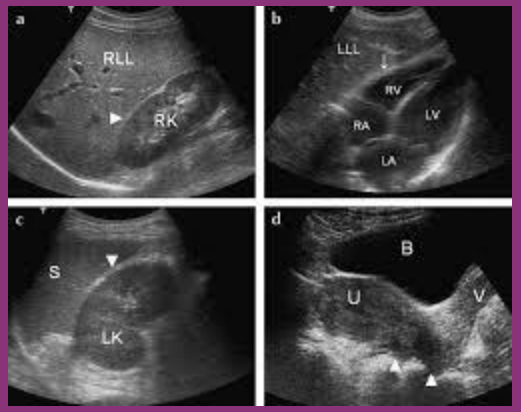

FOCUSED ASSESSMENT WITH SONOGRAPHY FOR TRAUMA(FAST)

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OBJECTIVES

- Describe the indications and limitations of bedside ultrasound in trauma
- Define the relevant local anatomy
- Understand the ultrasound protocol used in the setting of trauma
- Recognize the relevant findings and pitfalls in the detection of hemoperitoneum, hemopericardium and hemothorax

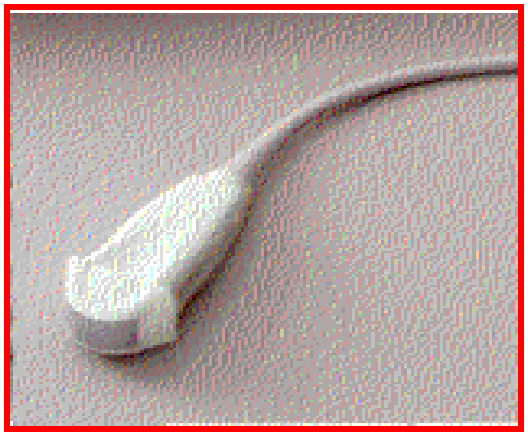
RADIOLOGICAL EVALUATION OF TRUMA

- CT: non-invasive, gives detail about organs
- DPL: most sensitive, invasive
- US: non-invasive, can detect 250cc of free fluid in Morrison's Pouch

FOCUSED ASSESSMENT WITH SONOGRAPHY FOR TRAUMA (FAST)

- To diagnose free intraperitoneal blood after blunt trauma
- 4 areas:
  - Perihepatic & hepato-renal space (Morrison's pouch)
  - Perisplenic
  - Pelvis (Pouch of Douglas/rectovesical pouch)
  - Pericardium (subxiphoid)
- sensitivity 60 to 95% for detecting 100 mL - 500 mL of fluid

- Extended FAST (E-FAST):
  - Add thoracic windows to look for pneumothorax.
  - Sensitivity 59%, specificity up to 99% for PTX (c/w CXR 20%)



Curved array

- Various “footprints”
  - Small footprint for thorax
  - Large for abdomen
- Variable frequencies
  - 5.0 MHz: thin, child
  - 3.5 MHz: versatile
  - 2.0 MHz: cardiac, large pts

FAST

- Advantages:
  - Portable, fast (<5 min)
  - No radiation or contrast
  - Less expensive

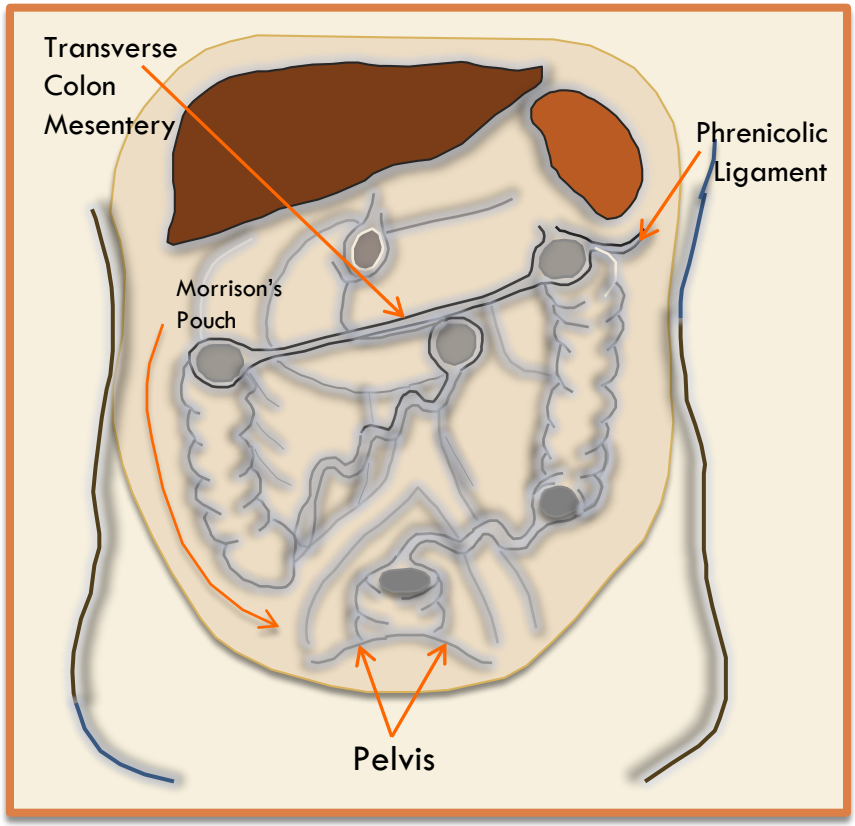
FAST

- Disadvantages
  - Not as good for solid parenchymal damage, retroperitoneum, or diaphragmatic defects.
  - Limited by obesity, substantial bowel gas, and subcut air.
  - Can’t distinguish blood from ascites.
  - high (31%) false-negative rate in detecting hemoperitoneum in the presence of pelvic fracture

FAST

- The most important preoperative objective in the management of the patient with trauma is to ascertain whether or not laparotomy is needed, and not the diagnosis of a specific organ injury”

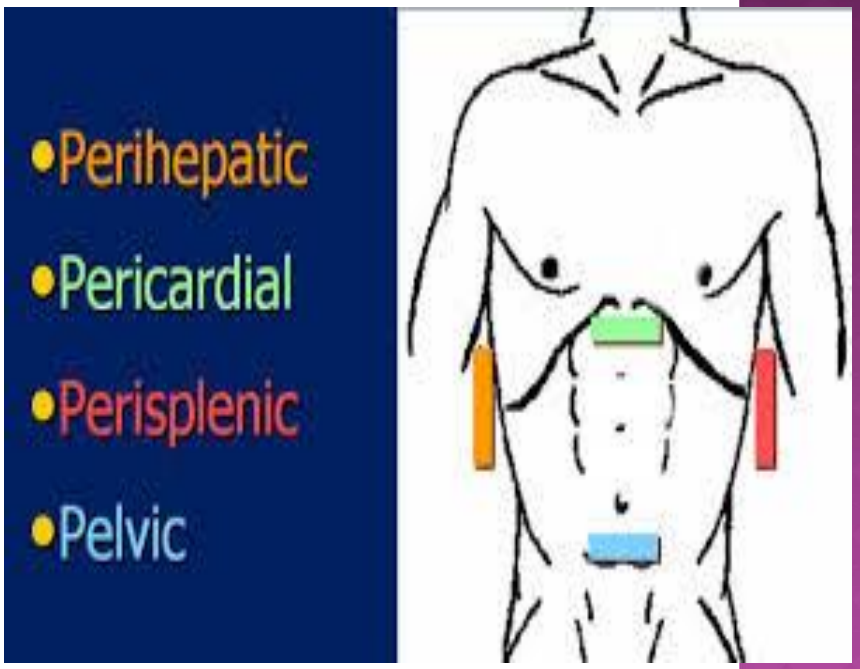
FAST ANATOMY



FAST

- Detects free intraperitoneal fluid
- Blood/fluid pools in dependent areas
- Pelvis
  - Most dependent
- Hepatorenal fossa
  - Most dependent

