

# PD1 inhibitor pneumonitis

When to get your respirologist involved

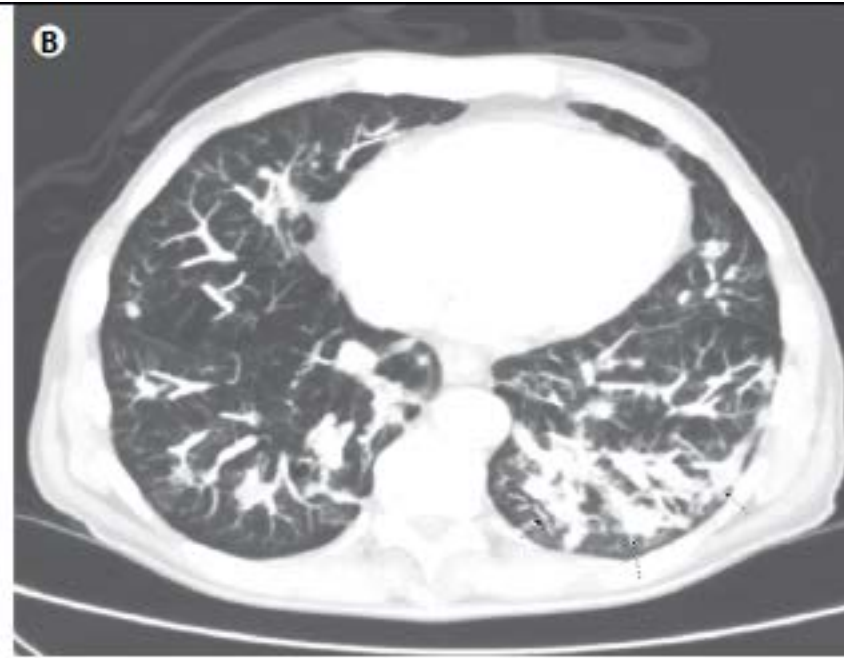
Jacquelyn Dirks MD FRCPC

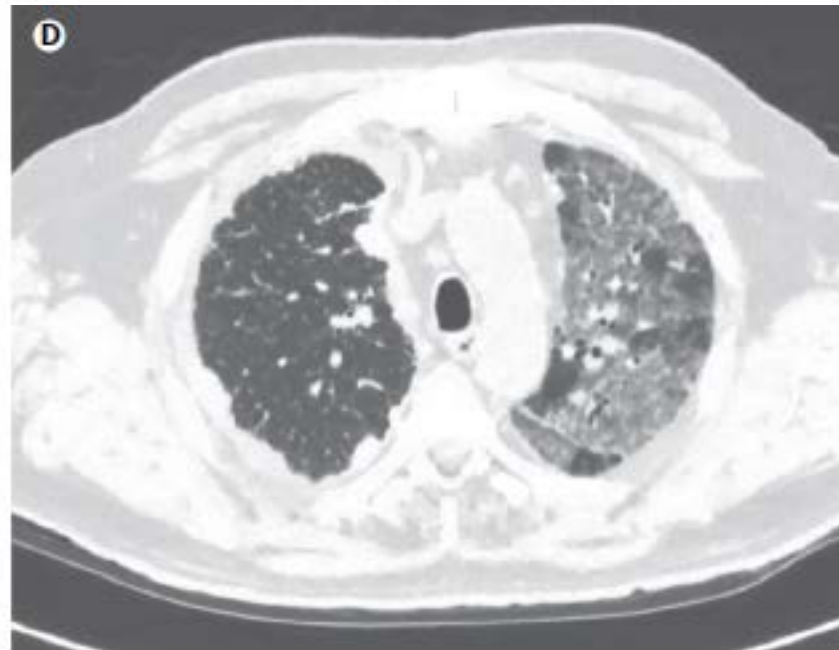
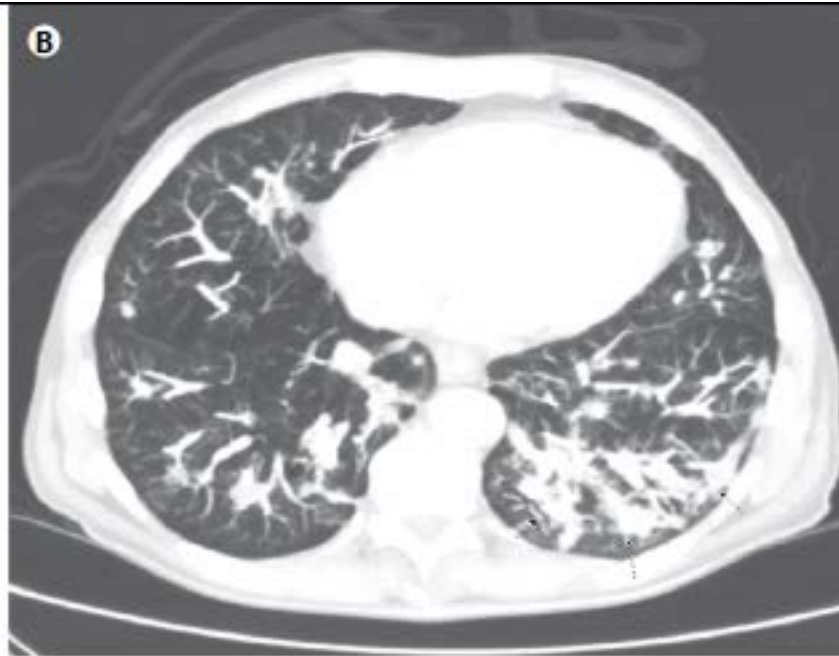
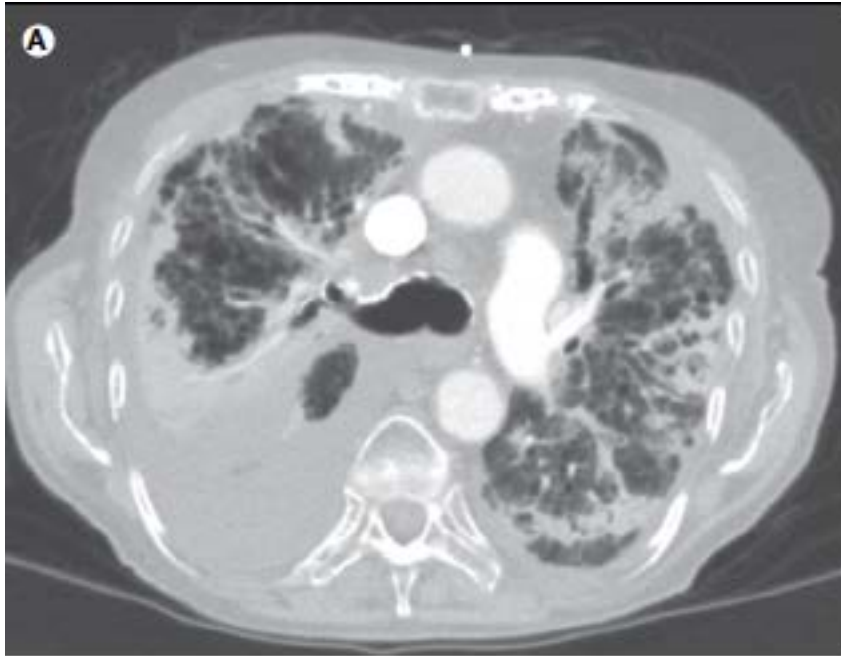
Internal Medicine/Respirology,

