

Bronchoscopy: Improving diagnostic yield

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Goals of this talk



- Describe ways to improve your chances of making a diagnosis
- Describe how to improve your chances of making a diagnosis using basic bronchoscopic techniques
- Learn about advanced bronchoscopic techniques to improve yield.

Background of lung cancer

- Lung cancer is a leading cause of death in the United States
- 157,300 death due to lung cancer in 2010
- 55% of patients for surgical resection of a suspicious lung lesion are benign. Ann Thorac Surg 2011;91:227-33

Incidence of Lung Cancer

Estimated New Cases*

			Males	Females			
Prostate	241,740	29%			Breast	226,870	29%
Lung & bronchus	116,470	14%			Lung & bronchus	109,690	14%
Colon & rectum	73,420	9%			Colon & rectum	70,040	9%
Urinary bladder	55,600	7%			Uterine corpus	47,130	6%
Melanoma of the skin	44,250	5%			Thyroid	43,210	5%
Kidney & renal pelvis	40,250	5%			Melanoma of the skin	32,000	4%
Non-Hodgkin lymphoma	38,160	4%			Non-Hodgkin lymphoma	31,970	4%
Oral cavity & pharynx	28,540	3%			Kidney & renal pelvis	24,520	3%
Leukemia	26,830	3%			Ovary	22,280	3%
Pancreas	22,090	3%			Pancreas	21,830	3%
All Sites	848,170	100%	All Sites	790,740	100%		

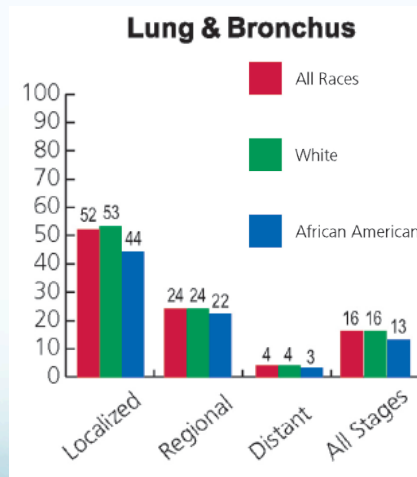
American Cancer Society Facts and Figures

Early Diagnosis Improves Survival

- If diagnosed at Stage III or IV, 15% survival rate at 5-years
- If diagnosed at Stage I, 88% survival rate at 10-years
- 92% survival rate if immediate removal of lesion
- Yet, only 16% of lung cancer patients are diagnosed at an early, localized stage

Sources:
 1. Intl Early Lung Cancer Action Program Investigators, 2006
 2. Ries, L, et al., SEER Cancer Statistics, NCI 2003

5 Year Survival

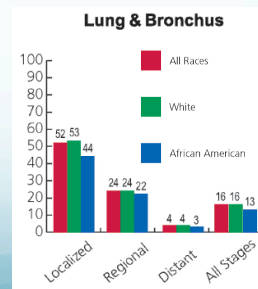


American Cancer Society Facts and Figures

Diagnosing Lung Cancer – CT guided biopsy

- Often thought to be modality of choice for diagnosing lung cancer
- CT guided biopsy Yield close to 80-90%
 - morbidity due to pneumothorax 15-20%
 - Older smokers with earlier stage cancers had more complications.

Ann Intern Med. 2011;155:137-144.



Basic Bronchoscopic techniques

- Washing, Brushing, Needling, Biopsy EBB/TBB



Yield of Basic Bronchoscopic Techniques

Technique	Central Disease	Peripheral Disease
Sputum	71% (1525 pts)	49% (1010 pts)
Washing	48%	43%
Brushing	59%	52%
EBB/TBB	74%	46%
Combined Modalities	88% (3754 pts)	69% (4136 pts)

