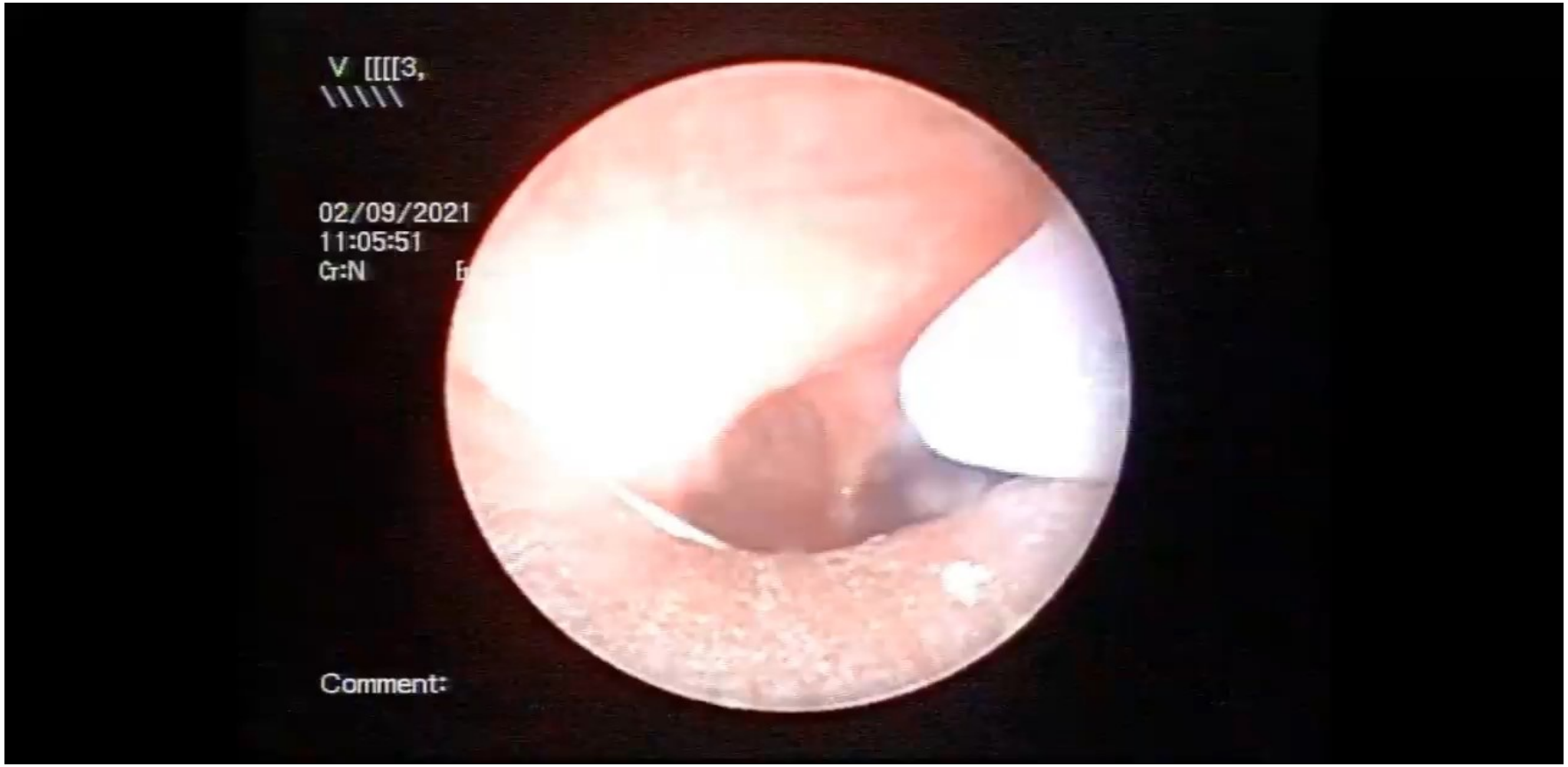
- **Follow-up:**
  - Pathology: Typical carcinoid tumor GALLIUM 68-PET was scheduled
  - No uptake and involvement in GALYUM 68-PET
  - Surveillance bronchoscopies were scheduled