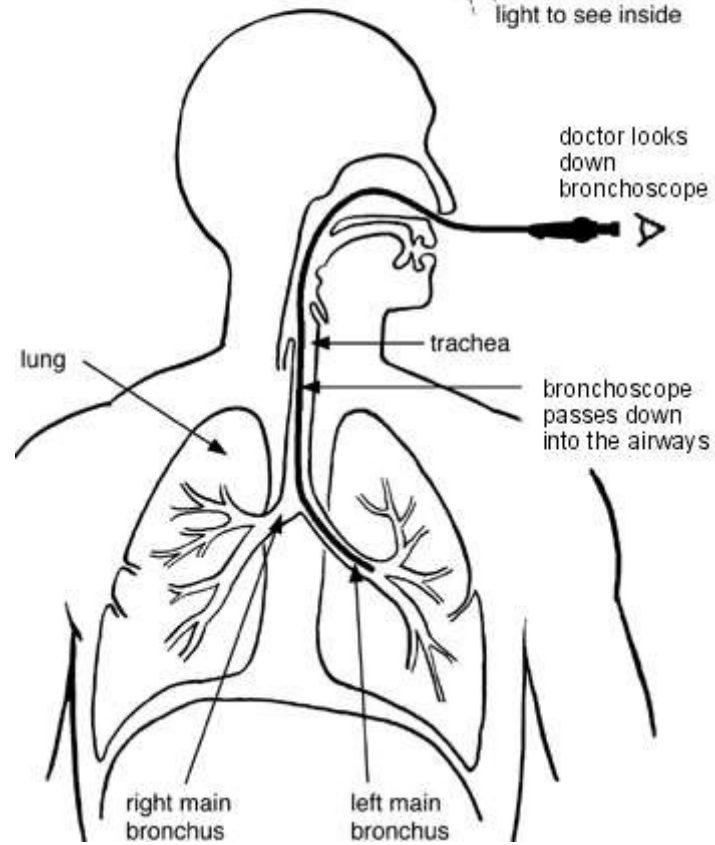
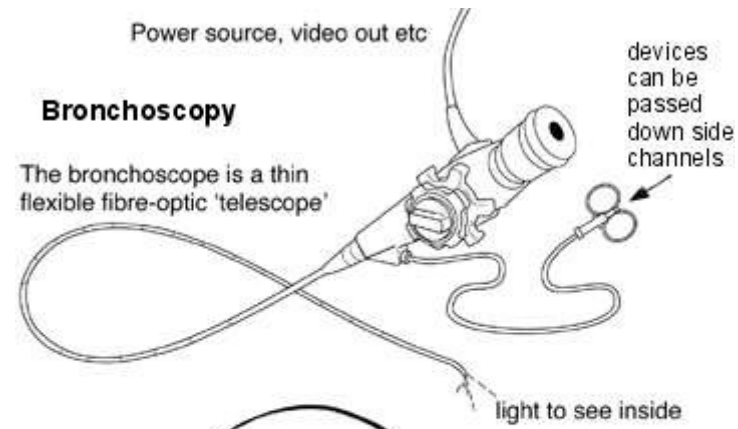
Assistant Professor of Medicine University of Manitoba

# Cancer patients are at risk of several pulmonary complications

- Infection:
  - Typical community acquired pneumonia (bacterial)
  - Viral community acquired pneumonia
  - Fungal pneumonia
  - Pneumocystis pneumonia
- Worsening malignancy/metastatic disease
- Pulmonary embolism
- Drug-induced pneumonitis
  - The radiographic pattern is heterogeneous, and pathology diverse
  - Often a diagnosis of exclusion

