DIAGNOSTIC INNOVATIONS IN PERIPHERAL LUNG BIOPSIES

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BACKGROUND AND DISCLOSURES

CHI Lung Council National Pulmonary Lead and Co Chair

Society of Advanced Bronchoscopy Board of Trustees and Chair of Education and Program Development

AABIP Committee on Advanced Bronchoscopy

Medtronic Interventional Lung Solutions

Intuitive Surgical Robotics

Auris Surgical Robotics

BodyVision

Boston Scientific Pulmonary

Merit Medical Endotek

Biodesix

Veracyte

PERIPHERAL LUNG NODULES

- Standard Bronchoscopy diagnostic yield 14%
- EBUS/ENB Bronchoscopy 16 trials diagnostic yield ranging from 64 to 94%
  - Only three studies with diagnostic yields greater than 85%
  - Wang Memoli Meta Analysis for all guided bronchoscopy diagnostic yield is 70%

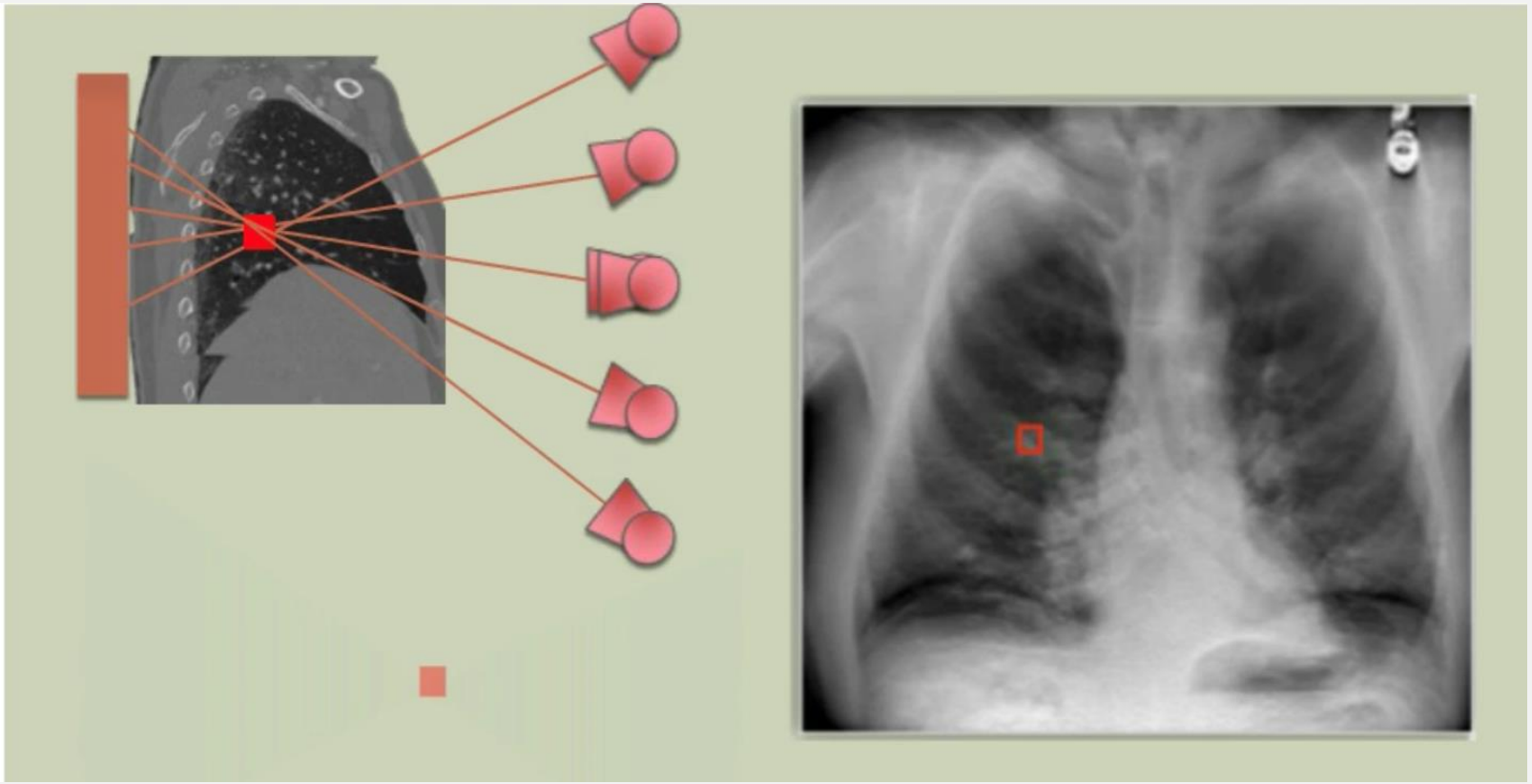
Advantages of bronchoscopy include low rates of complications including life threatening bleeding and pneumothorax rate