  area in supramesocolic region



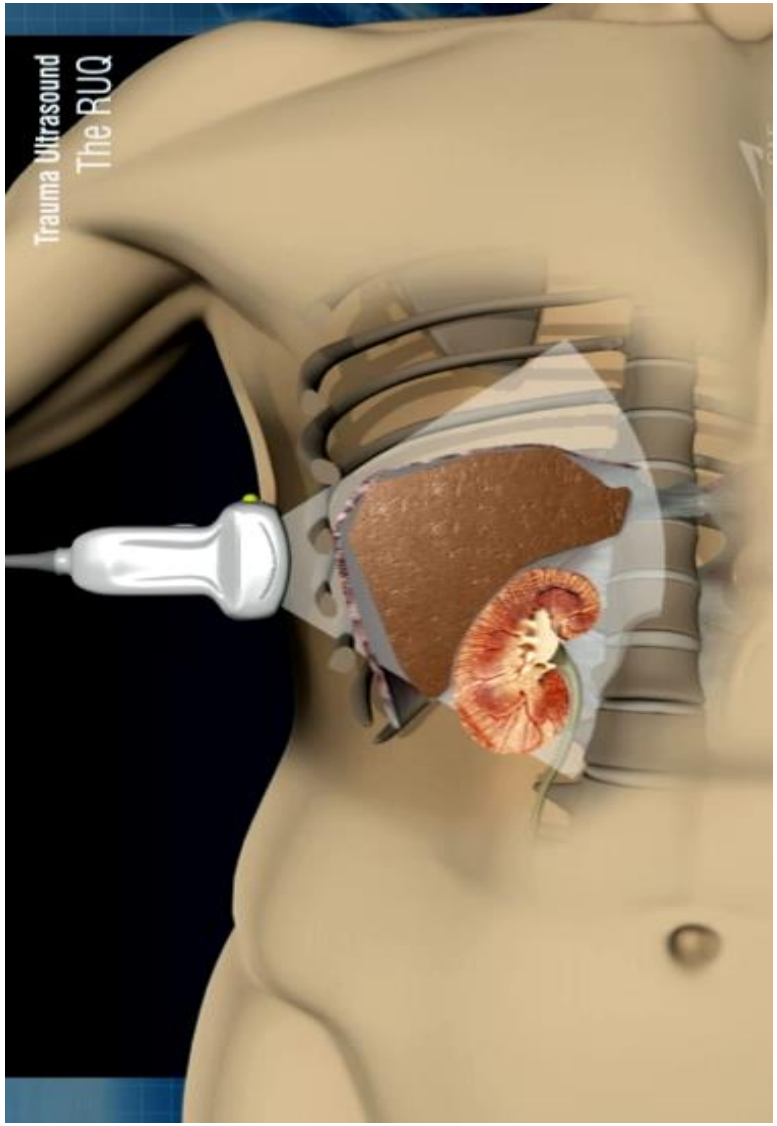
PERIHEPATIC VIEW

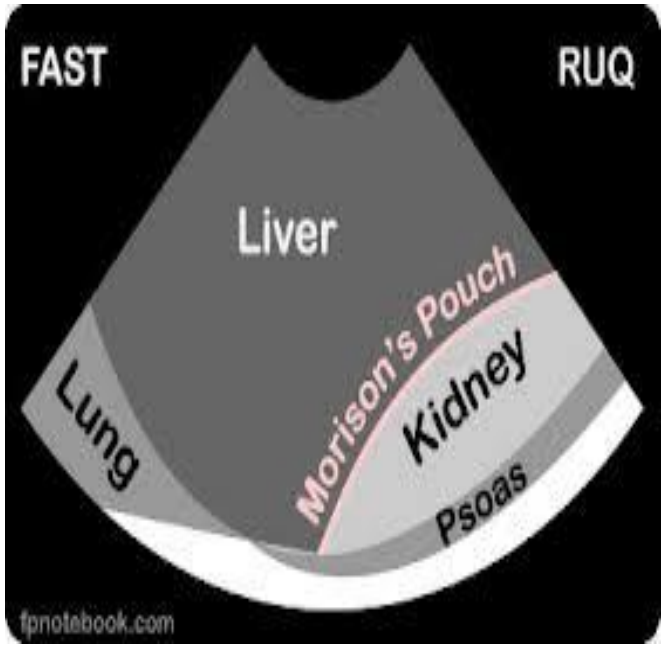
Position
- Probe placed with indicator to pt.'s head
- Probe placed around 8-11th rib space, mid axillary line

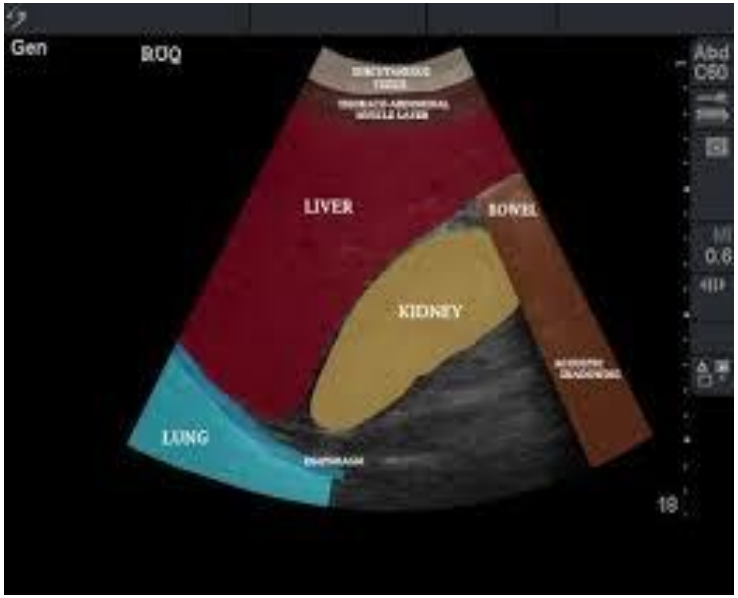
May need to slide probe around rib shadow

Do not forget to interrogate inferior pole of kidney

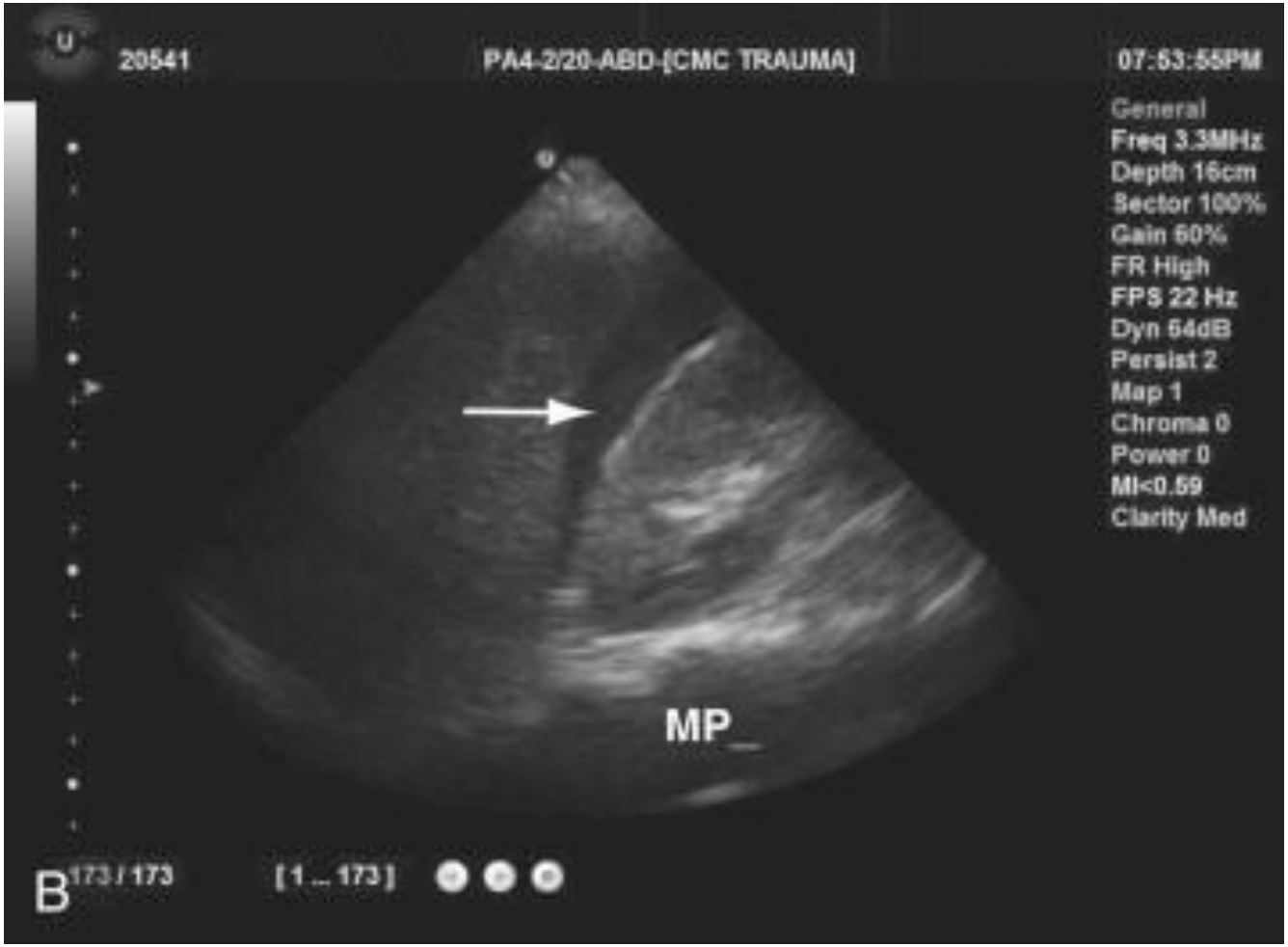
Move caudal from your R pleural space until liver and kidney are seen