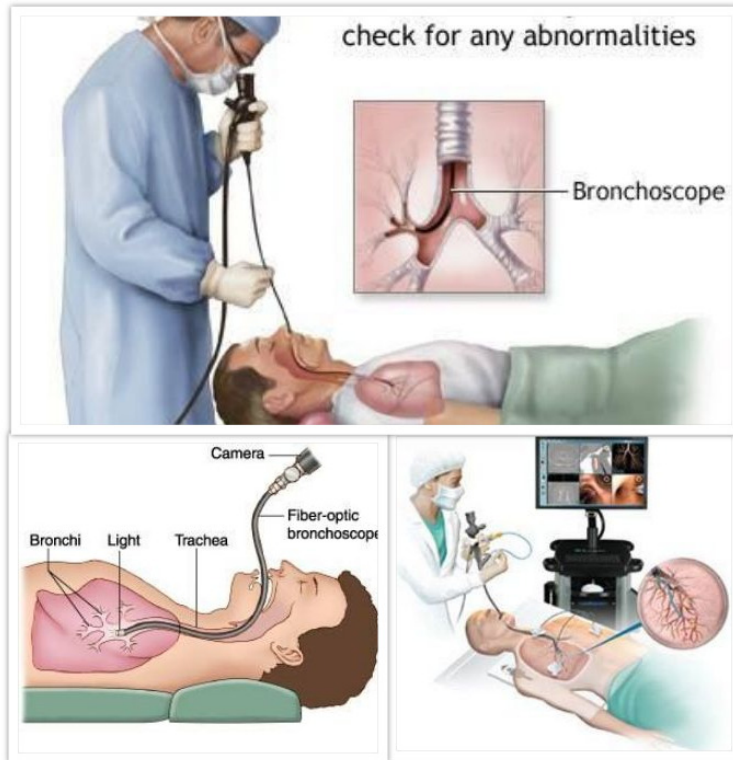








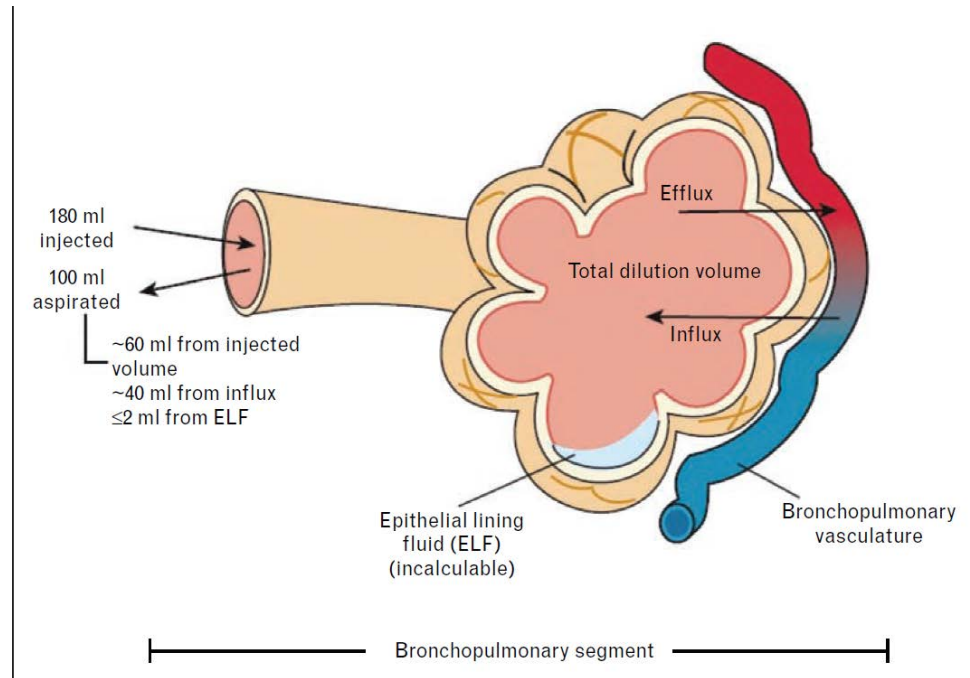
# Getting a Sample: Bronchoscopy



- Outpatient/inpatient procedure
- Involves procedural sedation
- Risks: related to sedation, hypoxemia, bronchospasm, sample-related side effects
- Serious side effects: 0.06%
- Procedural mortality: 0.013%