THERMAL METHODS





CASE 2



THERMAL METHODS
+
MECHANICAL RESECTION

Istanbul

CASE 3

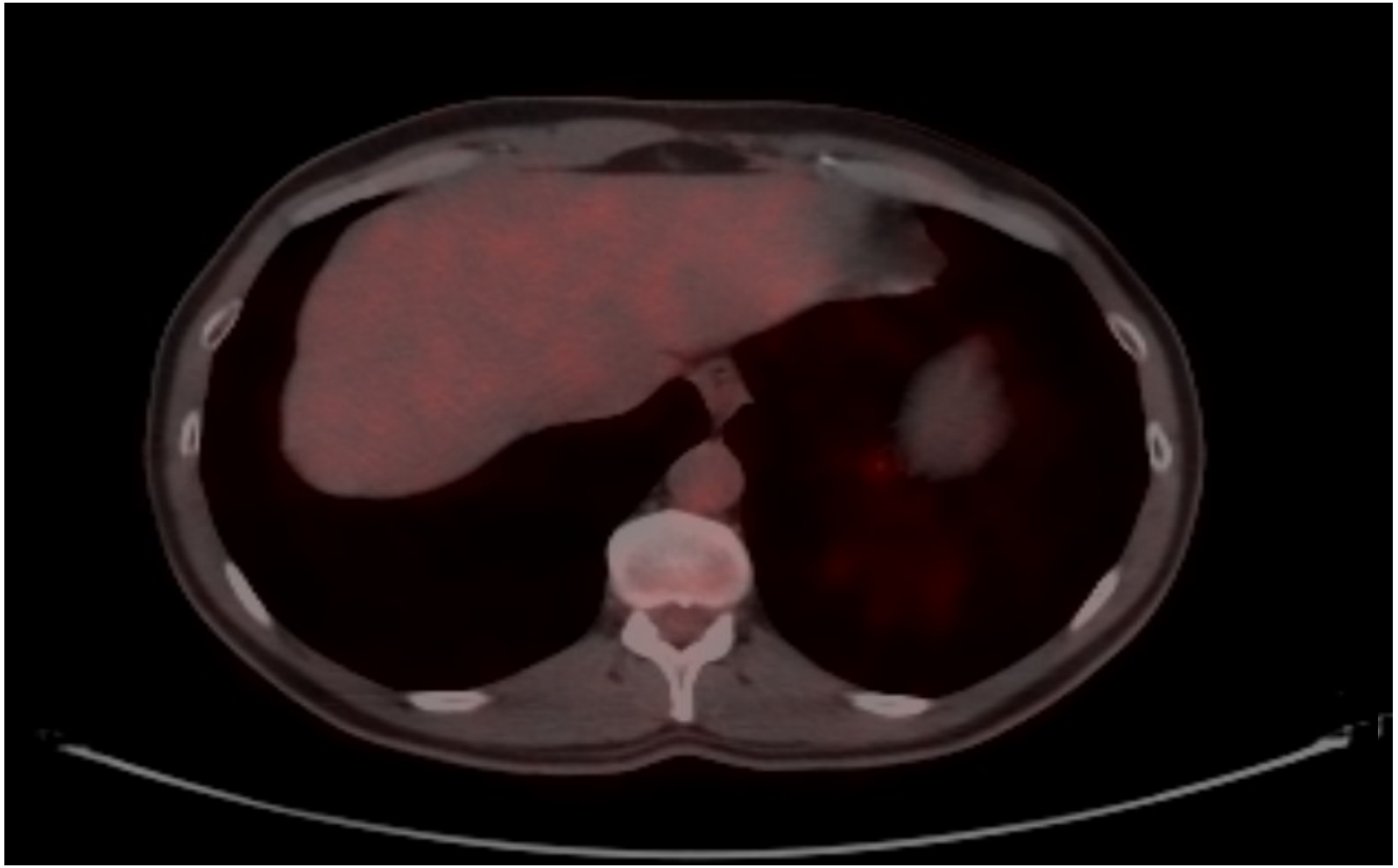
- Habits: Active smoker: 50packs/year

- Initial ABG: PH: 7.46 SO_2: 80
  PCO_2: 27 PO_2: 56

- The hypoxic patient was hospitalized for an interventional bronchoscopic procedure
- The patient's respiratory distress worsened and referred to the intensive care unit non-intubated