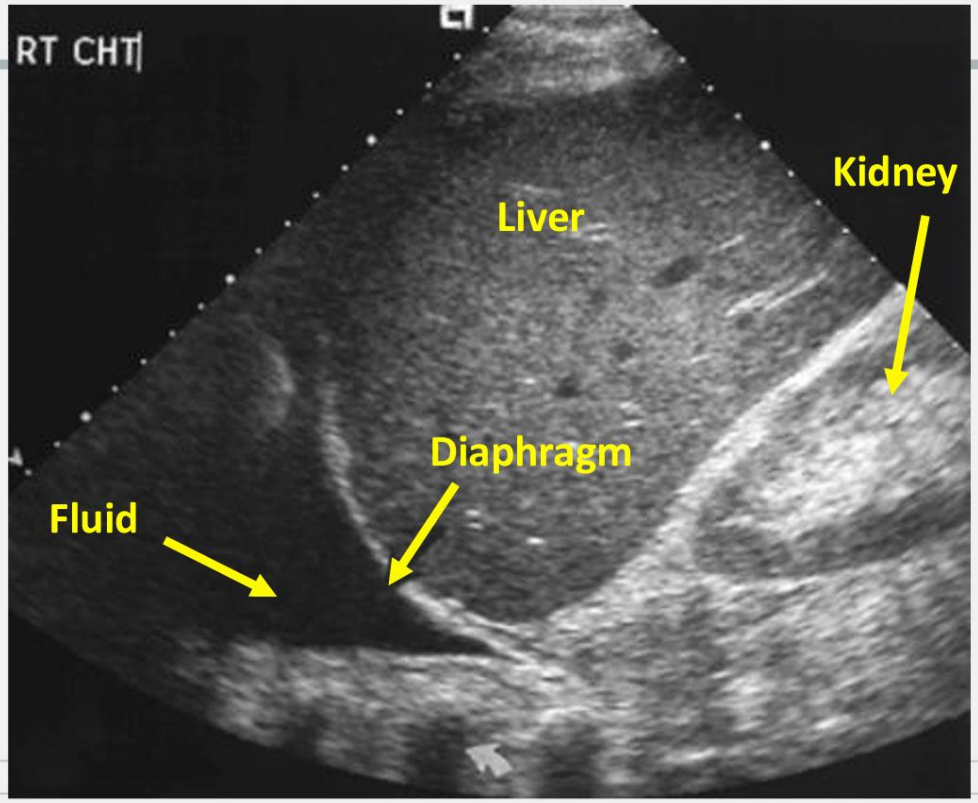

FAST
RUQ
Liver
Morison's Pouch
Kidney
Lung
Psoas
fpnotebook.com


Gen
RUQ
Abd
C50
LIVER
BOWEL
KIDNEY
LUNG
0:6
18

PERIHEPATIC VIEW


20541
PA4-2/20-ABD-[CMC TRAUMA]
07:53:55PM
General
Freq 3.3MHz
Depth 16cm
Sector 100%
Gain 60%
FR High
FPS 22 Hz
Dyn 64dB
Persist 2
Map 1
Chroma 0
Power 0
MI<0.59
Clarity Med
MP
B 173 / 173
[1 ... 173]

Pleural effusion (fluid in chest cavity)



PERISPLENIC VIEW

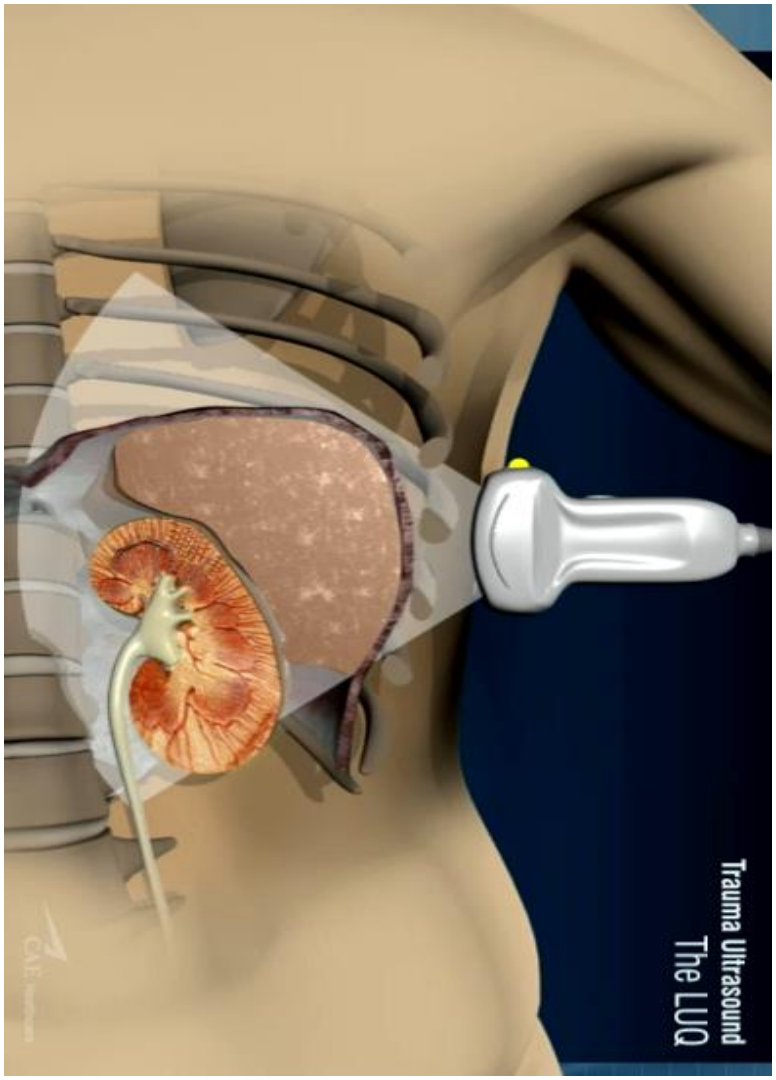
Position

- Probe placed with indicator to pt's head
- Probe placed around 6 9th rib space, mid axillary line

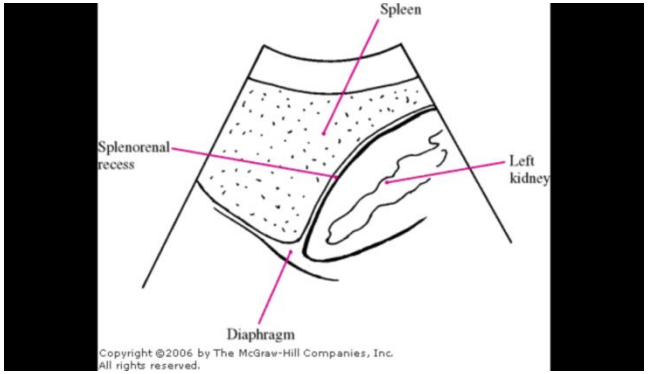
May be difficult to achieve due to rib shadow

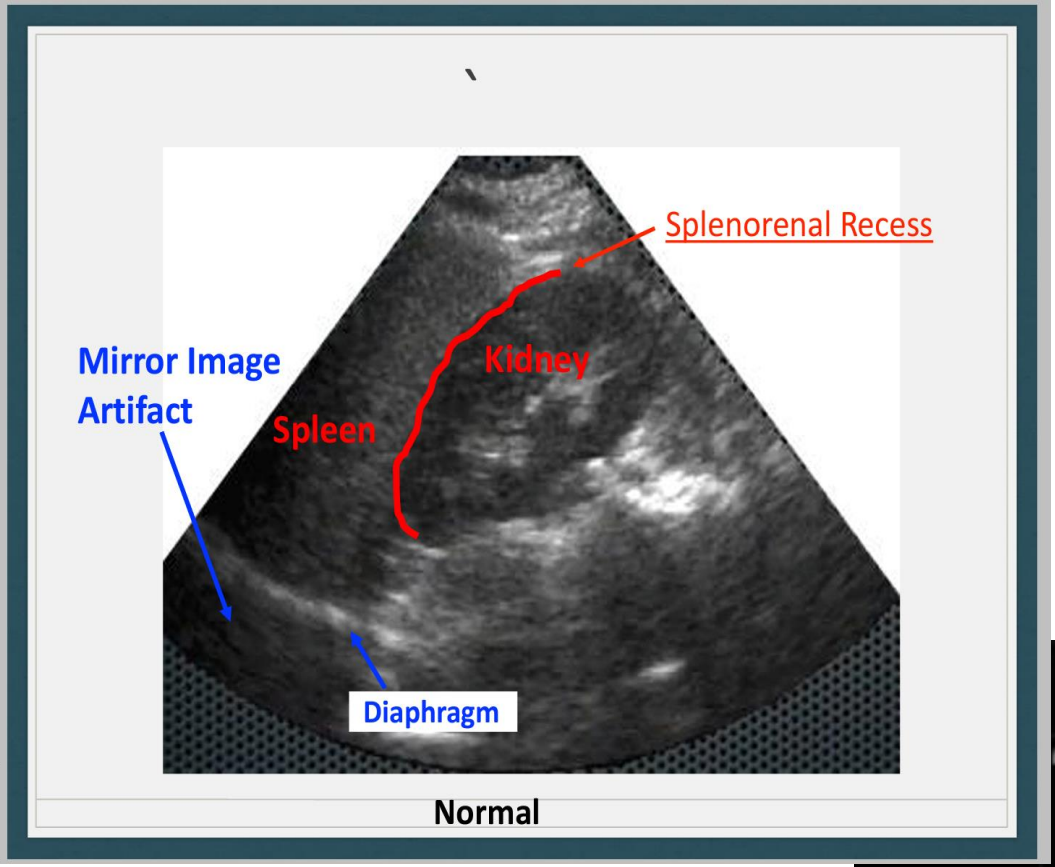
Ask pt. to inhale deeply to displace anatomy inferiorly