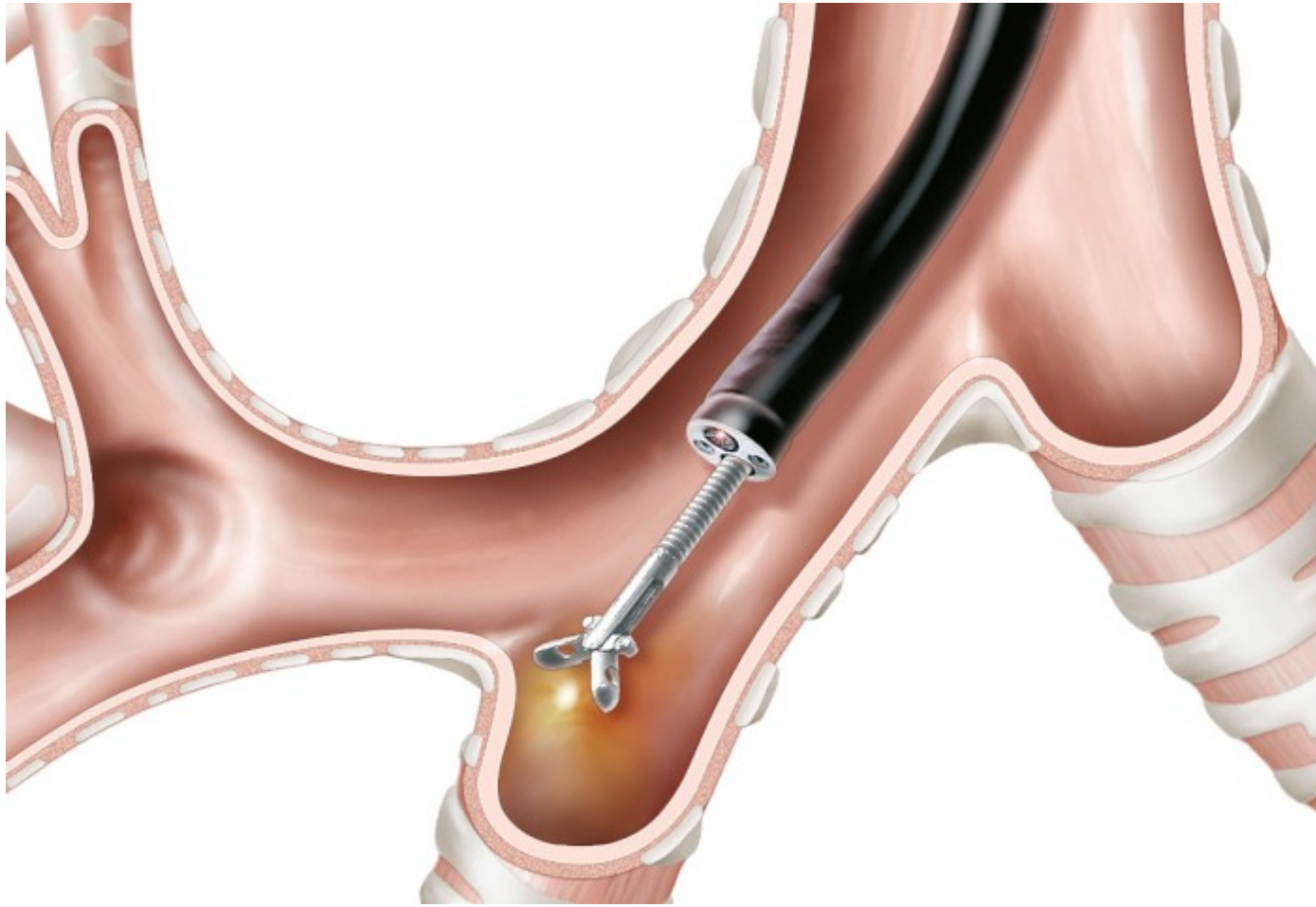
# Sample: Bronchoalveolar Lavage

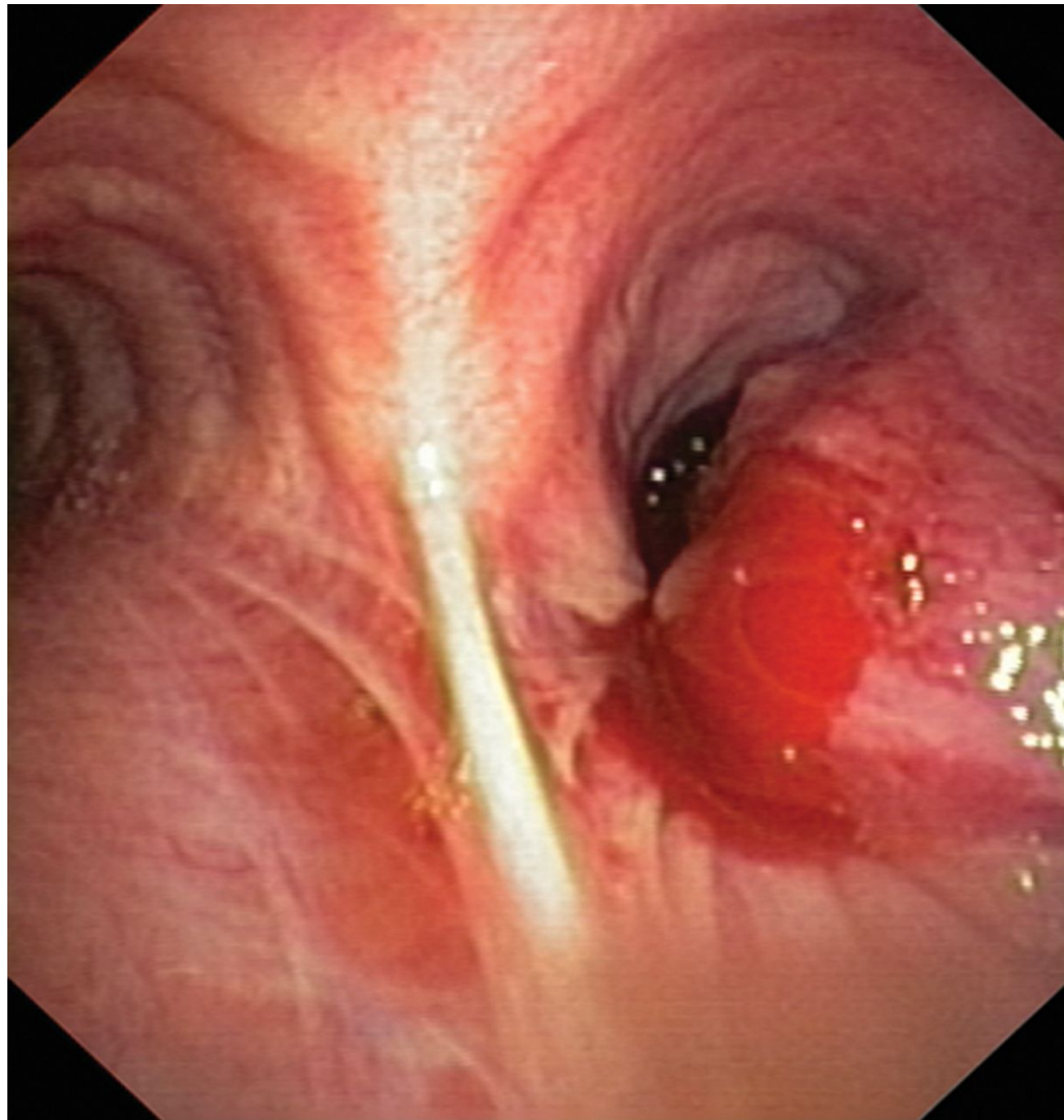
- Saline is inserted distally into an airway via scope; then re-aspirated
- Meant to sample distal airway flora
- Sample sent: micro, cytology, cell count, occasionally other tests
- If this is all that is completed, bleeding is generally minimal
- Risk associated is generally related to hypoxia and procedural sedation: the more hypoxic, the more hesitant I am