CASE 3

PET-CT

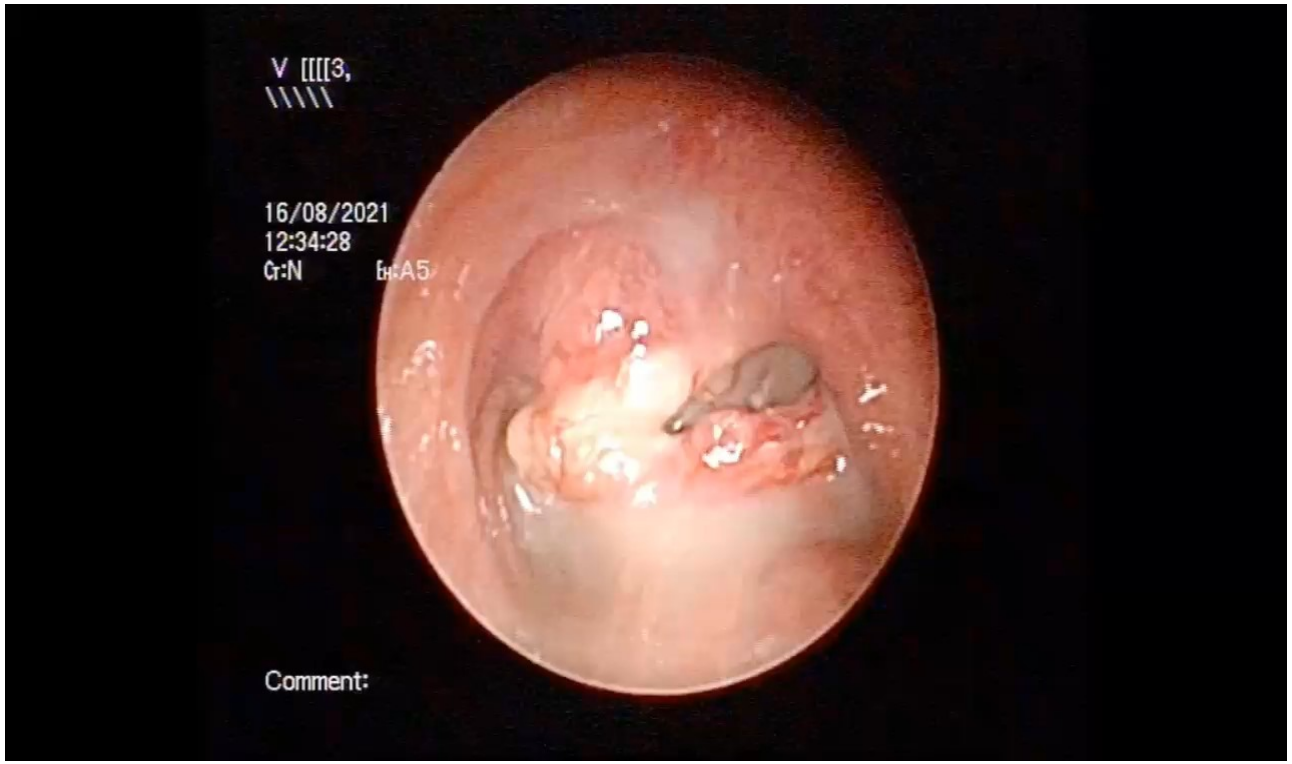


CASE 3

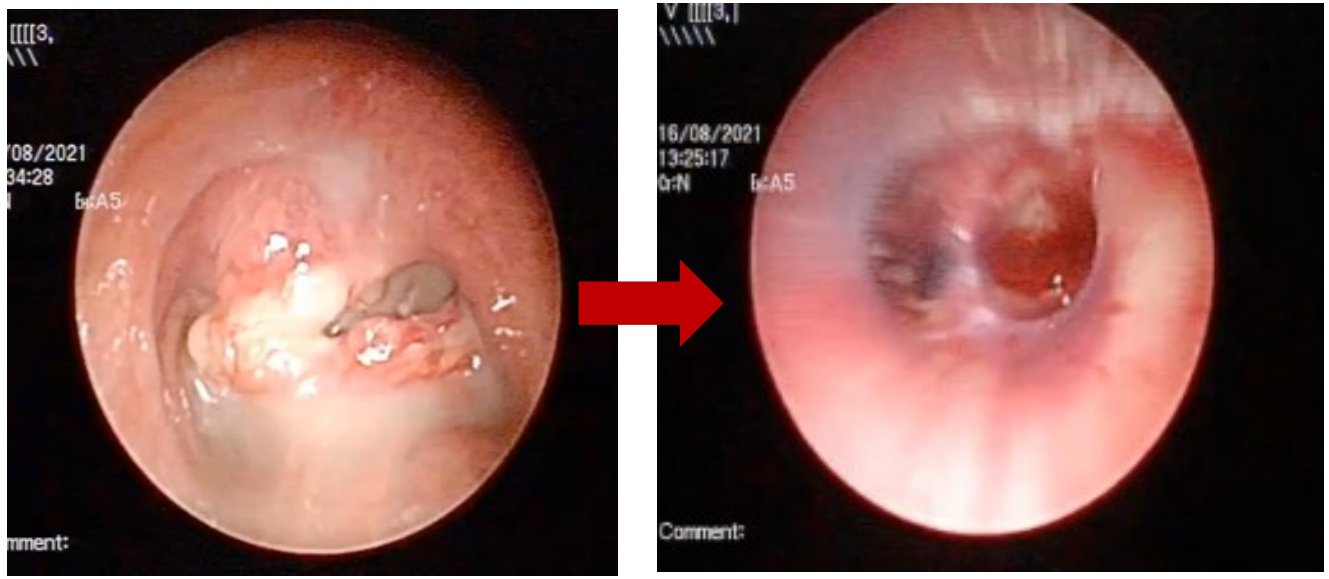
- Before the procedure:
  - **O_2 Sat: 75%**
    (16 L/min reservoir mask o_2)