OBSTACLES WITH STANDARD ENB BRONCHOSCOPY

CT TO BODY DIVERGENCE

- Changes in the lesion from the time of the original scan to procedure
- Intubation
- Atelectasis
- Changes with instrumentation
- Post biopsy hemorrhage
- Error Rate of 4-6 mms
- GGOs

FLUORONAVIGATIONAL BRONCHOSCOPY



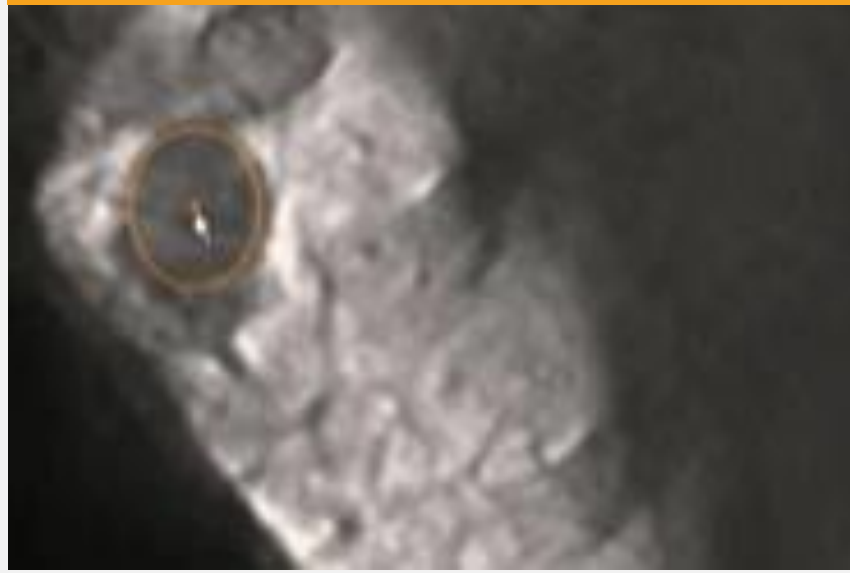
Images by Greg Kicska, MD, PhD. University of Washington, Seattle.

FLUORONAVIGATIONAL BRONCHOSCOPY

- 1st site in the World
- Locally register and enhance lesion visibility
- Eliminate discrepancy between "real" and "virtual" lesion
- Correct for CT to Body Divergence
- Account for tissue distortion caused by navigation catheter and bronchoscope
- Optimize alignment during biopsy
- 2D to 3D Visualization of the lesion