# Bronchoscopy and Endobronchial Biopsy

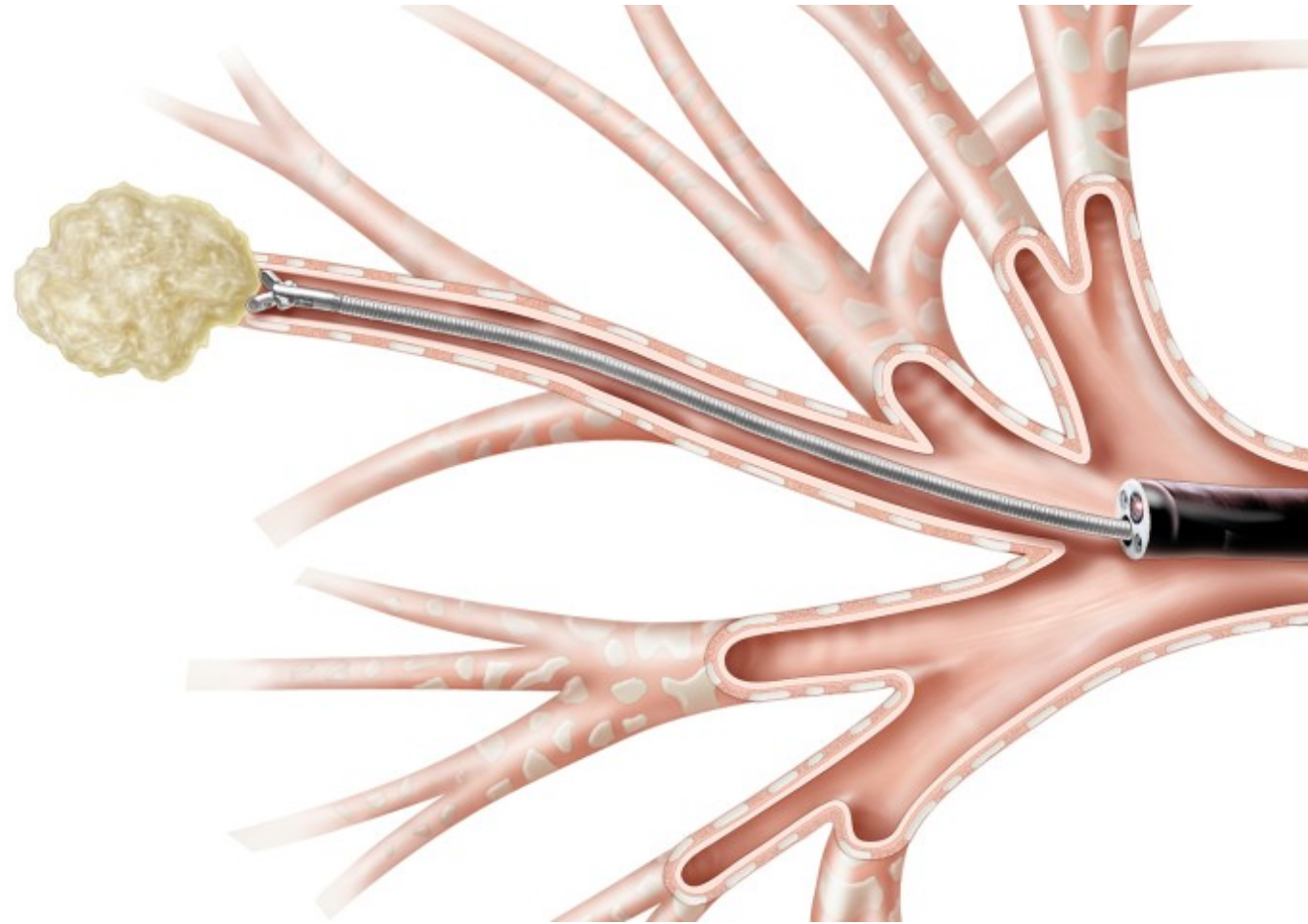




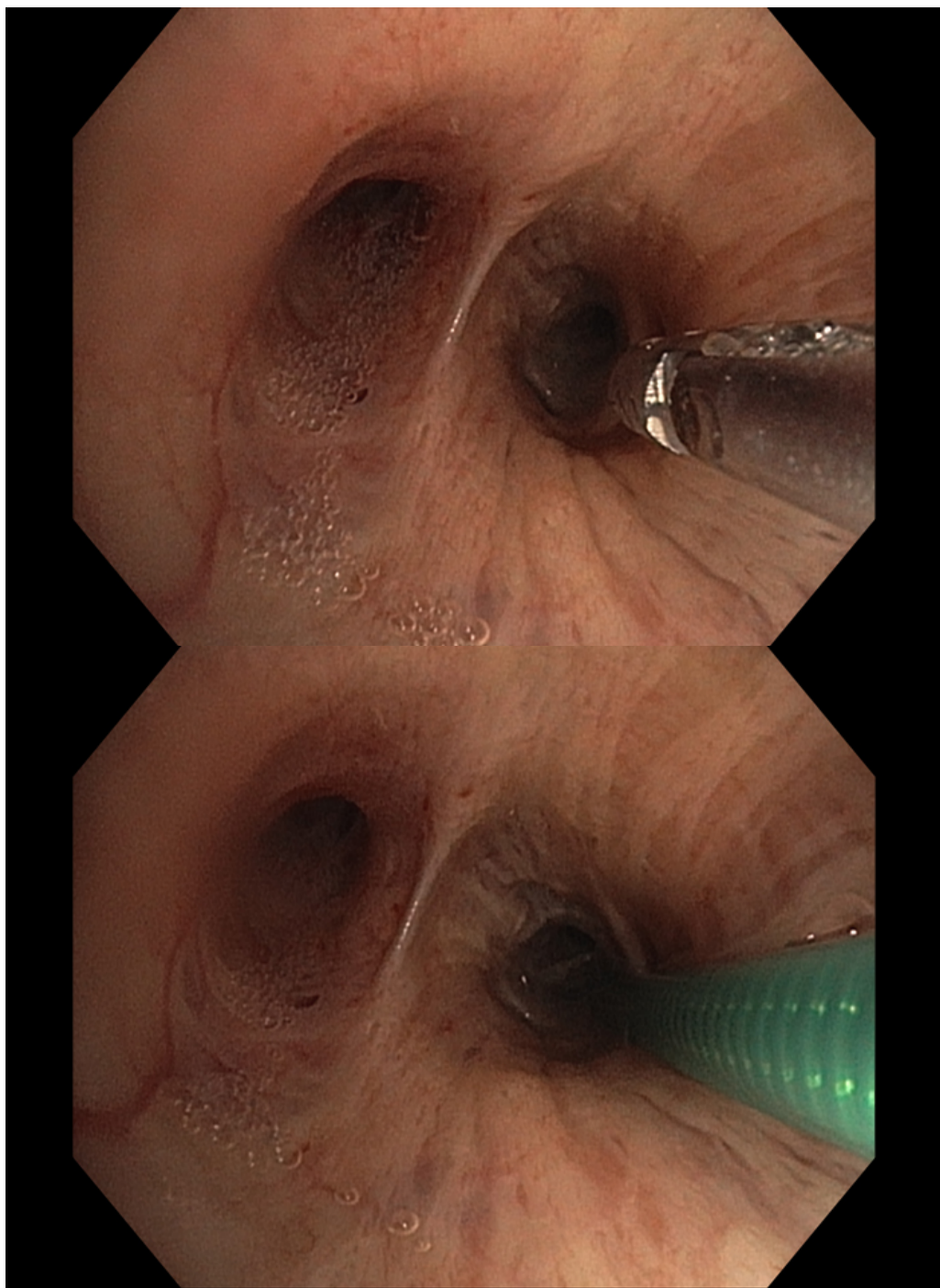
# Endobronchial Biopsy

- Beneficial to rule out malignancy or any lesion which is well visualized within the airway
- If within the view of the scope, diagnostic accuracy is usually high
- In diffuse airway disease where a discrete airway lesion is not seen, endobronchial biopsy is usually not done
- Complications:
  - Bleeding
  - bronchospasm