- After the procedure:
  - **O_2 Sat: 95%**
    (room air)

RIGID BRONCHOSCOPY

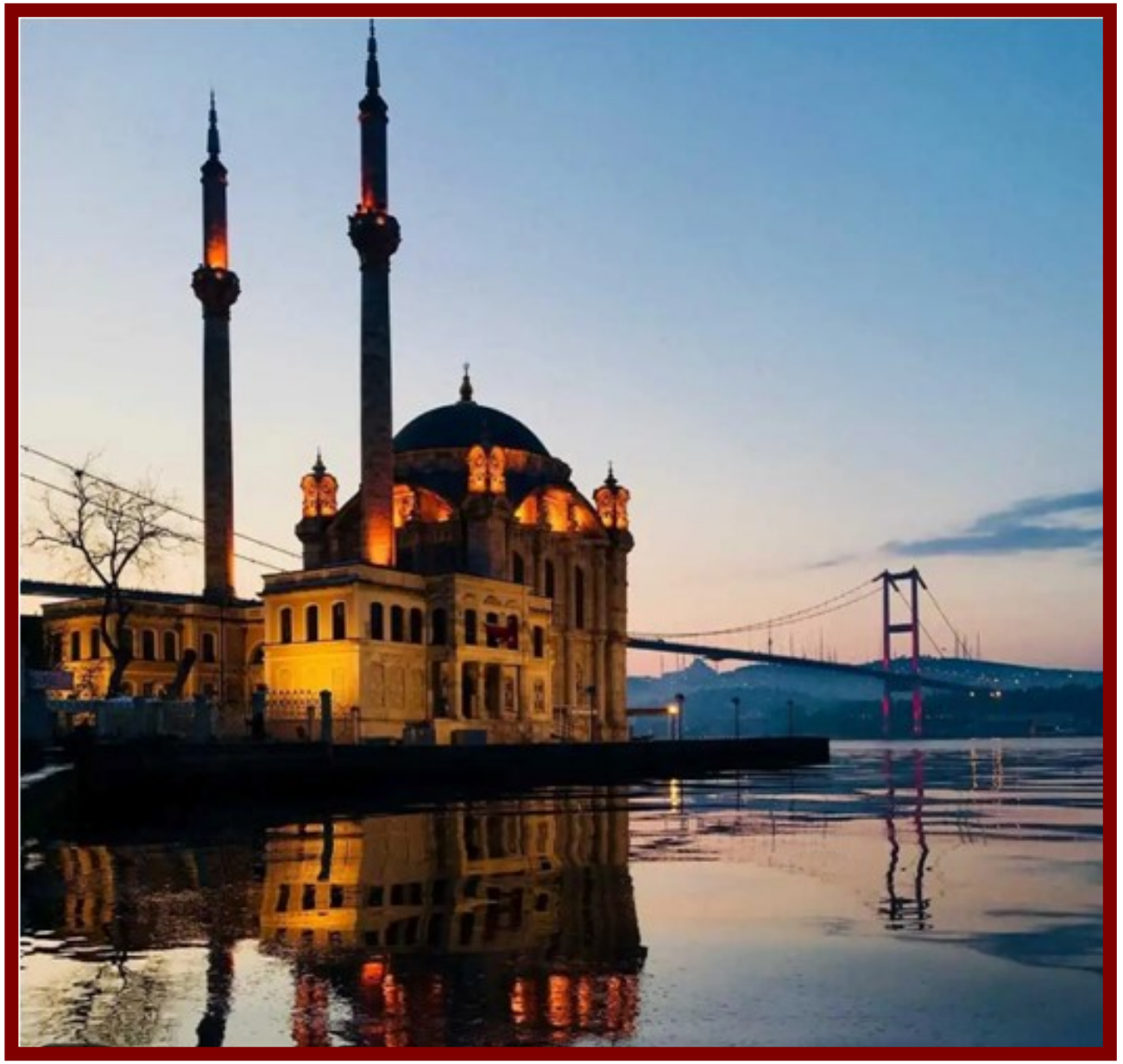


CASE 3



- **FOLLOW-UP:**
- Pathology: Squamous cell carcinoma
- The patient was referred to our oncology department
- Bronchoscopic evaluation was planned for the removal of the stent after the completion of oncologic treatment

