SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai

DEPARTMENT OF RADIOGRAPHY AND IMAGING TECHNOLOGY

COURSE NAME : MODERN IMAGING TECHNIQUES AND RECENT TRENDS IN IMAGING

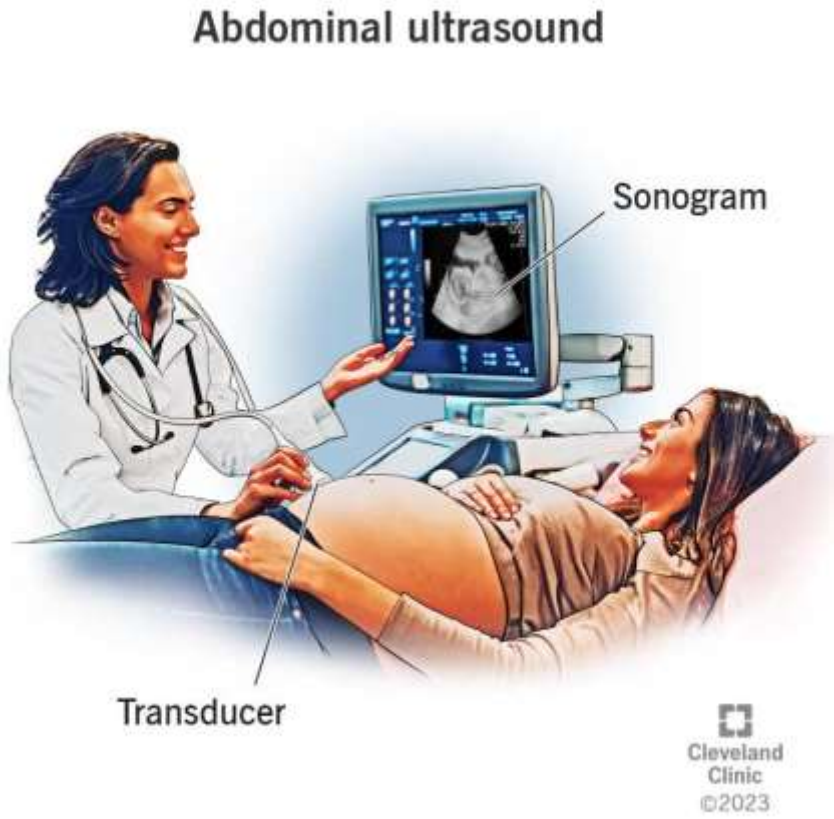
UNIT : ULTRASONOGRAPHY AND DOPPLER STUDIES

TOPIC : TRANSABDOMINAL SONOGRAPHY (TAS)

FACULTY NAME: MRS.G.HELANA JOY

INTRODUCTION (Define)

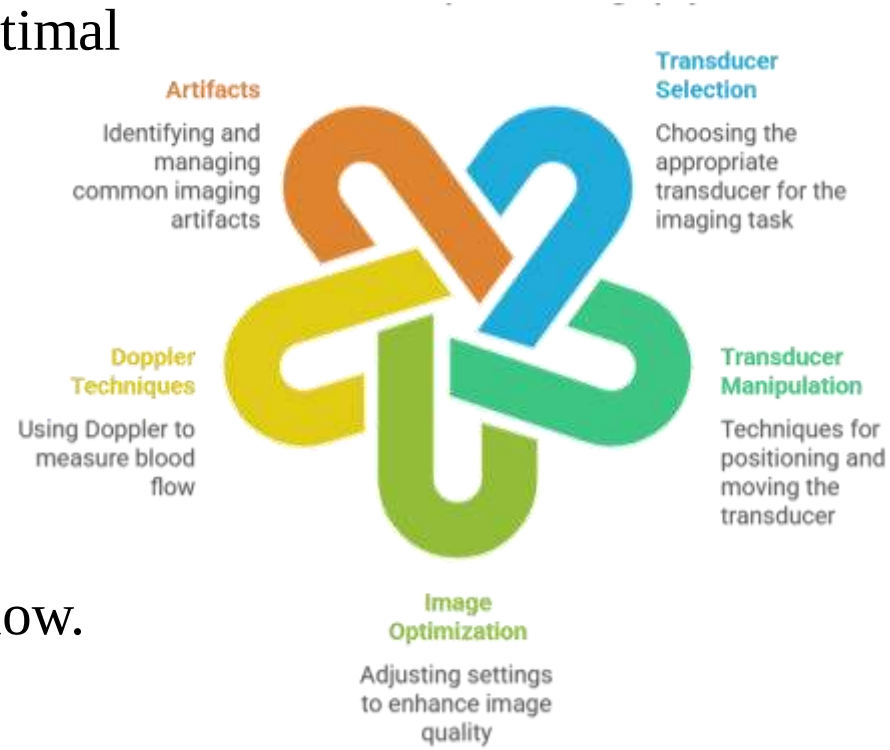
- Ultrasonography uses high-frequency sound waves to create real-time images of internal organs, vessels, and tissues for diagnosis and monitoring.
- Doppler studies assess blood flow, vascular integrity, and detect abnormalities by measuring the reflection of sound waves from moving blood.
- Transabdominal Sonography (TAS): A common non-invasive methodology for pelvic and abdominal imaging