BEFORE

AFTER

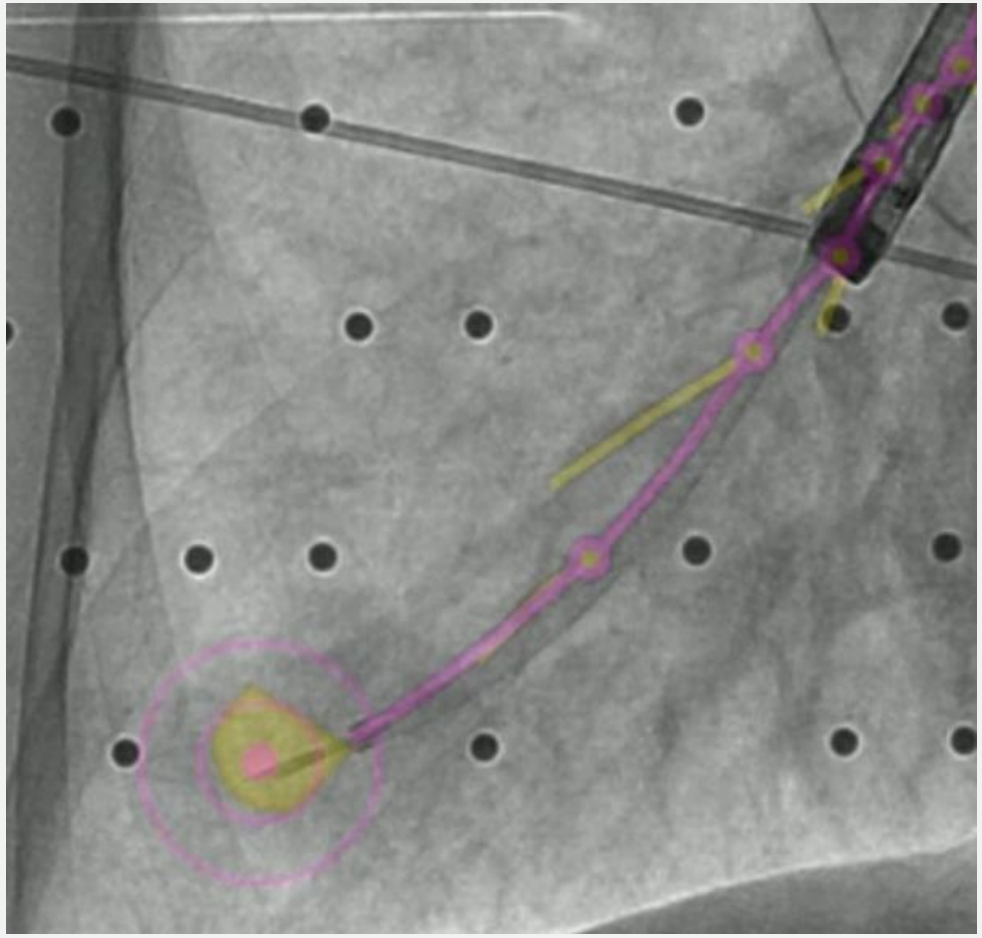


AUGMENTED FLUOROSCOPIC BRONCHOSCOPY

- Similar to FluoroNavigational Bronchoscopy
- Artificial Intelligence and Deep Neuronal Learning
- Account for Tissue Distortion
- Identify pathway and Target

AUGMENTED FLUOROSCOPIC NAVIGATIONAL BRONCHOSCOPY

- Currently in phase 1 trial
- 1 of 12 sites in the world
- Real-time lesion localization and navigation system
- High localization accuracy allows reliable sampling
- Smooth integration with procedure flow