Move caudal from your
L pleural space assessment
Until spleen, diaphragm and
kidney are seen

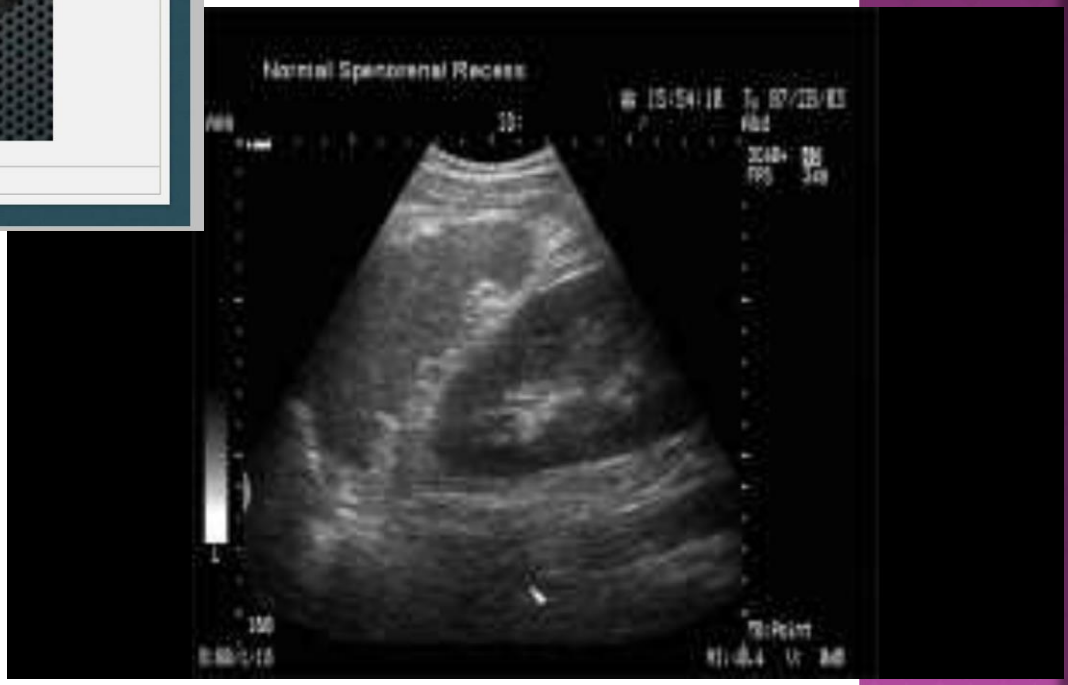


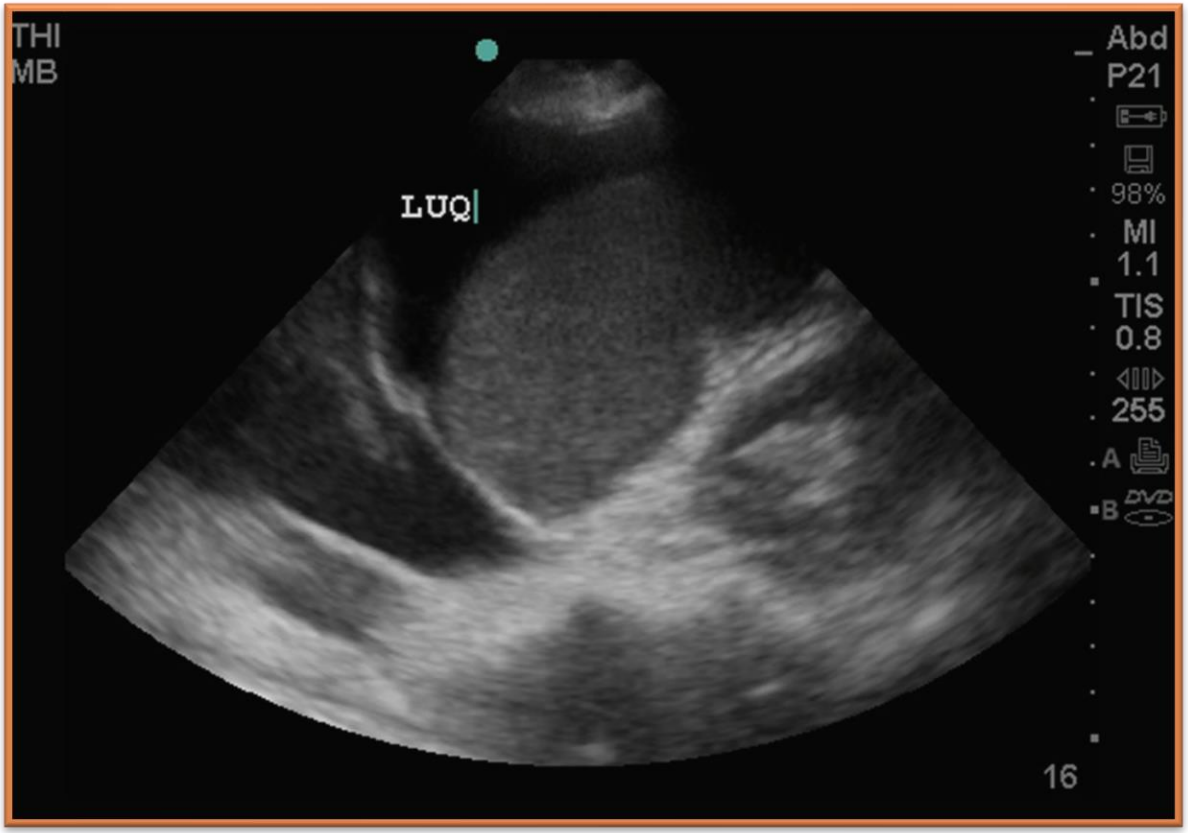
PERISPLENIC VIEW




Splenorenal Recess
Kidney
Mirror Image
Artifact
Spleen
Diaphragm

Normal


Normal Splenorenal Recess


THI
MB
Abd
P21
98%
MI
1.1
TIS
0.8
255
A
B
DVD
LUQ
16

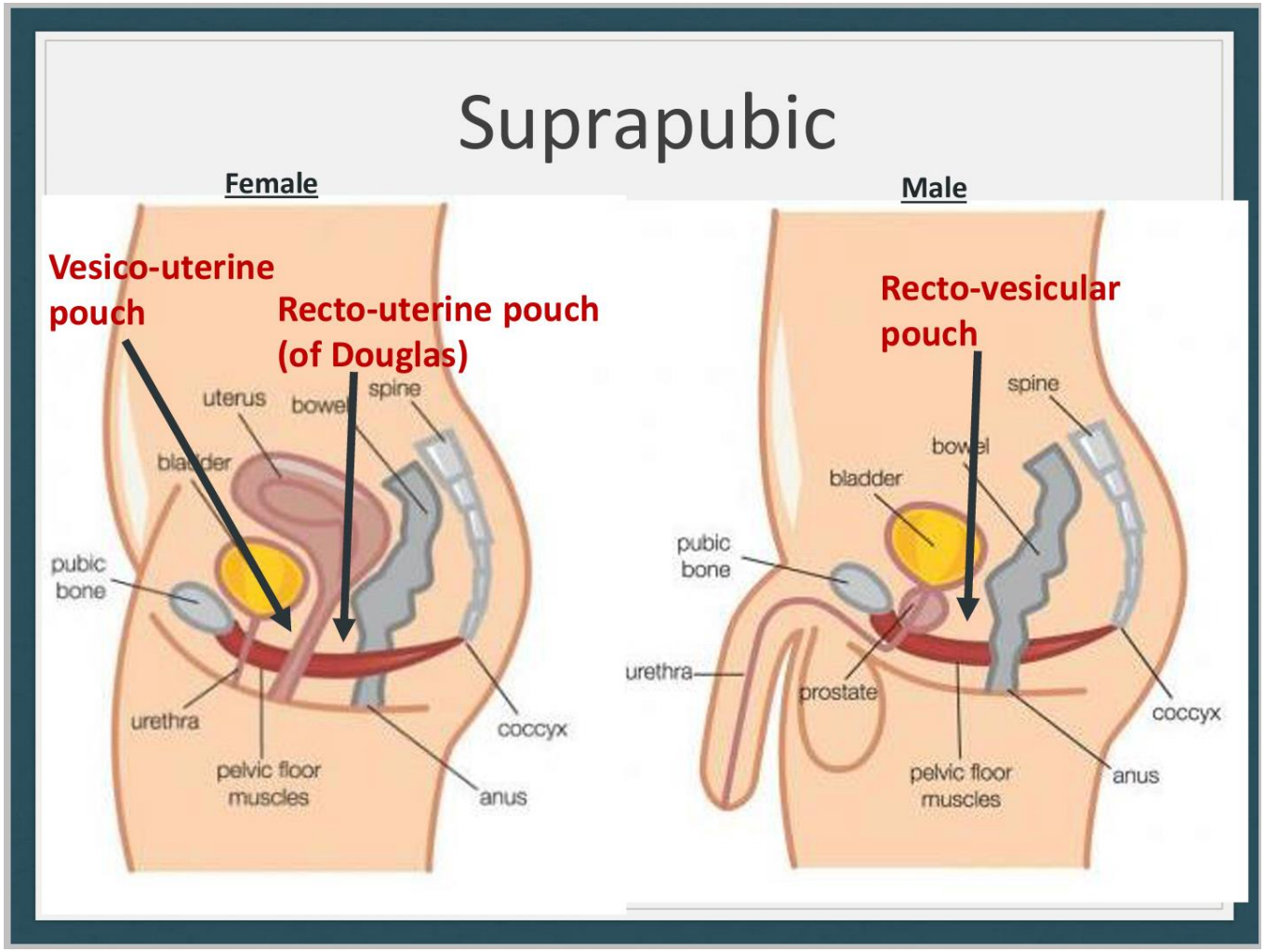

{306A251A-511C-4e0c-ABD0- PA4-2/20-ABD-General
91957
06:15:07PM
General
Freq 3.3MHz
Depth 18cm
Sector 100%
Gain 62%