Abdominal ultrasound
Sonogram
Transducer
Cleveland Clinic
©2023


P
Subcutaneous fat
Renal artery
RLQ transplant kidney
Renal vein
External iliac artery

TECHNIQUES OF SONOGRAPHY

- High-frequency probes convert electrical signals to sound waves.
- Gel removes air between the probe and skin to ensure optimal acoustic contact.
- Doppler techniques include:
  - Color Doppler: Maps blood flow visually.
  - Spectral Doppler: Graphs velocity of blood flow.
  - Power Doppler: Sensitive for detecting low-velocity flow.



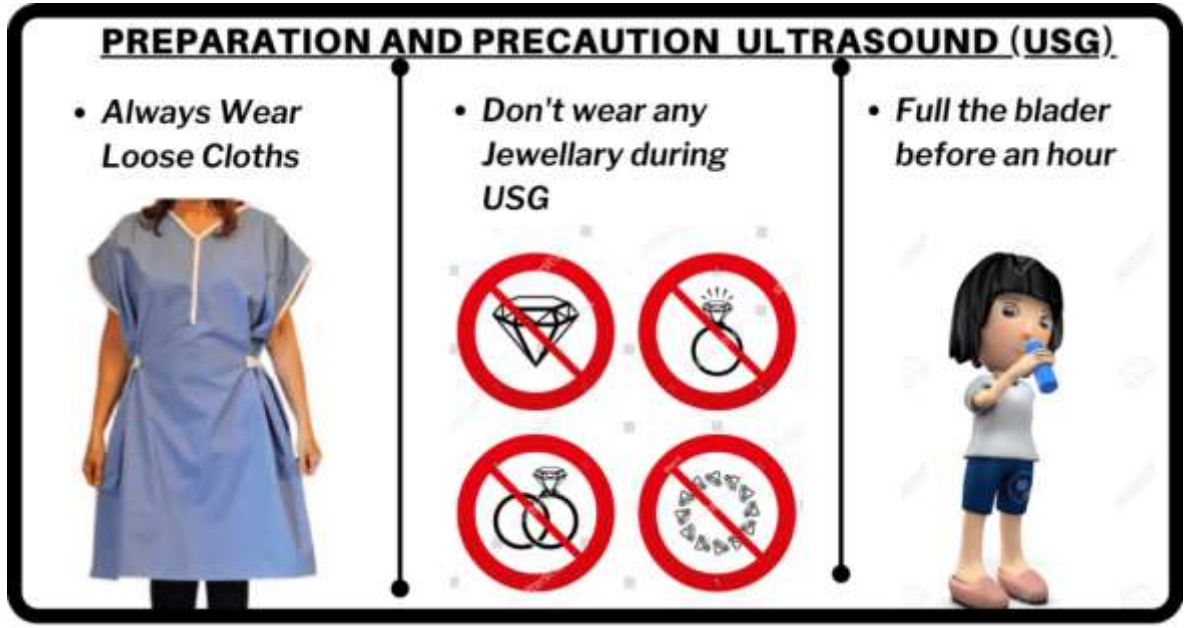
SELECTION OF SONOGRAPHY & TAS

- Chosen based on clinical indication (abdominal pain, vascular issues, organ screening, obstetric applications).
- Doppler modality selection guided by suspected pathology (stenosis, tumors, clot presence).