MECHANICAL RESECTION
+
THERMAL METHODS
+
AIRWAY STENTING



Istanbul

CASE 4

- 23 y/o, male

- Complaint: Dyspnea
- History: The patient was diagnosed with Ewing's sarcoma in April 2018 and completed oncological treatment After being under control for 1.5 years, he admitted to our hospital's emergency department due to severe dyspnea

CASE 4

- Medical history: Ewing sarcoma (2018)
- Habits: 4p/yıl sigara, aktif içici
- Physical examination:
  - BP: 110/80 HR: 130/min
  - RR: 30/min
  - Respiratory system: Stridor(+)
- Laboratuary:
  - WBC: 14.3910e3/uL PLT: 579 10e3/uL
  - CRP: 132 mg/dL

CASE 4

Before the procedure
SpO2: % 70
(10 L/min O2)

After the procedure
SpO2: % 98
(2 L/min O2)

AIRWAY STENTING

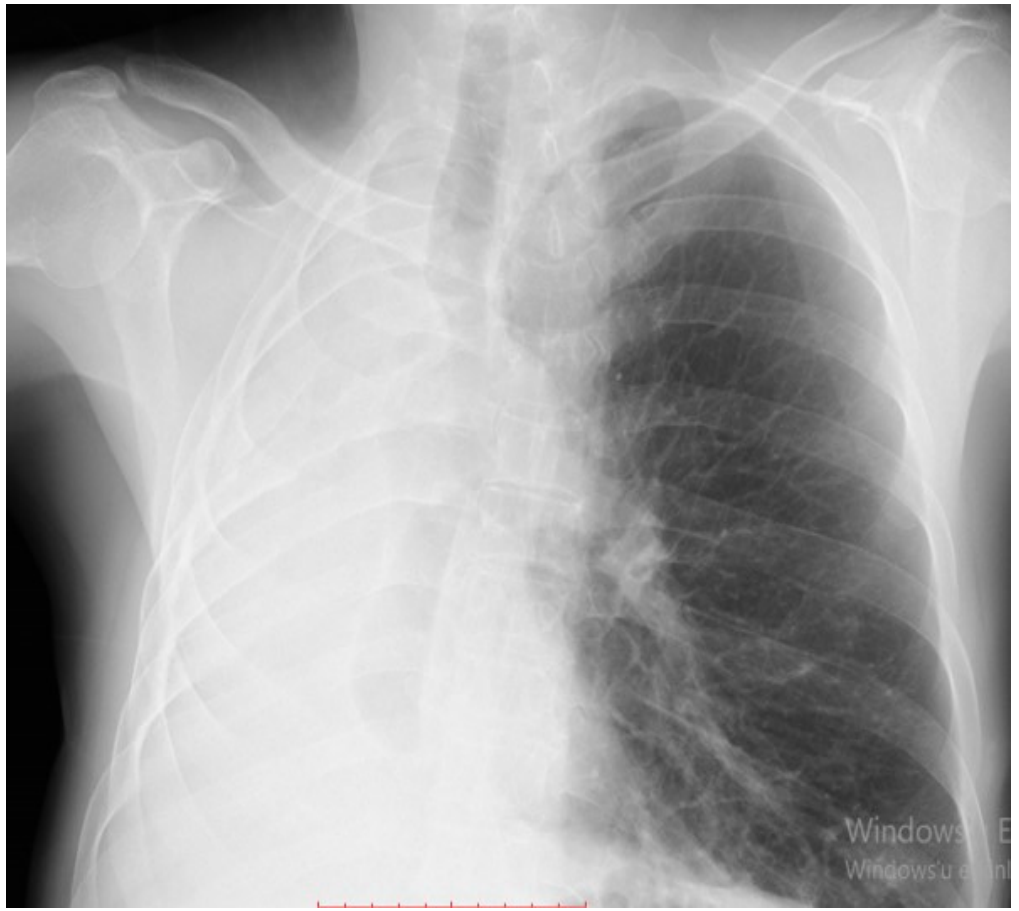
Istanbul

CASE 5

- 48 y/o, male
- Complaints: Hemoptysis, dyspnea
- History: The patient had a right pneumonectomy due to lung cancer in 2015 and received oncologic treatment