FR High
FPS 19 Hz
Dyn 75dB
Persist 2
Map 1
Chroma 0
Power 0
MI<0.59
Clarity Med
PS
[1 .. 36]


{306A251A-511C-4e0c-ABD0- PA4-2/20-ABD-General
91957
06:15:07PM
General
Freq 3.3MHz
Depth 18cm
Sector 100%
Gain 62%
FR High
FPS 19 Hz
Dyn 75dB
Persist 2
Map 1
Chroma 0
Power 0
MI<0.59
Clarity Med
PS
[1 ... 36]

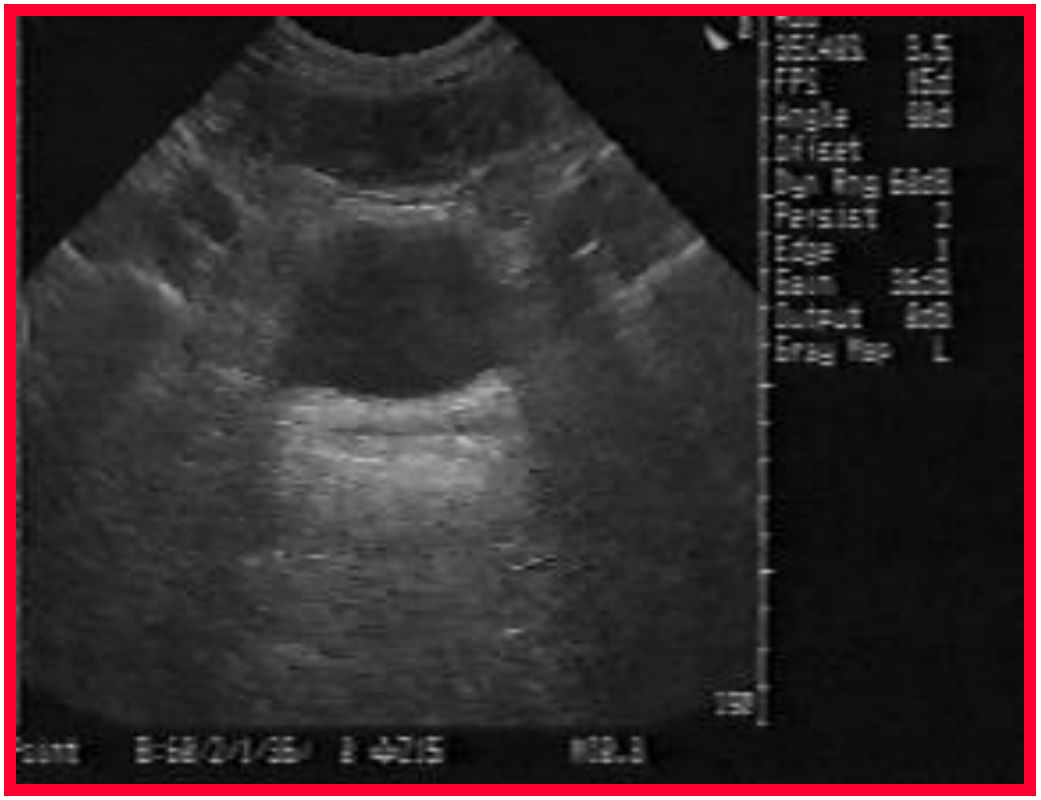
SUPRAPUBIC VIEW

Probe should be placed in the suprapubic position
Either can be transverse or longitudinal
Helpful to image before placement of a Foley catheter

