

Radiological Imaging in gynecology and obstetric

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Radiological Imaging in gynecology and obstetric

- 1- Ultrasound (US) .
- 2- Computed Tomography (CT scan).
- 3- Magnetic Resonance Imaging (MRI)
- 4- Conventional radiograph . (Plain & HSG)

Ultrasound US

Types

Imaging technique . . .

Definition of US

Sound whose frequency is higher than the upper end of the normal range of human hearing (higher than about 20,000 hertz) is called *ultrasound*. (Sound at frequencies too low to be audible—about 20 hertz or lower—is called *infrasound*) .

- **Medical ultrasound images, such as those of a fetus in the womb, are made by directing ultrasonic waves into the body, where they bounce off internal organs and other objects and are reflected back to a detector.**

- **Ultrasound imaging, also known as ultrasonography , images used for the fetus where the X-ray be harmful to the fetus .**
- **Because ultrasonic waves have very short wavelengths, they interact with very small objects and thus provide images with high resolution.**

US Indications for Obst & Gyn

- **1-Estimation of gestational age for conformation of clinical dating for patients who are to undergo elective repeat cesarean delivery, induction of labor, or elective termination of delivery .**
- **2- Evaluation of fetal growth when the patient have an identified etiology for uteroplacental insufficiency such as sever preeclampsia, chronic hypertension, chronic significant renal diseases, or sever diabetes mellitus or for other complications of pregnancy like intrauterine growth restriction or macrosomia is suspected.**
- **3- Vaginal bleeding of undetermined etiology.**
- **4- Determination of fetal presentation in labor .**
- **5- Suspected multiple gestation.**

US Indications for Obst & Gyn

- **6- Adjunct to amniocentesis.**
- **7- Significant uterine size (clinical date discrepancy).**
- **8- Pelvic mass detected clinically .**
- **9- Suspected hydatidiform mole.**
- **10- Adjust to cervical cerclage .**
- **11- Suspected ectopic pregnancy .**
- **12- Suspected fetal death .**
- **13- Suspected uterine abnormality.**

Color Doppler Ultrasound

Doppler ultrasound

An imaging technique using ultrasound that can detect moving liquids.

Color flow Doppler Ultrasound

a form of pulse wave Doppler in which the energy of the returning echoes is displayed as an assigned color; by convention echoes representing flow towards the transducer are seen as shades of red, and those representing flow away from the transducer are seen as shades of blue.

The color display is usually superimposed on the B-mode image, thus allowing simultaneous visualization of anatomy and flow dynamics.

Continuous wave Doppler Ultrasound

a technique in which the transducer emits and receives the ultrasound beam continuously, enabling the measurement of high velocity blood flow, such as occurs through heart valve stenosis.

Duplex Doppler Ultrasound

a form of image display in which both spectral and color flow images are seen simultaneously. This facilitates accurate anatomical location of the blood flow under investigation.

Doppler ultrasound flowmeter

a device for measuring blood flow that transmits sound at a frequency of several megahertz downstream along the flowing blood. Some of the sound waves are reflected by the moving red blood cells back toward the transducer. The difference in pitch between the transmitted and reflected sounds is produced as an **audible tone and is proportional to the velocity of blood flow.**

The flowmeter can be incorporated into a stethoscope so that qualitative and quantitative measurements of the flow of blood through arteries and veins can be obtained. The Doppler flowmeter is capable of recording very rapid pulsatile changes in flow as well as steady flow

MRI

To produce an image, an MRI machine uses a powerful magnet to generate a magnetic field. When a patient lies within this field, the nuclei of atoms within the body align themselves with the magnetic field (much as iron filings line up around a magnet).

Radio waves are then pulsed through the body, causing the nuclei to change their alignment with respect to the axis of the magnetic lines of force. As they return to their previous state after each pulse, **they produce faint, distinctive radio signals**; the rate at which they emit signals and the frequency of the signals depend on the type of atom, the temperature, the chemical environment, position, and other factors.

These signals are detected by coils around the body and processed by a computer to produce images of internal structures. MRI holds yet another significant advantage over CAT in that exposure to potentially harmful x-ray radiation is avoided.

MRI

The pelvic anatomy is very well demonstrated because of the excellent soft tissue contrast afforded by MRI .

Images are taken in different sections .

MRI can provide clear images from multiple angles without X-ray exposure . We believe that it is important to evaluate the usefulness of MRI for diagnostic purpose . The clinical indication for MRI during pregnancy are limited .

Regarding MRI in pregnant women

- 1- patients with active brain or spine signs and symptoms requiring imaging .
- 2- patients with cancer requiring imaging .
- 3- patients with chest, abdomen and pelvic signs and symptoms of active diseases when sonography is not diagnostic .
- 4- In specific cases when there is fetal anomalies or complex fetal disorder .

Magnetic Resonant Imaging (MRI)

MRI can be used for differential diagnosis of adnexal mass in pregnancy like(fibroid and dermoid cyst). This will enable some pregnant patients to avoid laparotomy and its concomitant risks .