# Bronchoscopy and Transbronchial Biopsy

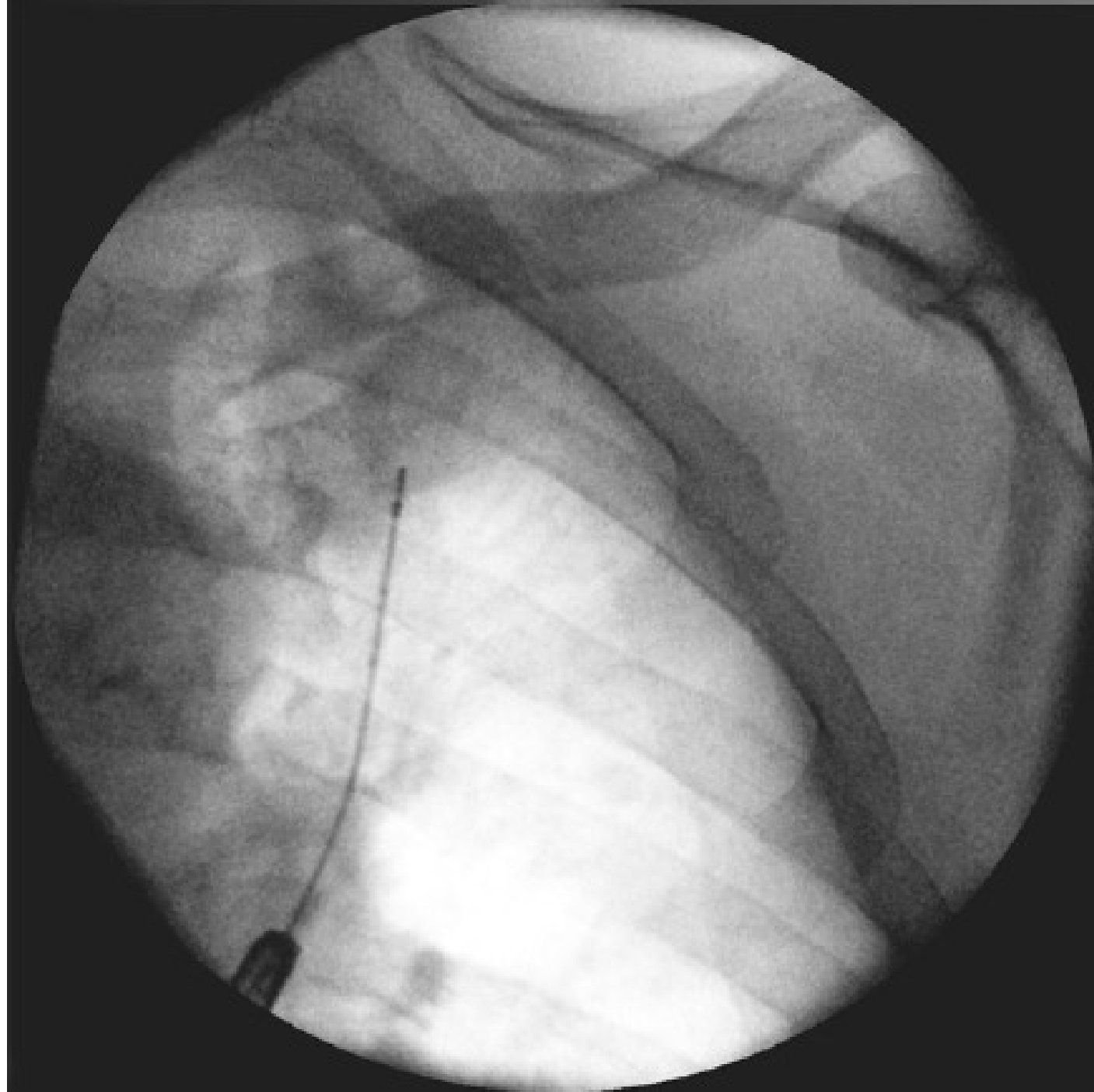




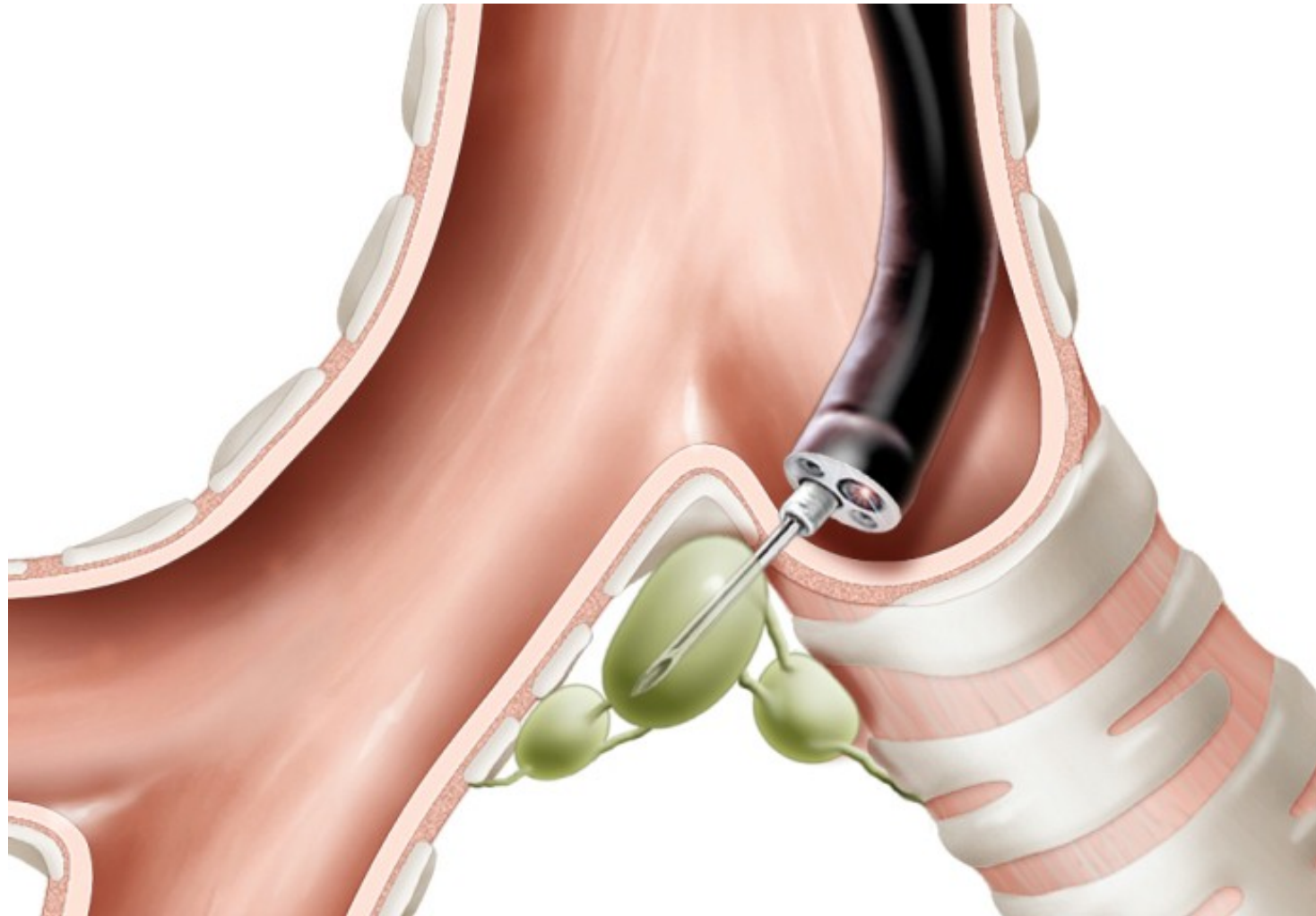


# Transbronchial Biopsy

- Can be more useful in diffuse airway disease
- Small samples taken, 3-5mm in diameter
- Usually 4-6 samples taken to maximize diagnostic yield
- In general, it is good at obtaining pathologic diagnosis of :
  - Miliary Tuberculosis/sarcoidosis/other diffuse granulomatous disease
  - Hypersensitivity pneumonitis
- It is less good at obtaining pathologic diagnosis of:
  - Other diffuse lung diseases
- Risks above general bronchoscopy include pneumothorax (2-4% in some cases series), bleeding