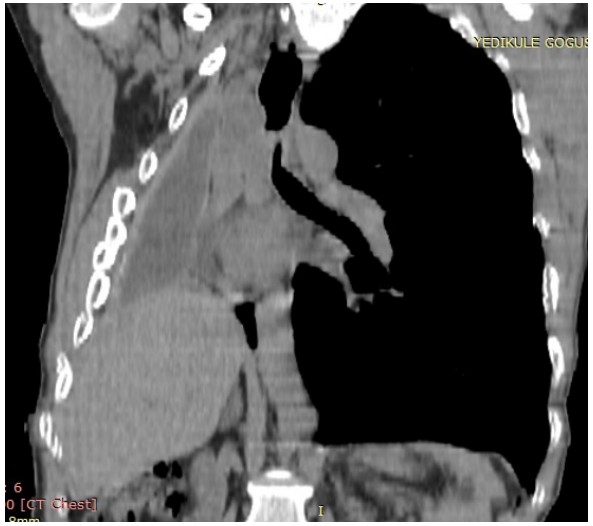
  For the past 6 months, he had a progressive dyspnea, and for the past month, he has been experiencing hemoptysis

  The patient was referred to us for evaluation and hospitalized



CASE 5

- History of present illness: Lung carcinoma
- Habits: Smoking history of 20 packs/year
  ex-smoker for 5 years
- Physical examination:
  TA: 100/60 mmHg, Pulse: 94/min,
  SO_2 : 92 (oda havası)
  Poor general condition
- Respiratory system:
  Tachipnea, no respiratory sound on the right hemithorax
- Laboratuary:
  No pathological results



