Ultrasound-guided Thoracentesis and Paracentesis

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Conflicts of Interest

No conflicts of interest to declare

No vested interests or investments other than as a purchaser
Objectives

By the end of the workshop, the participant will:

1) Understand the evidence supporting US guided thoracentesis
2) Understand the technique of using US to guide the procedure
3) Have had the opportunity to practice these techniques using task trainers
Outline

Rationale

Scanning

Hands-on
Rationale

Ultrasound

6 studies, 1600 patients
70% lower risk in pneumothorax (OR 0.3; 95% CI 0.2-0.7)

Gordon CE et al. Arch Intern Med 2010

>60,000 thoracentesis; risk of pneumothorax 20% reduction (OR 0.81; 95% CI 0.84-0.90); hospitalization costs, LOS

Mercaldi CJ and Lanes SF. Chest 2013

British Thoracic Society 2010 Guideline

“Bedside ultrasound guidance improves the success rate and reduces complications (including pneumothorax) and is therefore recommended for diagnostic aspirations.”

Hooper C et al. Thorax 2010

Best Practice Recommendations

Includes the use of ultrasonography and training

Daniels CE and Ryu JH. Curr Opin Pulm Med 2011
Range of utilities

1. Confirming suitable pocket of fluid and site of needle entry
   >1cm thickness recommended  
   Daniels CE and Ryu JH. Curr Opin Pulm Med 2011

2. Identifying location of solid organs

3. Assisting real-time guidance (optional)

4. Identifying post-procedure complications (pneumothorax)
What doesn’t work?

‘X’ marks the spot does NOT work

Pneumothorax rates no different than those without ultrasound and significantly higher than US-guided taps

Therefore, remote localization does not lower rates and should not be done

Scanning Rules of Thumb

1. Use a low frequency transducer
Scanning Rules of Thumb

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2. Perform a **longitudinal** scan
Scanning Rules of Thumb

1. Use a low frequency transducer
2. Perform a longitudinal scan
3. Always identify locations of organs to avoid
Where to Scan?

Supine patients

Triangle of Safety

Pectoralis Major
Latissimus dorsi
5th intercostal space

Triangle of Safety
Haverlock T et al. BTS Guidelines 2010
Where to Scan?

Pleural Effusions

Step 1: Find intercostal space (rib shadows)
Right pleural effusion
- Rib
- Liver
- Lung
- Rib shadow
Rib
Liver
Lung
Rib shadow
Not safe to do!
Jelly Fish Sign
Advanced Tips

Identifying overlying cellulitis

Power Doppler to ensure no vessels

Rule out pneumothorax post (stratosphere sign, absence of lung sliding, lung point)

Rule out re-expansion pulmonary edema (B lines)
Options for ultrasound-guidance

Dynamic  Static
Paracentesis

“Ultrasonography can be a useful adjunct in locating fluid and visualizing the spleen and other structures to be avoided.” Runyon BA. AASLD 2012

Largest pocket of fluid (aim for 2cm+)

Organs to avoid (liver, spleen etc)

Inferior epigastric vessels
Massive Hepatomegaly in RLQ