

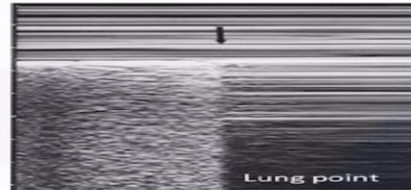
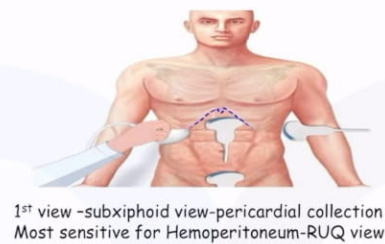
ULTRASONOGRAPHY

FAST (Focused Assessment with Sonography for Trauma)

00:00:15

- FAST is an ultrasound study used in patients with abdominal trauma. It involves four views: subxiphoid, right upper quadrant, left upper quadrant, and pelvic.
- The **right upper quadrant view is the most sensitive for hemoperitoneum** in a supine patient due to fluid collecting in the Morrison's pouch.

FAST -Focussed Assessment with Sonography for Trauma

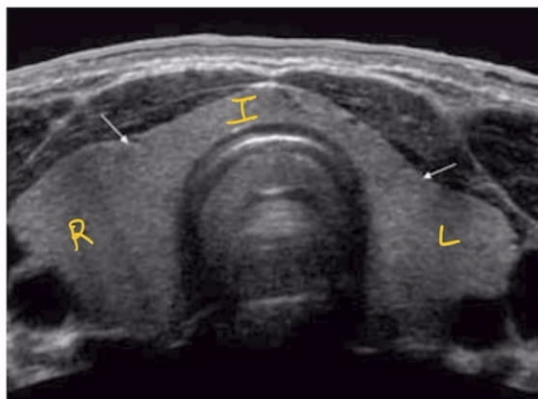


- **E-FAST** includes the four FAST views plus right and left anterior thoracic views to evaluate for pneumothorax.
- **Pneumothorax** appears as bright lines parallel to each other, called a **barcode or stratosphere sign**, while a normal lung shows a constant shimmering called a **seashore sign**. The point of transition between these two is called a **lung point**, which is pathognomonic for pneumothorax.
- If FAST is positive for hemoperitoneum, patient stability is assessed. Stable patients get a CT scan to identify the injured organ, unstable patients may need an emergency laparotomy.
- FAST may not detect fluid collections less than 100ml.

Thyroid Ultrasound

00:05:50

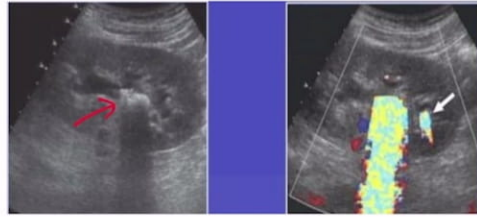
- Thyroid ultrasound is the primary method for assessing thyroid lesions.
- **Thyroid cancer** often appears as a **hypoechoic lesion**, taller than wide, with irregular borders and areas of calcifications.



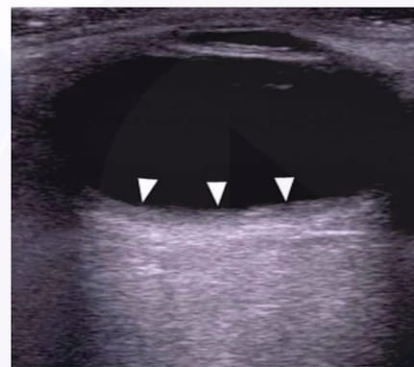
Gallbladder and Renal Ultrasound

00:06:56

- **Gallstones** appear as **hyperechoic areas** with **posterior acoustic shadowing**. They may show a "twinkling artifact" on color Doppler.



- **Cystic lesions** show **posterior acoustic enhancement**.



Cystic Lesions-Posterior
Acoustic Enhancement

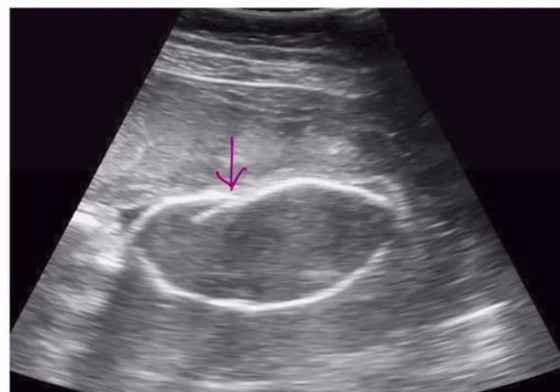
Ocular Ultrasound

- A V-shaped or funnel-shaped area in the vitreous is suggestive of **retinal detachment**.

Antenatal Ultrasound

00:08:20

- **Spalding's sign** (overlapping skull bones) indicates **intrauterine fetal demise**.

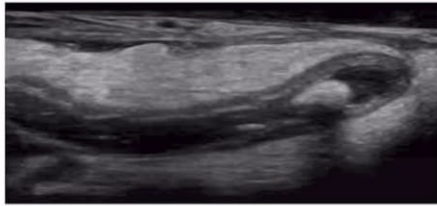


- **Robert's sign** (a ring of gas in the great vessels and heart) also indicates **intrauterine fetal demise**.