CASE 5

- History of present illness: Lung carcinoma
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- Physical examination:
  TA: 100/60 mmHg, Pulse: 94/min,
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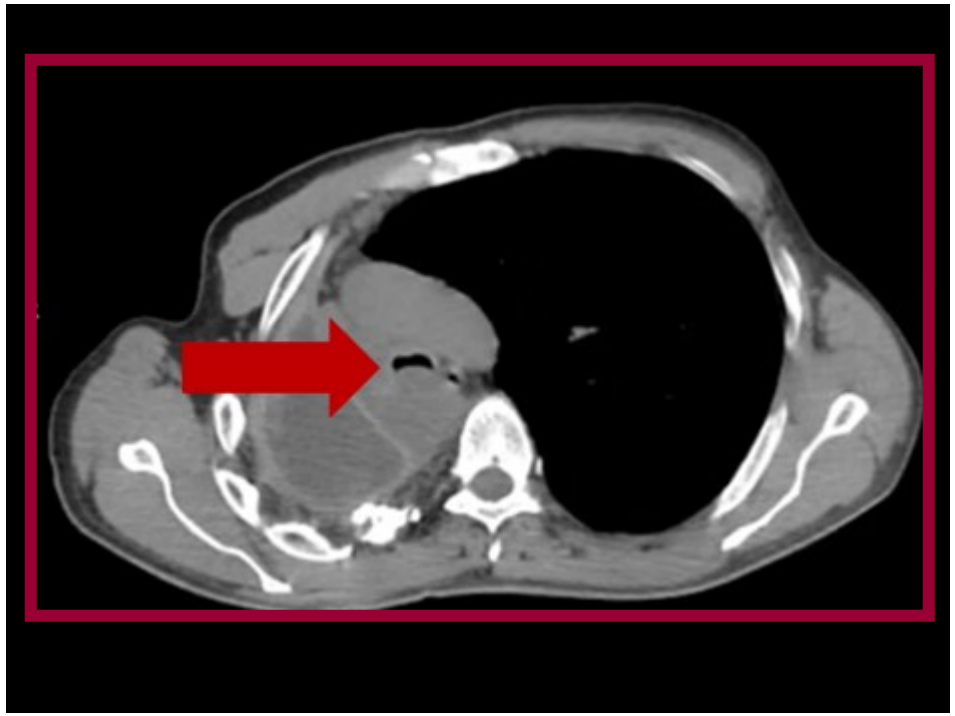
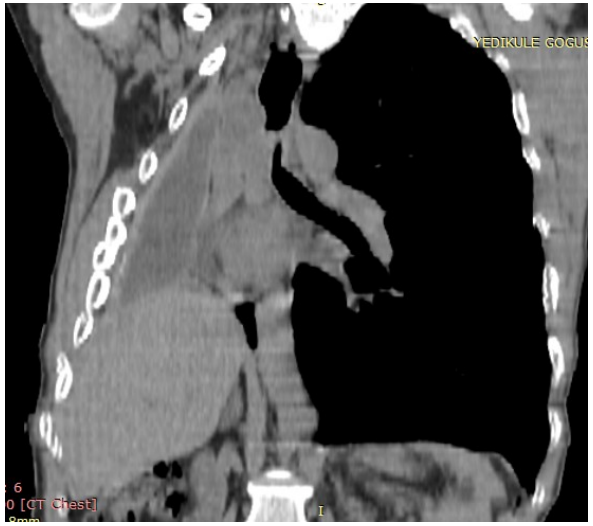
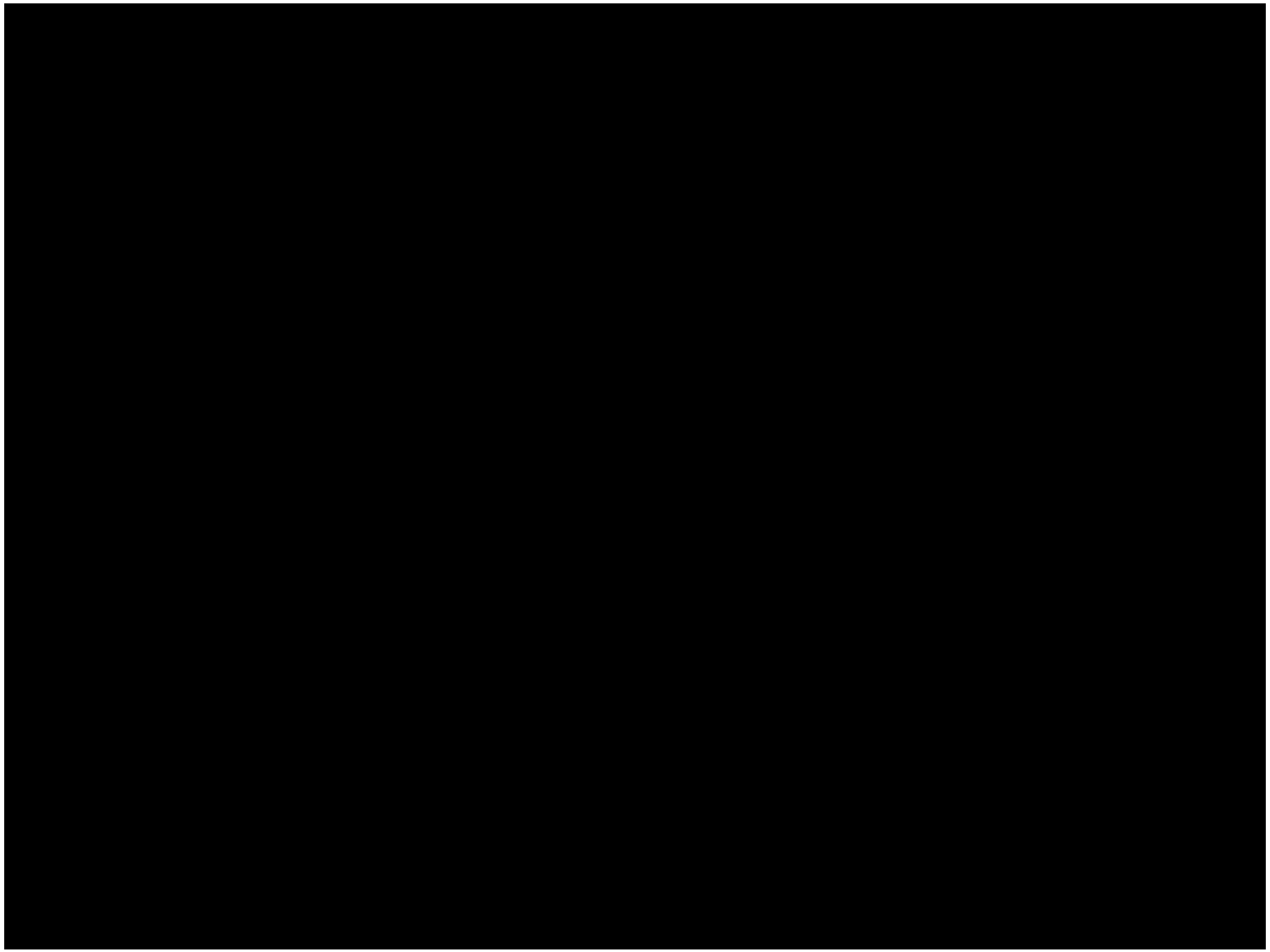
  Poor general condition
- Respiratory system:
  Tachipnea, no respiratory sound on the right hemithorax
- Laboratuary:
  No pathological results