PREPARATION, INSTRUCTIONS, & PATIENT POSITIONING

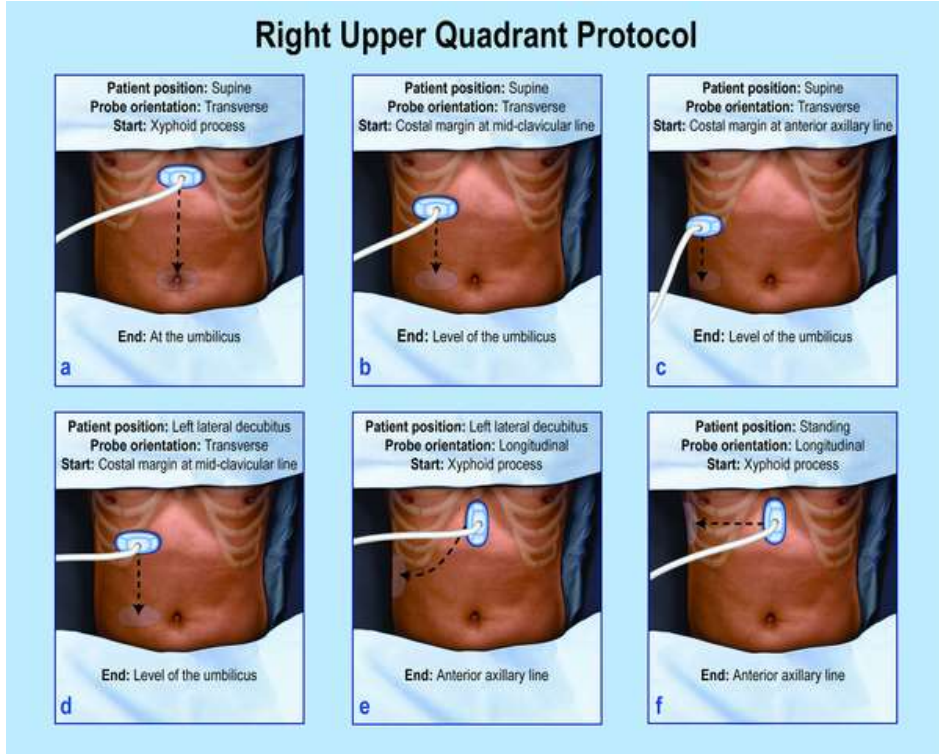
General Preparations

- Fasting: Most abdominal studies require fasting for 6–8 hours.
  - Reduces bowel gas for clear imaging.
- Hydration: Patient may be instructed to drink water for pelvic scans to fill the bladder.
- Clothing: Loose clothing is recommended; patient may be asked to wear a gown.
- No lotions, oils, powders on skin before scan



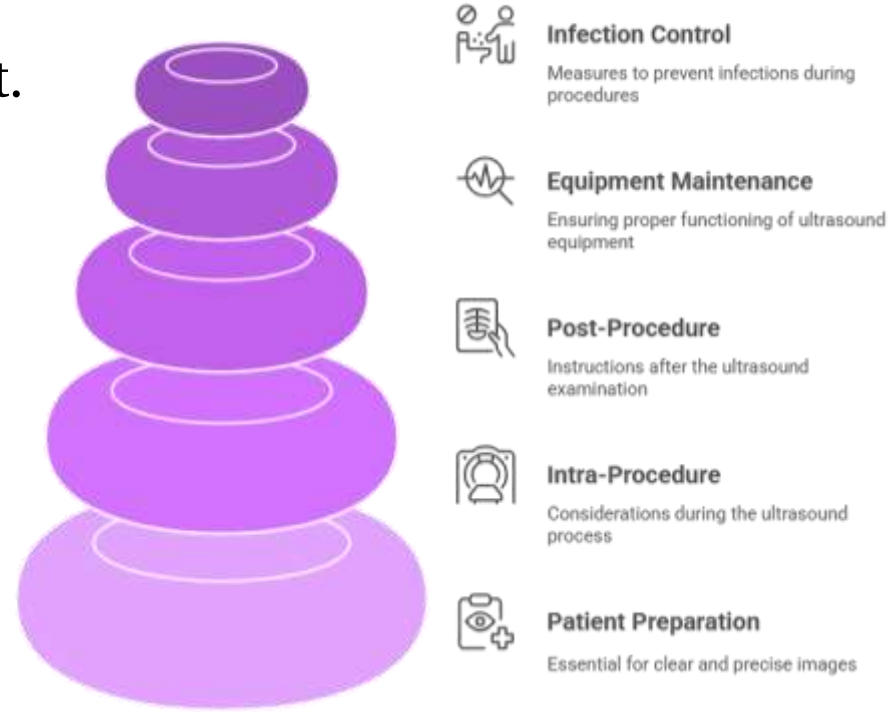
Positioning

- Transabdominal: Patient lies supine (on back); pillows/cushions may be used for comfort.
- For vascular studies (e.g., leg veins): may use semi-Fowler's or side-lying positions as needed.
- Patient instructions: Remain still, breathe as instructed to avoid motion artifacts.