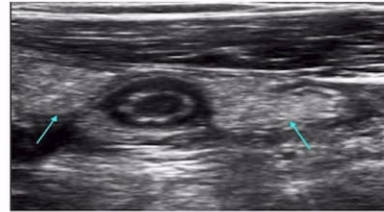
Appendicitis

00:08:55

- Acute appendicitis may appear as a blind-ended, tubular, non-compressible, peristaltic structure with a **target sign** on a short axis view.



blind ending, tubular, aperistaltic, noncompressible Structure



Target sign

- The **target sign** is not exclusive to appendicitis, and can be seen in conditions like idiopathic hypertrophic pyloric stenosis, intussusception and Crohn's disease.

Ectopic Pregnancy

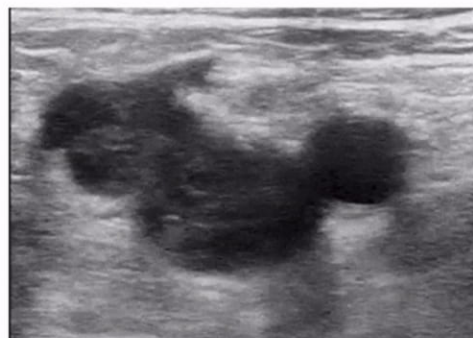
- A tubal ring sign, bagel, or donut-like ring in the fallopian tube with a ring of fire appearance on colour Doppler along with elevated beta hCG levels, is suggestive of ectopic pregnancy.
- Fluid in the pouch of Douglas, along with a complex adnexal cyst and tubal ring, may indicate a ruptured ectopic pregnancy.



Mickey Mouse Appearance

00:11:45

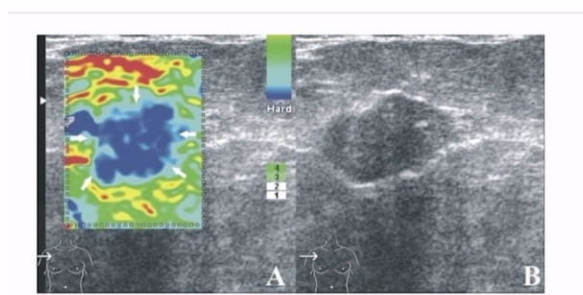
- A Mickey Mouse appearance on ultrasound can be seen at the **saphenofemoral junction**, the **portal triad in the liver** and on antenatal scans in cases of **anencephaly**. It can also be seen on **bone scans in Paget's disease**. A Mickey Mouse appearance on MRI of the brain is seen with **progressive supranuclear palsy**.



Ultrasound Elastography & Fibroscan

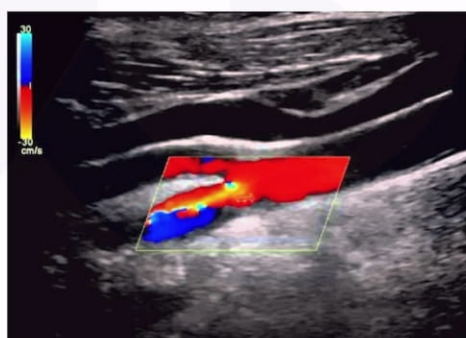
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- Ultrasound elastography uses color coding to evaluate tissue stiffness and can guide biopsies.
- Fibroscan uses ultrasound elastography to assess the progression of chronic liver disease to cirrhosis.



Color Doppler

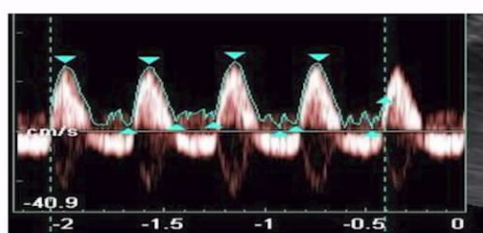
- Color Doppler is based on frequency shifts caused by moving sources, like blood flow.
- Color coding indicates **direction of flow**: red towards the probe, blue away from the probe.
- The **intensity of color** indicates **velocity** of flow.



Umbilical Artery Doppler

00:16:24

- Normal umbilical artery Doppler shows good systolic and diastolic flow. The systolic to diastolic (S/D) ratio is normally less than 2-3.
- An increased S/D ratio (more than 3.5) indicates decreased, absent, or reversed diastolic flow and is suggestive of intrauterine growth restriction (IUGR) or impending fetal demise.
- Diastolic flow reversal indicates an urgent need for delivery due to the high risk of stillbirth.



Diastolic Reversal
in Umbilical artery doppler

Uterine Artery Doppler

- Normal uterine arteries should have absent diastolic notching beyond 22 weeks of gestation.
- Persistence of diastolic notching beyond 22 weeks is associated with pre-eclampsia or pregnancy-induced hypertension.

Fetal MCA (Middle Cerebral Artery) Doppler

- Increased peak systolic velocity or high pulsatility in the fetal MCA suggests fetal hypoxia, anemia, or hydrops.
- This is due to a "brain-sparing" effect where blood is redirected to the cerebral circulation.