# Endobronchial Ultrasound Guided Biopsy





# Endobronchial Ultrasound Guided Biopsy

- Bronchoscopy with the capacity to biopsy lymph nodes and proximal structures outside the airway
- Increases diagnostic yield, allows non-surgical staging of the mediastinum for malignancy workup
- Yield for malignancy is quite good
- Yield for non-malignant pathology is less good
- Risks above general bronchoscopy include bleeding, pneumothorax and pneumomediastinum, inadvertent puncture of vessels

How Useful is bronchoscopy in cases like this?

# Role of bronchoalveolar lavage in the management of immunocompromised patients with pulmonary infiltrates

Randall Choo<sup>1,2</sup>, Devanand Anantham<sup>2,3</sup>

*Ann Transl Med* 2019;7(3):49

- Systemic review

- 23 studies
- 3395 procedures with 3192 immunocompromised patients
  - Mechanical ventilation excluded
- Diagnostic yield of bronchoscopy from 29-65%
- Higher diagnostic yields in:
  - Non-hematopathologic malignancies (42% vs 29%)
  - Neutropenic patients (41% vs 24%)
  - Patients with symptoms (61% vs 29%)
  - Consolidation/ground glass opacification/tree and bud change (61% vs 35%) vs reticular change

Table 2 Diagnostic yield and complication rate of BAL in immunocompromised patients with pulmonary infiltrates

Study, year of publication	Study design	Inclusion criteria	Mean age in years	BAL procedures		Diagnostic yield	BAL result modifying patient management	Complication rate	Mortality rate
				Male %	[patient number]				
Reichenberger <i>et al.</i> , 2001 (22)	Retrospective	Post renal transplant	–	66.2	91 [71]	69% (63/91)	–	–	–
Hohenadel <i>et al.</i> , 2001 (23)	Retrospective	Hematology patients	–	71.6	95 [95]	65% (62/95)	84% (80/95)	16% (15/95)	22% (21/95) at 4 weeks
Rañó <i>et al.</i> , 2001 (2)	Prospective	Mixed etiology, HIV excluded	50±17	62.5	135 [200]	50% (68/135)	26% (35/135)	2% (3/135)	41% (81/200)
Taggart <i>et al.</i> , 2002 (24)	Retrospective	HIV patients	–	–	216 [174]	50% (108/216)	–	–	–
Danés <i>et al.</i> , 2002 (21)	Prospective	Mixed aetiology including HIV	–	66.4	134 [241]	52% (70/134)	–	–	–
Jain <i>et al.</i> , 2004 (19)	Prospective	Mixed etiology, HIV excluded	49.2±17.7	64.4	99 [104]	38% (48/125) <sup>#</sup>	–	14% (8/59)	–
Bissinger <i>et al.</i> , 2005 (25)	Retrospective	Hematology patients	–	66.2	95 [77]	56% (53/95)	–	–	45% (35/77) at 36 months
Peikert <i>et al.</i> , 2005 (10)	Retrospective	Neutropenia	55±17	–	35 [35]	49% (17/35)	49% (17/35)	9% (3/35)	26% (9/35) at 4 weeks
Hofmeister <i>et al.</i> , 2006 (26)	Retrospective	Hematopoietic stem cell transplant	–	52.6	91 [78]	49% (45/91)	20% (18/91)	8% (7/91)	65% (59/91) at 2 months
Vélez <i>et al.</i> , 2007 (27)	Prospective	Mixed aetiology including HIV	34.1±10.8	73.3	109 [101]	49% (60/122) <sup>#</sup>	–	–	–
Boersma <i>et al.</i> , 2007 (28)	Prospective	Hematological malignancy	–	–	35 [32]	26% (9/35)	–	–	–
Burger, 2007 (29)	Retrospective	Hematopoietic stem cell transplant	45±15	–	27 [21]	52% (14/27)	–	52% (11/21)	43% (9/21) at 30 days, 52% (11/21) at 1 year
Cordani <i>et al.</i> , 2008 (30)	Prospective	Hematological malignancy	–	79.2	25 [24]	44% (11/25)	56% (14/25)	–	–
Hummel <i>et al.</i> , 2008 (18)	Retrospective	Hematological malignancy	–	–	246 [199]	48% (118/246)	38% (94/246)	1% (3/246)	–
Kuehnhardt <i>et al.</i> , 2009 (31)	Retrospective	Solid organ or hematological malignancy with neutropenia	–	63.8	58 [43]	67% (39/58) bacterial, 59% (32/54) fungal	10% (6/58)	7% (4/58)	19% (11/58)

Table 2 (continued)

# In Summary

- PD-1 inhibitor pneumonitis is a diagnosis of exclusion, and is present in immunocompromised individuals with a wide differential diagnosis
- Your local respirologist can be a helpful resource both in clinical experience, as well as sample acquisition to rule out other causes
- Bronchoscopy can be a useful tool in the evaluation of drug-induced pneumonitis, often as a way to evaluate for other causes
- In general it is a safe procedure, however patient presentation and acuity may limit its ability to be performed

Back to Dr. Dawe