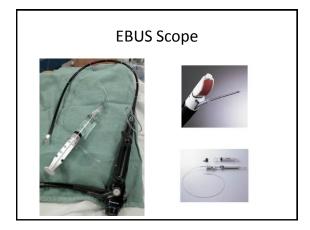
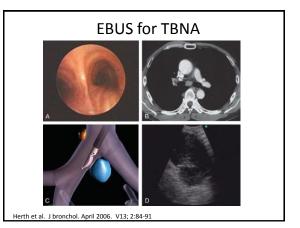
Practical Approaches and Pitfalls in Assessment of EBUS

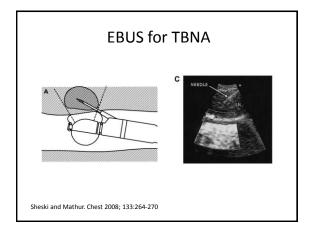
Maureen F. Zakowski, MD PPS June 2015

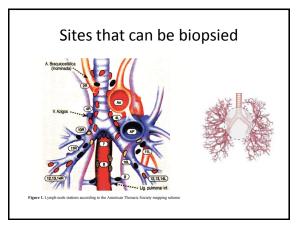
EBUS-FNA

- Endobronchial ultrasound guided FNA is a minimally invasive technique for diagnosing mediastinal lesions, most often for lung cancer staging
- Uses an ultrasound probe fixed to the end of a bronchoscope
- It allows for real-time imaging and staging of peri-bronchial structures including hilum and lung









Biopsy Sites

- Mediastinal Lymph nodes
 - Stations 2, 4, 7, 10, 11
- Peri-bronchial masses
 - Mediastinal tumors
 - Lung cancer
 - Esophageal cancer
 - Benign lesions
- Lung masses

Types of Tumors Diagnosed

- Lung
 - NSCLC
 - Large cell, poorly diff, adeno, squamous
 - Small cell lung cancer
- Renal Cell
- Lymphoma
- BreastHead and Neck cancer

Complications

- Bleeding
 - Even if you hit a blood vessel, bleeding complications are very rare
- Infection
- Pneumothorax
 - Very rare for central biopsy

EBUS and Cytology

- Cytology has a critical role in the clinical success of EBUS
- Cytology easier, cheaper and faster than mediastinoscopy
- Need for constant training and monitoring

Literature on EBUS and Cytology

- Actually rather scant
- Accepted as effective, accurate and first line good as mediastinoscopy per ACCP and ESTS
- Current attention being given to EBUS and telecytology to increase efficiency
- Material suitable for IHC, molecular studies, etc

Specimen	N	Accuracy	Citation
EBUS TBNA	48/ 39 cell blocks	44%,64% 84% with IHC	Wallace WA, Rassi DM. Eur Respir J. 2011 Mar 15
TBNA	188 EBUS 77 TBNA	EBUS TBNA 91% TBNA 71% Specificity 100%	Stoll LM, Yung PC, Clark DP, Li QK. Cancer Cytopathol 2010 Oct 25
EBUS/EUS TBNA	43	Cyto=Histo 42/43 samples were adequate for analysis	van Eijk R, Licht J, Strumpf M et al. PLoS One 2011, Mar 8
Mix of cytology cases	99 EBUS	96% adequate for analysis. No histology control	Billah S, Stewart J, Staerkl G et al. Cancer Cytopathol 2011 April 25
EBUS/EBUS	35	77% adequate	Schuurbiers OC, Looijen- Salamon MG, Ligtenberg MJ et al. J Thorac Oncol 2010 Oct 5
	EBUS/EUS TBNA EBUS/EUS TBNA Mix of cytology cases	EBUS TBNA 48/ 39 cell blocks TBNA 188 EBUS 77 TBNA EBUS/EUS 43 TBNA 99 EBUS cytology cases	EBUS TBNA 48/ 39 cell 44%,64% blocks 84% with IHC TBNA 188 EBUS 77 TBNA EBUS TBNA 91% TBNA 200 Cyto=Histo 42/43 samples were adequate for analysis Mix of cytology cases 99 EBUS 96% adequate for analysis. No histology control

Adequacy of EBUS Specimens

- No gold standard for adequacy
- Literature ranges from noting presence of lymphocytes to requiring > 40 lymphocytes per 10 hpf
- Pigmented macrophages present?