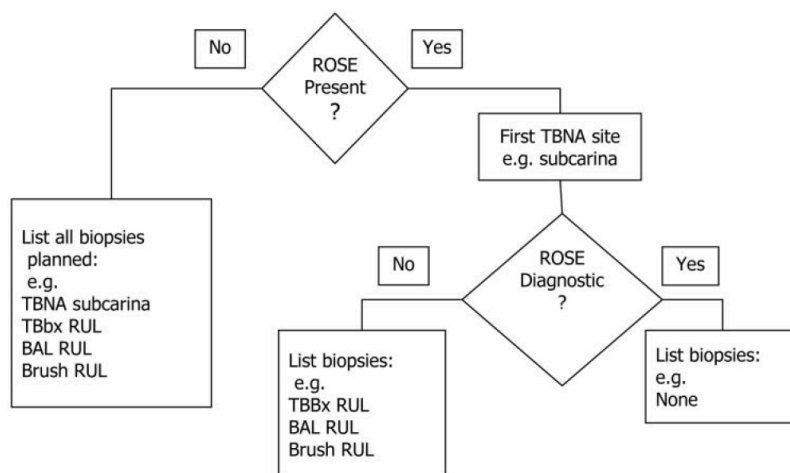
Chest 2003, 123(Supl):115S-128S

Rapid On Site Evaluation (ROSE)

- Reduces number of procedures required to optimize yield
- After the first positive pass, collect enough sample in cellblock for cytological studies and genetic evaluation



ROSE Flow Algorithm



Chest 2005, 128(2);869

FIGURE 1. Preprocedure algorithm.

Summary: Using Basic Bronchoscopic Techniques to Improve Yield

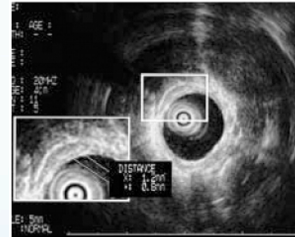
- Use Rapid On Site Evaluation (ROSE), which optimizes yield with fewer procedures
 - Alternatively, ROSE allows you to reach a diagnosis using the fewest procedures
- Combine modalities
 - Save your washings for cytology
 - Brush liberally
 - Needle or biopsy Nodes and Masses

Advanced Bronchoscopic Techniques

- The bigger the lesion, or the more visible it is, the better the yield.
- Advanced bronchoscopy techniques make lesions easier to see.

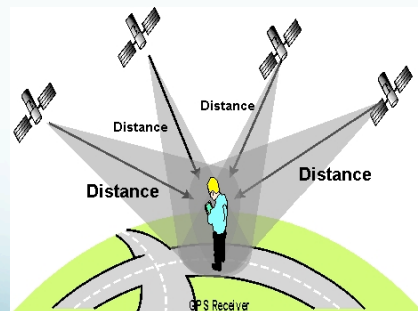
Endobronchial Ultrasound

- Curvilinear or radial probes visualize structures within and beyond the bronchial wall.

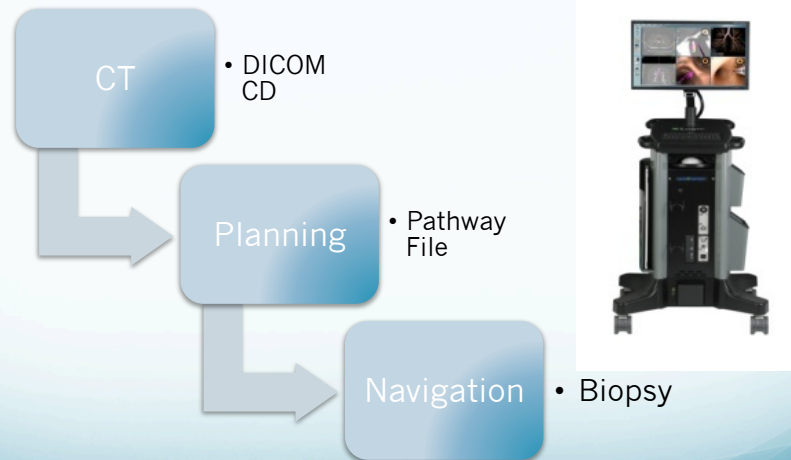


Electromagnetic Navigation Bronchoscopy (ENB)