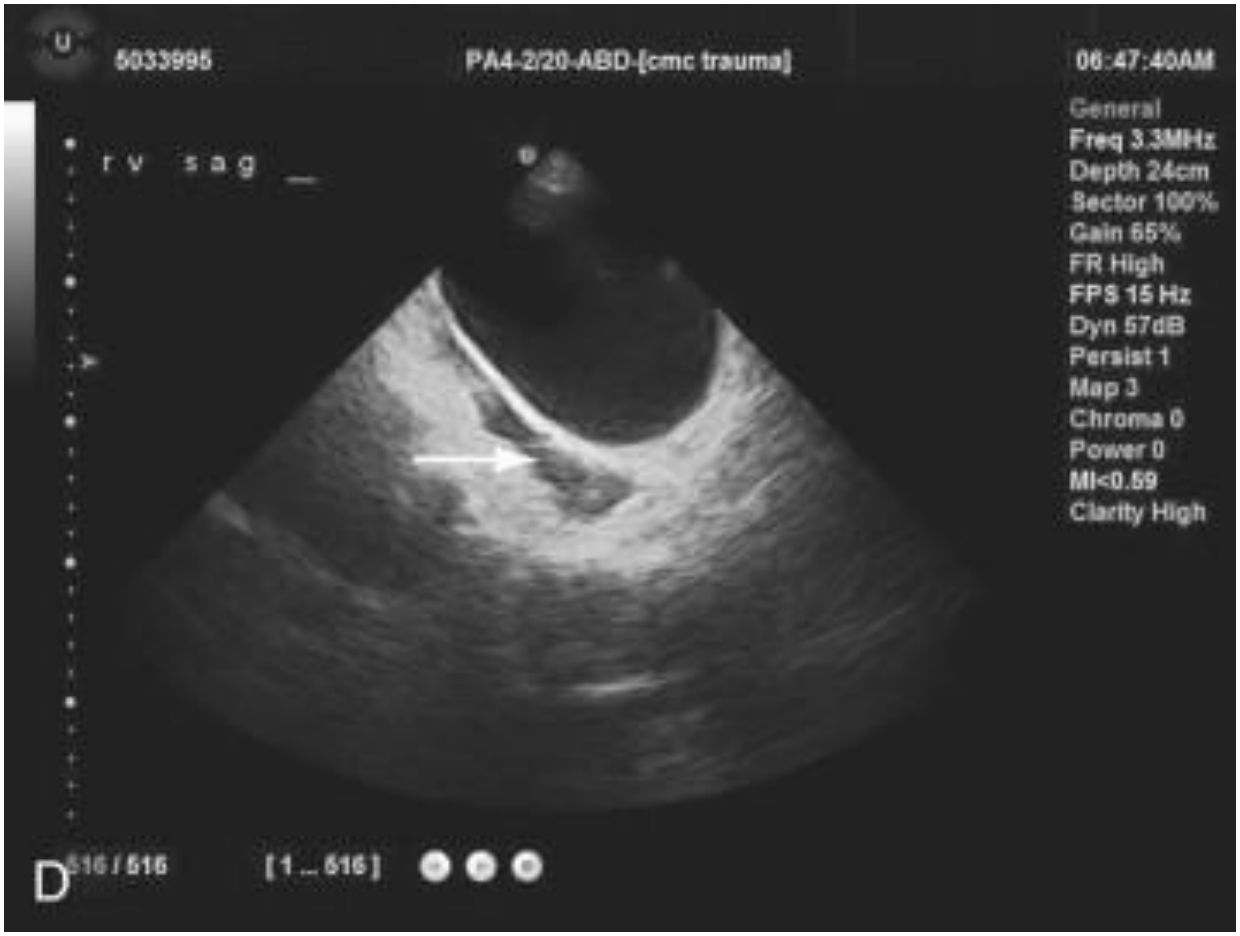
Suprapubic

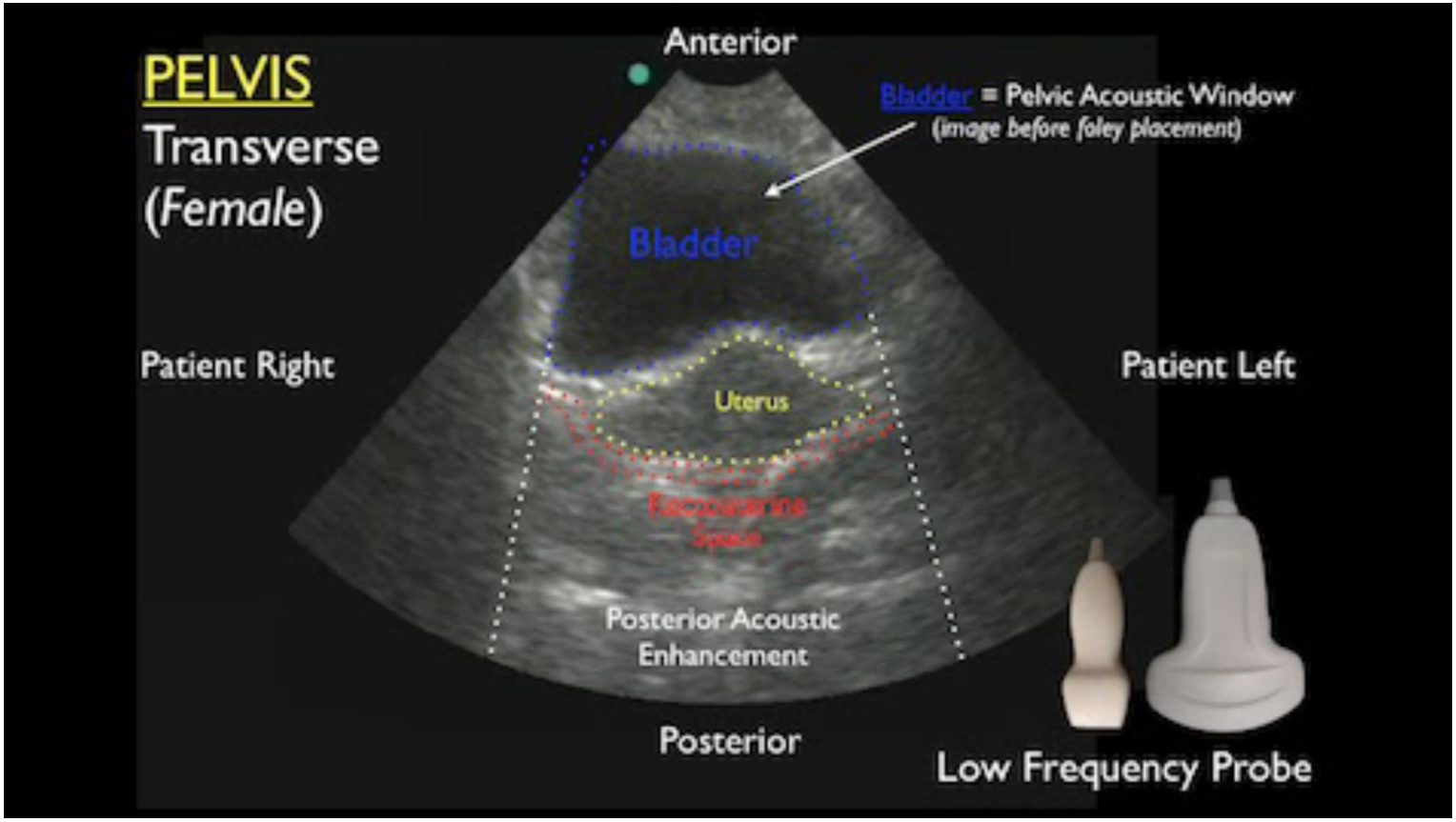

Female
Vesico-uterine pouch
Recto-uterine pouch (of Douglas)
uterus
bowel
spine
bladder
pubic bone
urethra
pelvic floor muscles
coccyx
anus
Male
Recto-vesicular pouch
spine
bowel
bladder
pubic bone
urethra
prostate
coccyx
pelvic floor muscles
anus

SUPRAPUBIC VIEW



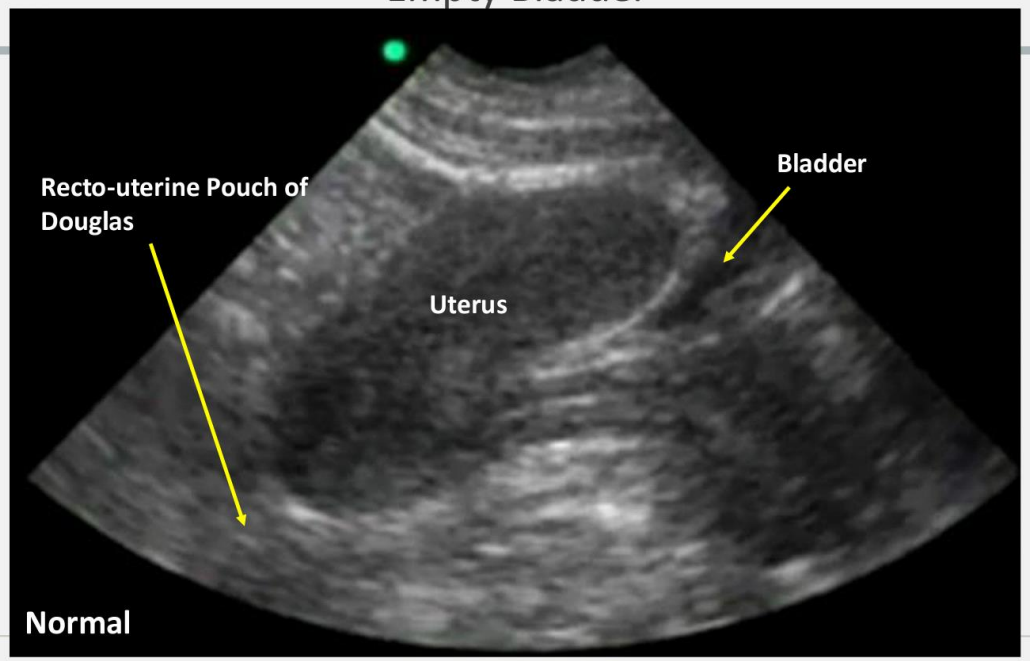
SUPRAPUBIC VIEW




PELVIS
Transverse
(Female)
Anterior
Bladder = Pelvic Acoustic Window
(image before foley placement)
Bladder
Patient Right
Patient Left
Uterus
Rectovesical
Space
Posterior Acoustic
Enhancement
Posterior
Low Frequency Probe