CONE BEAM CT BRONCHOSCOPY

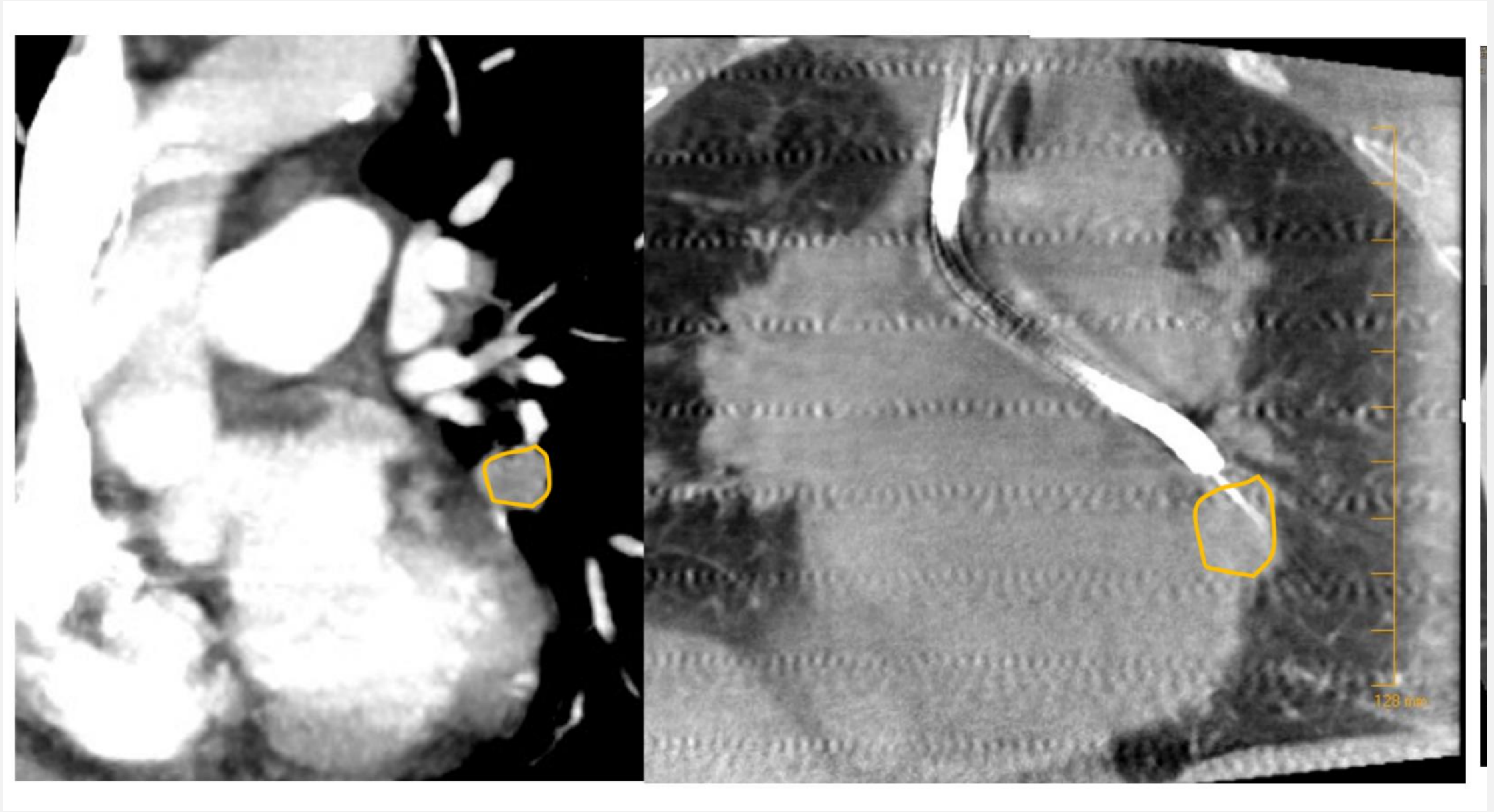
NAVIGATE

SECURE

SPIN

Virtual 3D Reconstruction and Real time “tool in lesion” confirmation

Pacemakers are no longer a limiting factor



Difficult to Reach and See Lesions

CONE BEAM CT BRONCHOSCOPY INITIAL EXPERIENCE

- 50 patients, 54 PLLs
  - 96% CT confirmation "tool in lesion"
  - Tissue Adequacy Rate of 90.7%
  - Four "atypical cells"
  - 61% patients positive for malignancy
  - One PTX
  - Average Radiation exposure 577±396 mGy

CONE BEAM CT TECHNOLOGY

- Paradigm Shift
- Excellent Safety
- Difficult to reach and difficult to see lesions including GGOs
- “Center in lesion” for molecular acquisition
- Nodal Sampling as well as biopsy of the peripheral lung lesion
- Low Risk of Complications
- Fluoronavigational bronchoscopy trial, BodyVision Trial, Neuwave Endobronchial Ablation Trial*, Robot to Robot bronchoscopy*