PATIENT CARE AND MAINTENANCE PROTOCOLS

- Inform patient about the procedure, address concerns.
- Monitor for discomfort or anxiety—reassure and support.
- Hygiene protocols for probes and ultrasound gel to prevent cross-infection.
- Regular calibration and maintenance of ultrasound equipment for quality assurance.

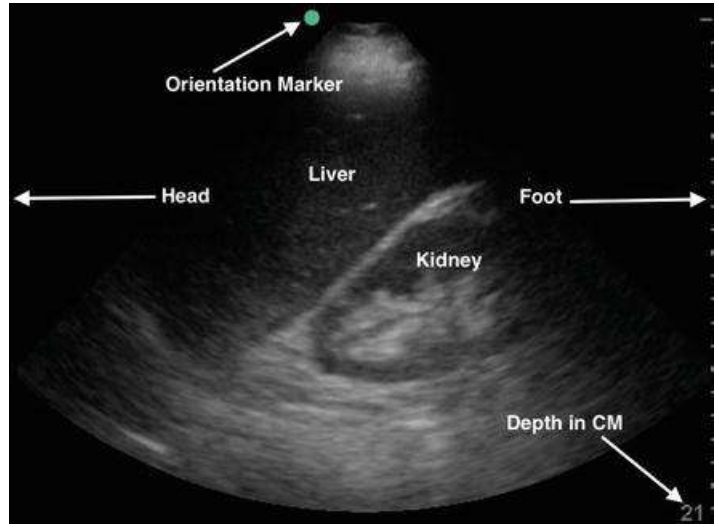


CLINICAL APPLICATIONS

- AS: Visualizes uterus, ovaries, bladder; diagnoses cysts, tumors, pregnancy, and fluid collections.
- Doppler: Evaluates arterial/venous patency, organ perfusion, fetal well-being, and vascular anomalies.
- Widespread uses: Obstetrics, gynecology, hepatobiliary, renal, and vascular medicine.

DISPLAY METHODS & IMAGE QUALITY

- Real-time imaging: Enables dynamic assessment and guidance for procedures.
- Image optimization: Adjust frequency, depth, focus, and gain for best results.
- Quality assurance: Standard protocols, equipment checks, and operator training enhance reproducibility and reliability.
- Ensuring reproducible, high-quality images reduces diagnostic errors.



ASSURANCE TO PATIENTS FOR TAS

- Non-invasive, no radiation, safe for all ages.
- Well-tolerated with proper explanation and preparation.
- Immediate feedback possible; results often available quickly.

SUMMARY


PREPARATIONS & INSTRUCTIONS
Patient History
Patient History & Consent
Fasting (Abdominal)
Full Bladder (Pelvic US)
Remove Jewelry/Clothing
TECHNIQUES & SELECTION
2D/3D/4D Sonography
Doppler (Color, Power,
Wave, Continuous Wave,
Contrast-Enhanced US
PATIENT POSITIONING & CARE
Supine, Prone, Lateral,
Semi & Waiting
Privacy During Vitals
(Critical Cases)
ULTRASONOGRAPHY
/ DOPPLER STUDIES
Fasting (Abdominal US)
Full Bladder
(Pelvic US)
Remove Jewelry/Clothing
Privacy & Warmth
Artifact Reduction
Patient Education &
of Findings
MAINTENANCE PROTOCOLS
Equipment Cleaning
Cleaning & Disinfection
Probe Sterilization
Regular Calibration
Documentation of Service
CLINICAL APPLICATIONS & DISPLAY
Abdominal, Cardiac,
Obstetric/Gynecological,
Musculoskeletal, Vascular
Small Parts (Thyroid, Breast)
Doppler, Duplex/Triplex
MAINTENANCE PROTOCOLS
Display Modes (B-Mode,
Gain/Frequency Adjustment
Artifact Recognition &
Clear Communication &
of Findings

References

- https://medlineplus.gov/lab-tests/doppler-ultrasound/
- https://my.clevelandclinic.org/health/diagnostics/4995-ultrasound
- https://my.clevelandclinic.org/health/diagnostics/4994-abdominal-ultrasound