- GPS for the Bronchoscope

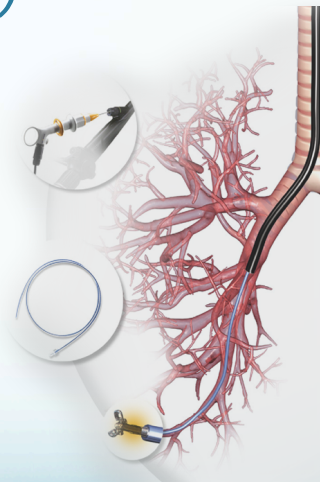


Procedure Overview

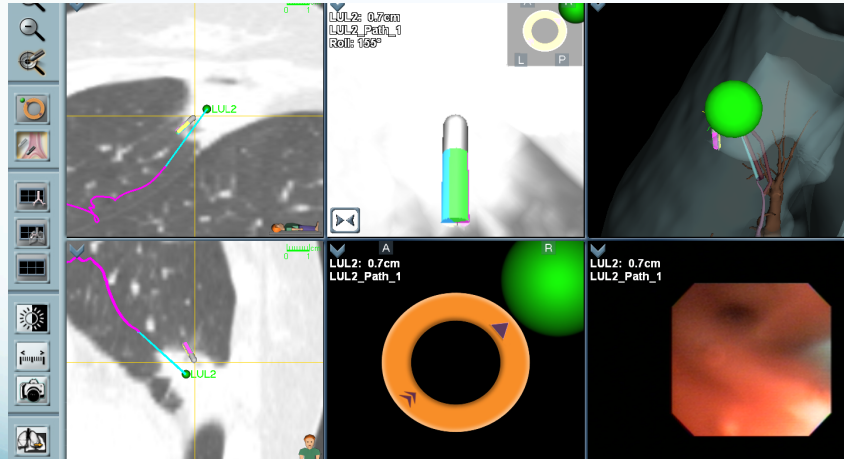


Positioning the locatable guide (LG)

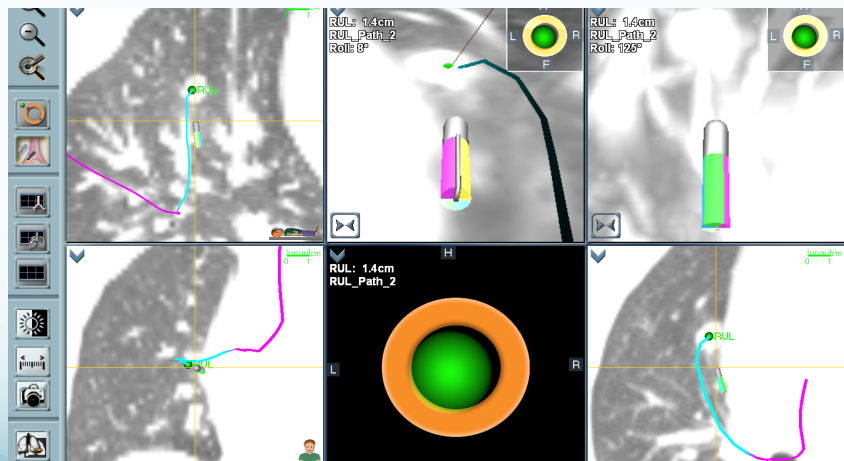
- Use a standard bronchoscope
- Prep the patient
 - Grid and sensors
- Navigate to closest 4th or 5th Gen bronchus
- Deploy the LG and working sheath
 - Navigate to within 1-2 CM of target
- Withdraw guide leaving sheath in place to brush and biopsy



Nearing Target



On Target



The Benefits of ENB

- Lower rate of Pneumothorax compared with CT biopsy
- Allows for navigation further into the bronchial tree; up to 17 generations
- Yield is 70-80% for small peripheral lesions, and 100% for more central lymph nodes

The drawbacks of ENB

- Sensitive to the environment
- A virtual view is still not a direct visualization
 - Maximum Intensity Projection

Combined Modalities

- Radial probe EBUS deployed through the working channel
- Autofloresence – Night vision for the bronchoscope,
- Narrow band – Blue green light enhances malignant tissue

Conclusion

- In summary, to get the highest diagnostic yield possible:
 1. Get as close to the lesion as you can with the best techniques available to you
 2. Get as clear a view as you can of the lesion
 3. Then let a pathologist tell you if you are in the right spot

Questions....?