Suprapubic - Sagittal, Female

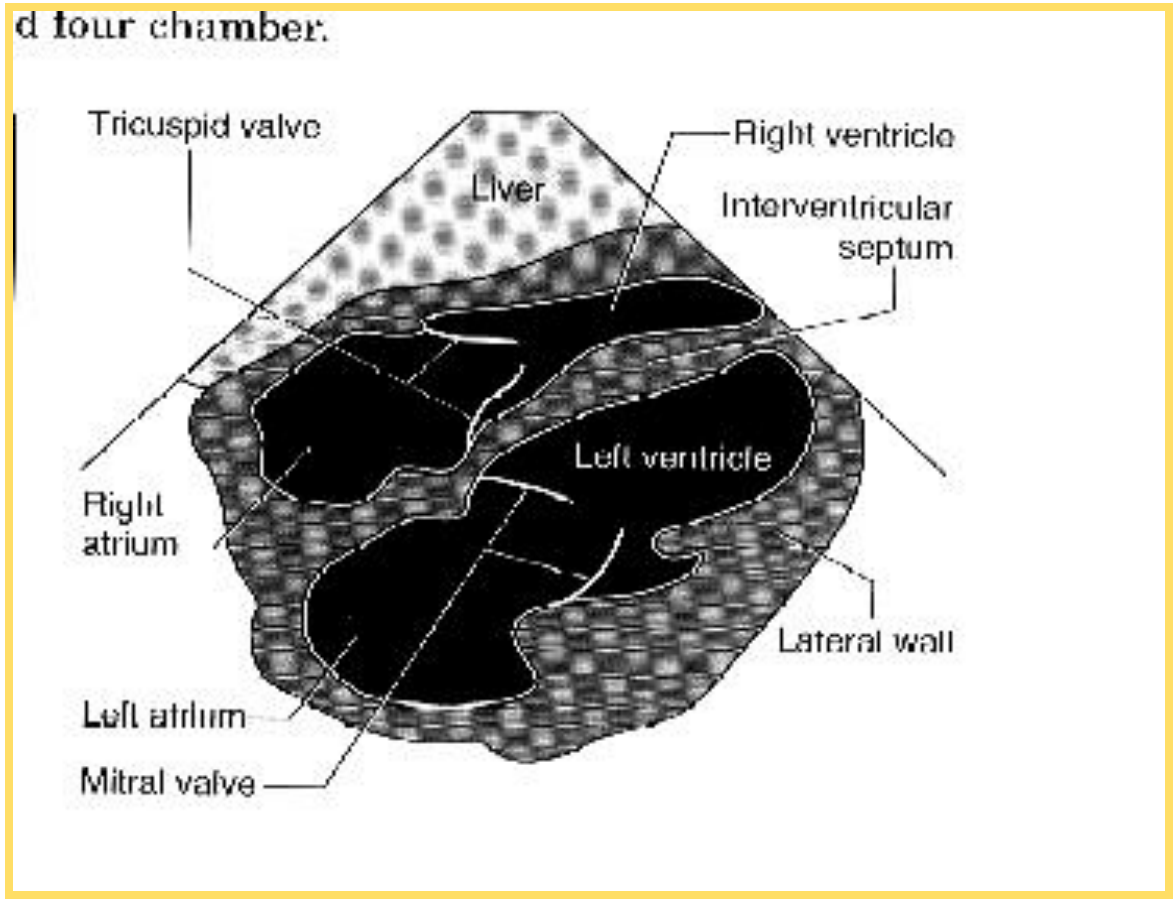
Empty Bladder

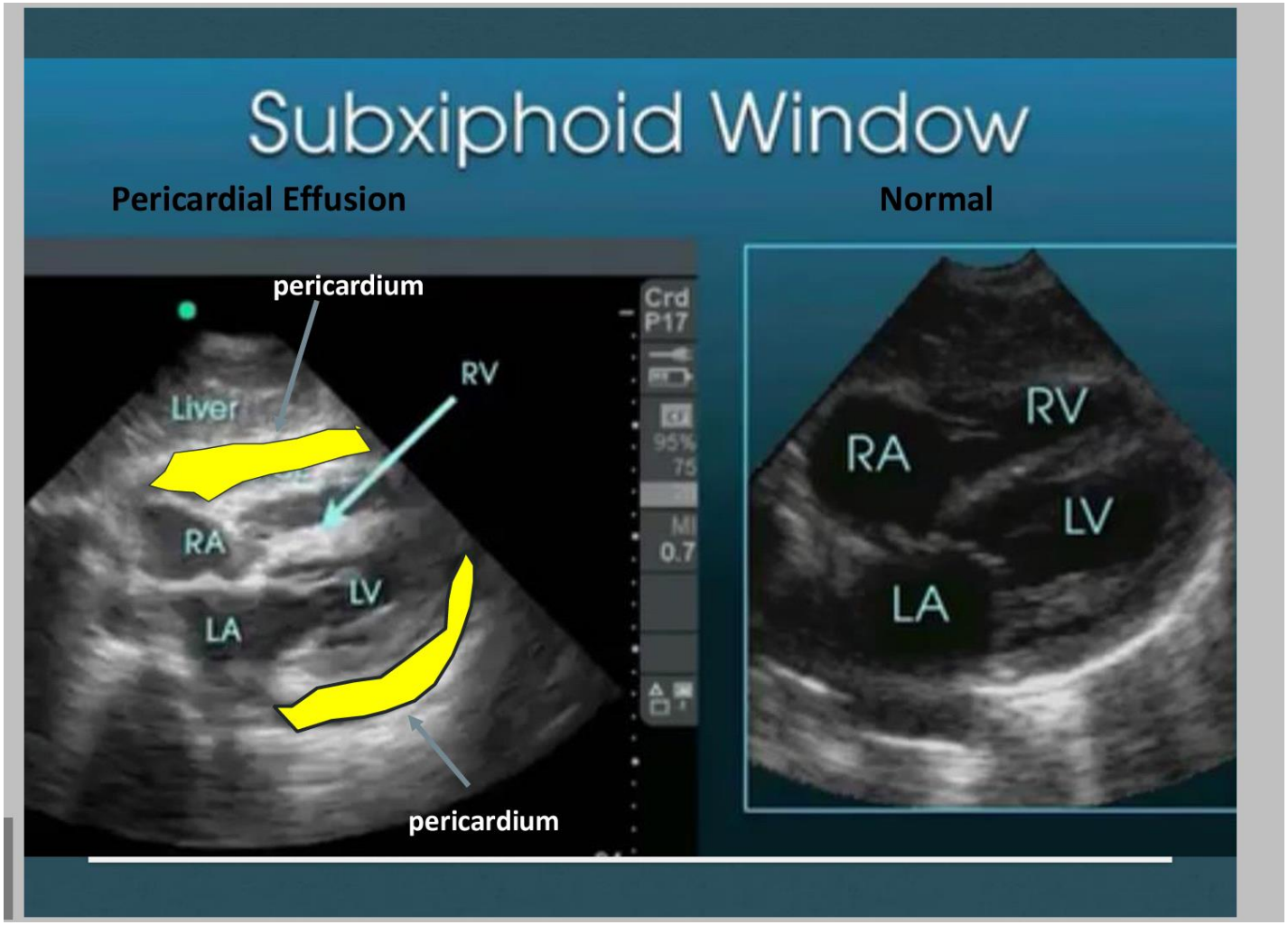


SUBCOSTAL VIEW

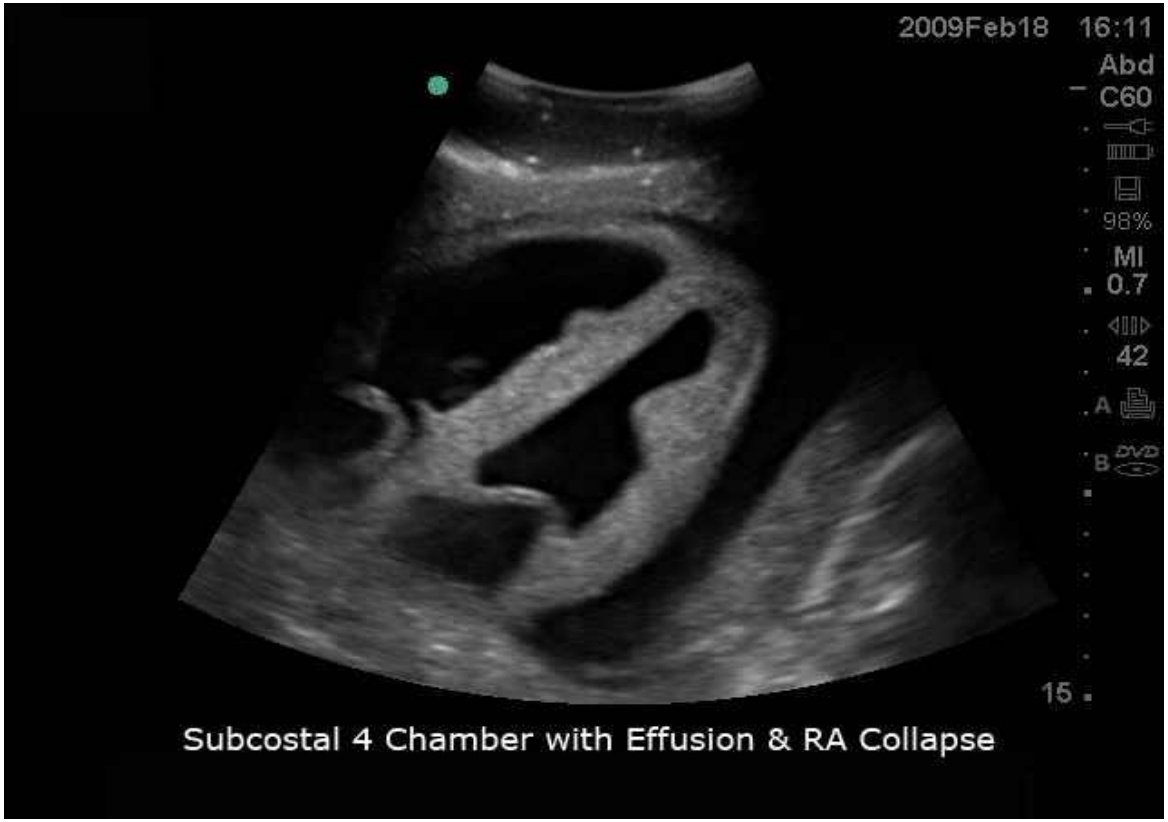
- Most practical in trauma setting
- Away from airway and neck/chest procedures
- Also called Sub-Xyphoid view