Role of Cytotech in EBUS

- Expertly trained techs present during procedure
- Should prepare slides
- Microscopic assessment of ADEQUACY
- Not the same as a frozen section, or is it?
- Ability to modify procedure or obtain material for additional work up
- · This is a time intensive activity

Limits of cytology

- Less diagnostic material
- Cell blocks do not exist for all cases
- Usually all material is consumed at the time of diagnosis
- · Cannot determine invasion- at any site
- Additional training beyond general path needed
- Cytotechs CAN NOT make a diagnosis

Experience Counts

- Literature says operators need between 10-140 procedures to be good at this!
- Should be doing 20 a year at least
- Cytology learning curve depends on prior experience as cellular morphology varies little with collection method

Diagnostic Difficulties

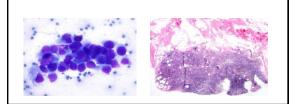
- Signet ring cell carcinomas mimicking goblet cells
- Granulomata mistaken for carcinoma
- Necrotic background of infections
- Neuroendocrine tumors: carcinoid, small cell, LCNEC
- Background material: mucin, debris, tigroid background attributed only to seminoma

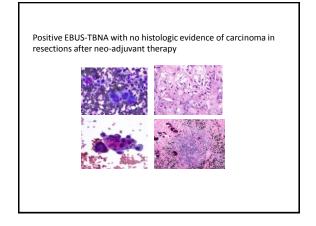
Pitfalls in EBUS

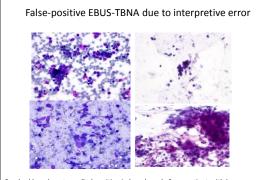
- Operator cytologist mismatch
- Lack of adequacy standards
- Poorly made preps
- Cellular "contaminants" from tracheal wall such as bronchial cells, cartilage, sub mucosal seromucinous glands, mesothelial cells, etc

Discrepant FNA - Histology

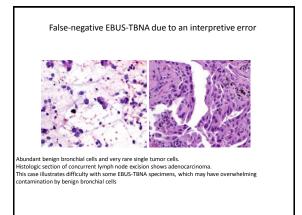
Surgical Sampling Errors: FNA called correctly positive, minimally sampled lymph node from concurrent mediastinoscopy negative on histology







Crushed lymphocytes called positive in lymph node from patient with known squamous cell carcinoma in lung



Practicalities

- Experienced team approach
- Set some material aside for flow, etc
- Clinical history
- Number of cells may be large in lymph node aspirate, look hard at the "atypical" cells as negative here is not always hypo cellular

A Word about "ROSE"

- Often considered critical as the EBUS may be converted to mediastinoscopy or lung resection may be done after immediate assessment
- Allows feedback to operator and modification of procedure
- Data show that with experienced operators the diagnostic rate does not change with ROSE

What about Negatives?

- EBUS has high PPV (nearly 100%) but NPV varies considerably
- Recent study by MUSC that the vast majority of LNs sampled by EBUS with a diagnosis of negative or unsatisfactory were likely to be TN
- Suggesting that a more conservative approach to follow up of these patients may be appropriate

"Intra-Op" Cytology including EBUS

What Do Surgeons Want?

Adequate

- Lymphocytes or no lymphocytes?
 - This is important since the procedure is often ruling out cancer, so benign is adequate here
- Tumor or no tumor?
- This would allow for patient to go straight to surgery

Definitive read

- · What is the best way to get it?
 - Bring to Cytology?
 Bring to Frozen Sections?
 - Bring to Frozen :
 - On call person?

Conclusions

- Procedure is here to stay
- Another area where cytology has improved patient care and expense
- Screening through a sea of lymphocytes is hard
- Experience counts, team approach needed
- · Constant QA to recognize errors

References

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