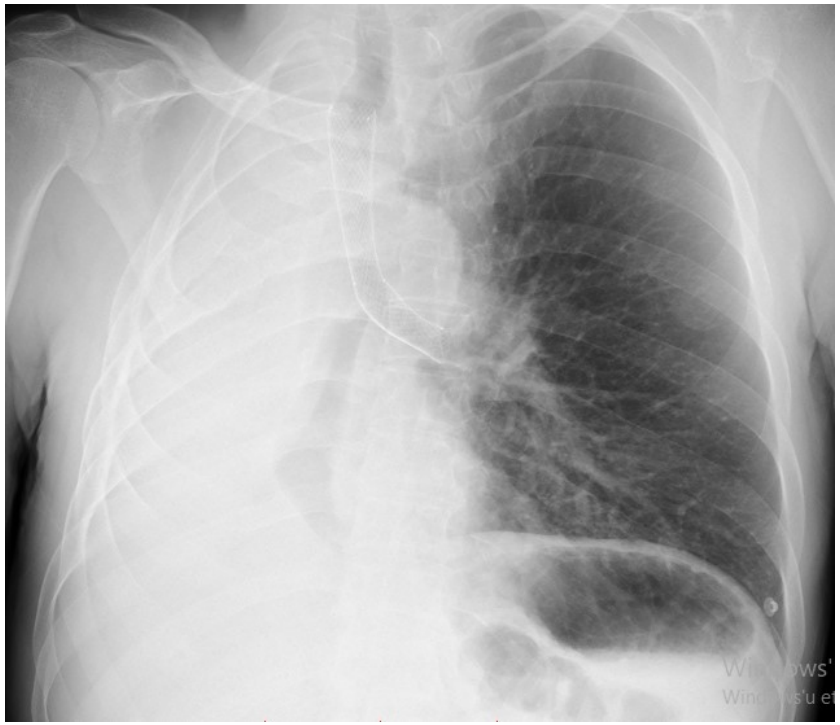
CASE 5

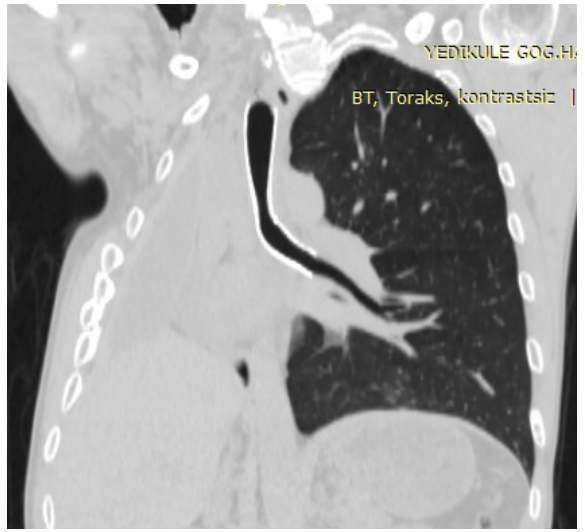
RIGID BRONCHOSCOPY

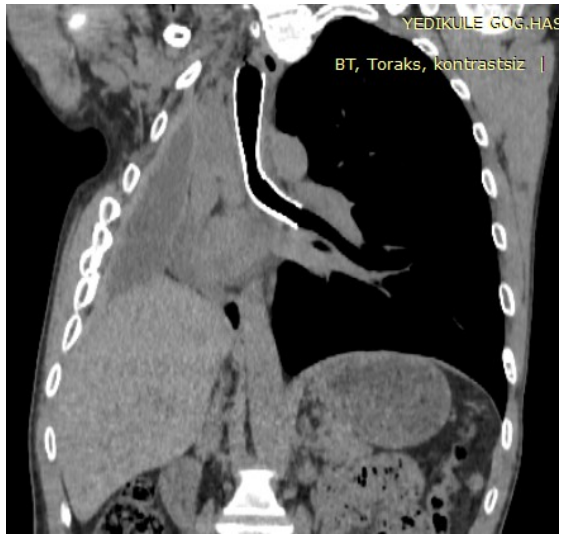


MECHANICAL RESECTION
+
THERMAL METHODS
+
AIRWAY STENTING

CASE 5







- **FOLLOW-UP:**
- Pathology:Non-small cell lung carcinoma
  (Squamous cell carcinoma)
- Referred to oncology
- Follow-up bronchoscopies were scheduled

Conclusion…

Interventional pulmonology/bronchoscopy,
in the management of malignant central airway obstructions:

- Minimal/semi-invasive
- Can be applied in a multimodal approach
- Has low complication rates
- Dramatically aids symptom relief
- Provides therapeutic/time-saving benefits for the patients


Thanks you for your attention ...