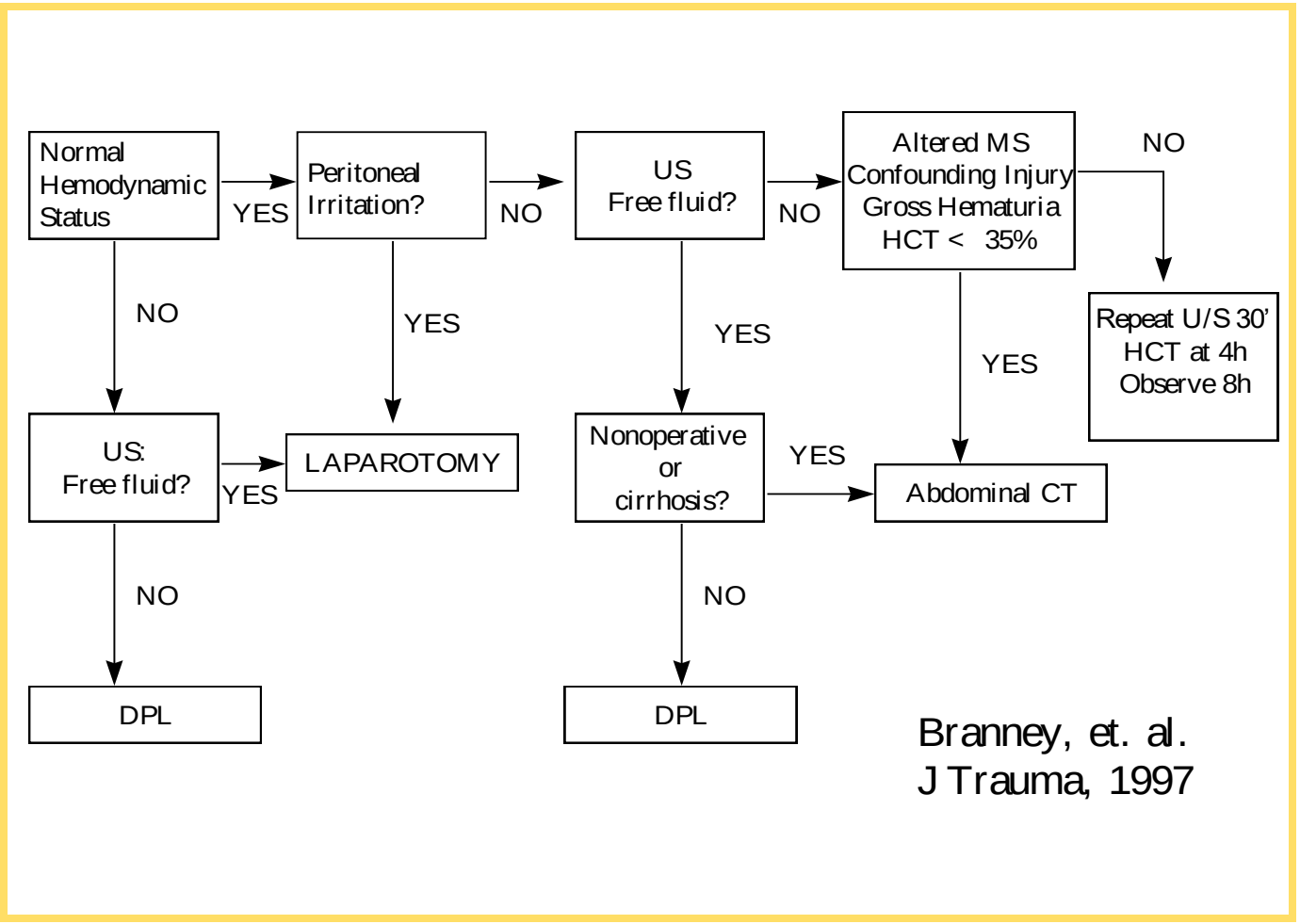
SUBCOSTAL VIEW




Subxiphoid Window
Pericardial Effusion
Normal
pericardium
RV
Liver
RA
LV
LA
pericardium
RV
RA
LV
LA

SUBCOSTAL VIEW




Normal Hemodynamic Status
YES
Peritoneal Irritation?
NO
US Free fluid?
NO
Altered MS
Confounding Injury
Gross Hematuria
HCT < 35%
NO
Repeat U/S 30'
HCT at 4h
Observe 8h
NO
YES
YES
YES
US: Free fluid?
YES
LAPAROTOMY
Nonoperative or cirrhosis?
YES
Abdominal CT
NO
NO
DPL
DPL
Branney, et. al.
J Trauma, 1997

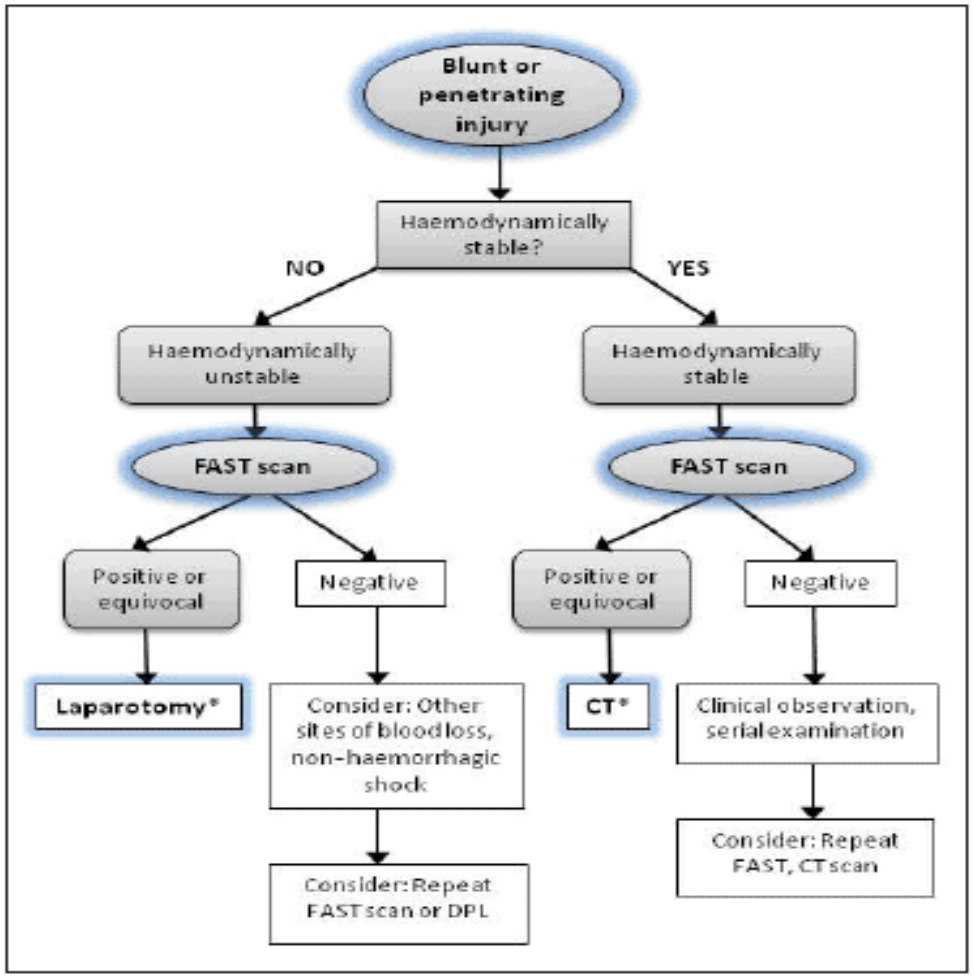


Fig. 3. Flow diagram to guide the use of FAST in trauma management in peripheral hospitals.

FAST - LIMITATIONS

- US relatively insensitive for detecting traumatic abdominal organ injury
- Fluid may pool at variable rates
  - Minimum volume for US detection
  - Multiple views at multiple sites
  - Serial exams: repeat exam if there is a change in clinical picture
- Operator dependent

FAST - LIMITATIONS

- Intraperitoneal fluid may be
  - Blood
  - Preexisting ascites
  - Urine
  - Intestinal contents

Thank You