Polycystic Ovarian Syndrome (PCOS)

00:21:27

- PCOS is characterized by **increased ovarian volume** due to a **thick central stroma** with **small follicles placed peripherally**.
- The number of follicles will be more than 20.



PCOS-Polycystic Ovarian Syndrome

Ovarian volume >10 ml
Ovarian follicles >20
Ovarian follicle size < 10mm
Thick central stroma

Ovarian Hyperstimulation Syndrome (OHSS)

- OHSS is caused by infertility treatments, such as hCG injections, leading to bilaterally enlarged ovaries with large cysts and spoke-wheel-like stroma.
- OHSS can cause third-space fluid collections (ascites, pleural and pericardial effusions) due to capillary leak, as well as hemoconcentration and thrombosis.

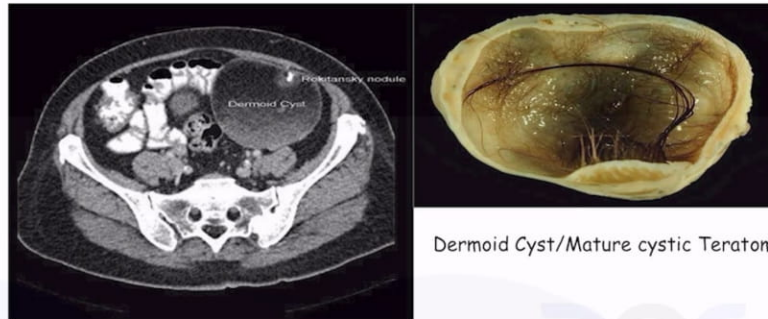


Theca Lutein Cysts

- Theca lutein cysts can develop in patients with elevated beta hCG, such as in molar pregnancies or multiple gestations, causing bilaterally enlarged ovaries with cysts.

Dermoid Cysts

- Dermoid cysts (mature cystic teratomas) may contain hair follicles, fat, and calcifications, giving a "dot and dash" appearance on ultrasound. They are hyperintense on T1-weighted MRI images. Which appear black on ct (fat)



Dermoid Cyst/Mature cystic Teratoma

Molar Pregnancy

- Complete moles show a **snowstorm appearance** on ultrasound due to multiple grape-like cysts within the uterine cavity. Complete moles carry a higher risk of choriocarcinoma. Partial moles have a mix of fetal parts and grape-like cysts.



Hydatiform Mole-
Snowstorm Appearance

Gestational Sacs

- A true gestational sac is **eccentric**, has a double decidual sac sign, and contains a double bleb sign (amnion and yolk sac).
- A pseudo gestational sac is central, has a single layer lining it, and lacks a double bleb. The double decidual sac is made of the decidua parietalis and the decidua capsularis.



Double Bleb sign

Twin Pregnancies

- The **lambda sign** or **twin peaks sign**, indicates a **thick intervening septum** and is seen in **di-amniotic, di-chorionic** twin pregnancies.
- The **T-sign**, indicating a **thin intervening septum**, is seen in **di-amniotic, mono-chorionic** twin pregnancies.



Lambda sign

λ sign / Twin peak sign



T sign

T - sign

Anencephaly

- Anencephaly can be seen on antenatal scans with a **frog eye** or **Mickey Mouse appearance**.
- It can be diagnosed as early as 10-11 weeks of gestation, but it is best diagnosed after 14 weeks.

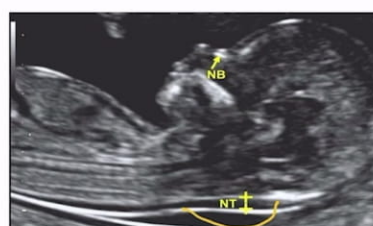


→ Acrania
→ Frog Eye Appearance
Anencephaly



Nuchal Translucency Scan

- The nuchal translucency scan is performed between 11 and 13 weeks and 6 days of gestation (or up to 14 weeks).
- An increased nuchal translucency (more than 3mm) and absent nasal bone is suggestive of aneuploidy.



NB

NT ↑

Nuchal Skin Fold Thickness

- Nuchal skin fold thickness is measured in the second trimester (18-24 weeks), and a measurement of more than 6-7 mm is suggestive of aneuploidy.

Fetal Anomaly Scan

- The fetal anomaly scan (targeted imaging for fetal anomalies) is best done between 18 and 20 weeks of gestation in the second trimester.

Fetal Biometrics

- **Crown-rump length** is the most accurate measurement for gestational age in the **first trimester**.
- **Biparietal diameter** is used for gestational age in the second trimester. Head circumference is used when there is an abnormal skull shape.
- **Femur length** is used for gestational age in the **late third trimester**. Short long bones can also be suggestive of aneuploidy.
- **Abdominal circumference** is used to assess fetal growth and IUGR (intrauterine growth restriction) and macrosomia.
- The **transcerebellar diameter** is the least affected fetal biometric parameter in IUGR, therefore is preferred for gestational age assessment in these cases.

TUTORIALS

LOGIN FOR SUCCESS

Mind Map