MRI may not be recommended in the following cases

- 1- a pacemaker.**
- 2- an implantable cardioverter-defibrillator (ICD).**
- 3- a nerve stimulator .**
- 4- cochlea implant .**
- 5- a drug pump .**
- 6- brain aneurysm clip .**
- 7- metallic fragments in or near eye or vessels .**
- 8- prosthetic (artificial) metal heart valve .**
- 9- eye implants (small clip hold the retina) .**

MRI scanning is not usually recommended during the first three months (first trimester)of pregnancy

Computed Tomography CT scan

- 1 - In general CT scan are not recommended during pregnancy unless the benefits of CT scan clearly outweigh the potential risks**
- 2 - Gestational trophoblastic neoplasia (GTN) including invasive mole, choriocarcinoma , placental site trophoblastic tumor & epitheloid trophoblastic tumor**
- 3 - CT is used for demonstration of cerebral edema of occipital lobes in pre-eclampsia preceded by blindness .**
- 4 - CT scan is used for diagnosis of intrapelvic metastasis from colon & rectum carcinoma .**
- 5 - Diagnosis & staging of ovarian tumors .**

Conventional X-Ray

1- plain radiograph .

2- Hysterosalpingography .

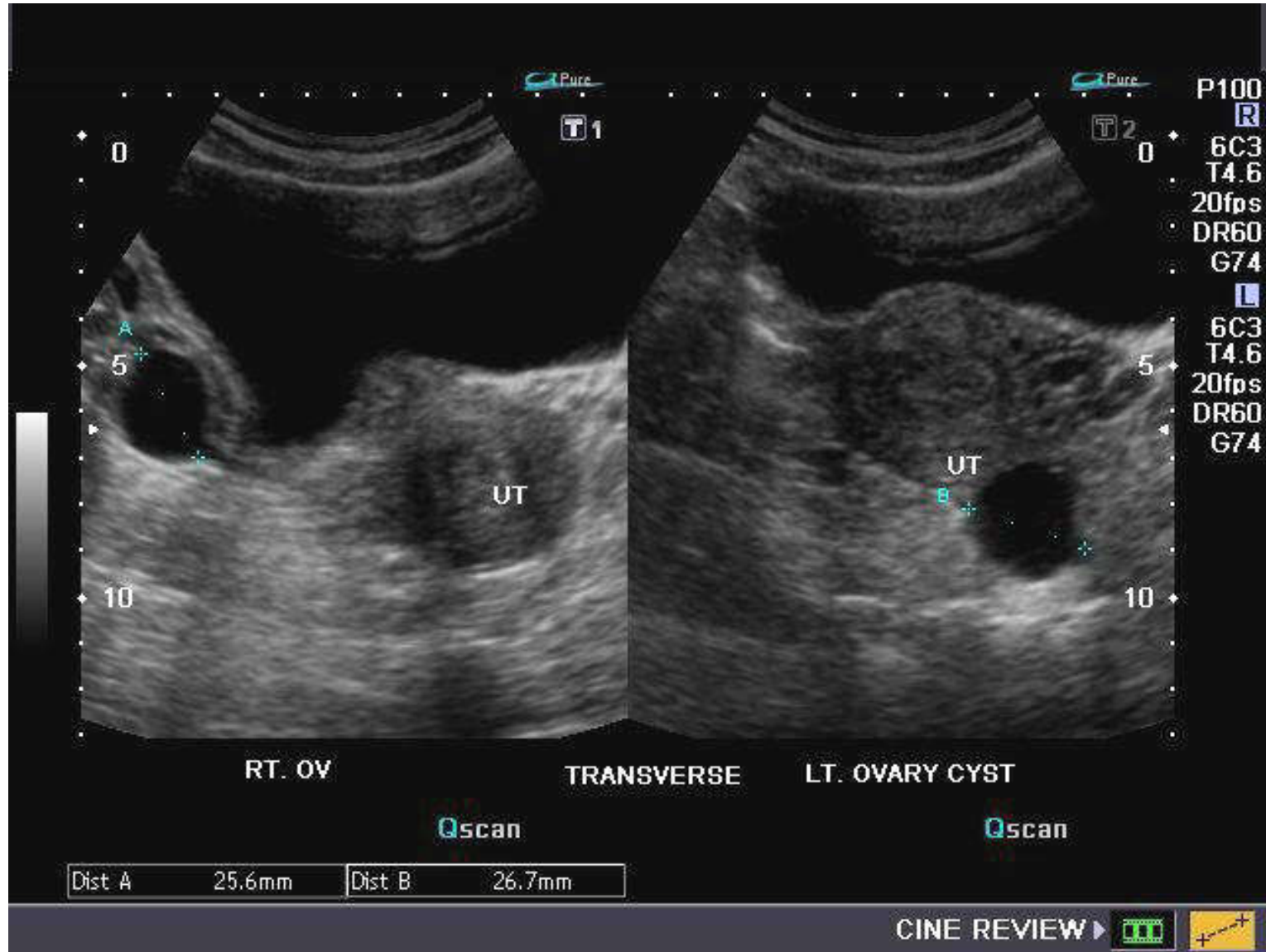




Normal ovary







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C 3.5 MHz



dnf F R→

13 Fps

Distance
4.15 CM

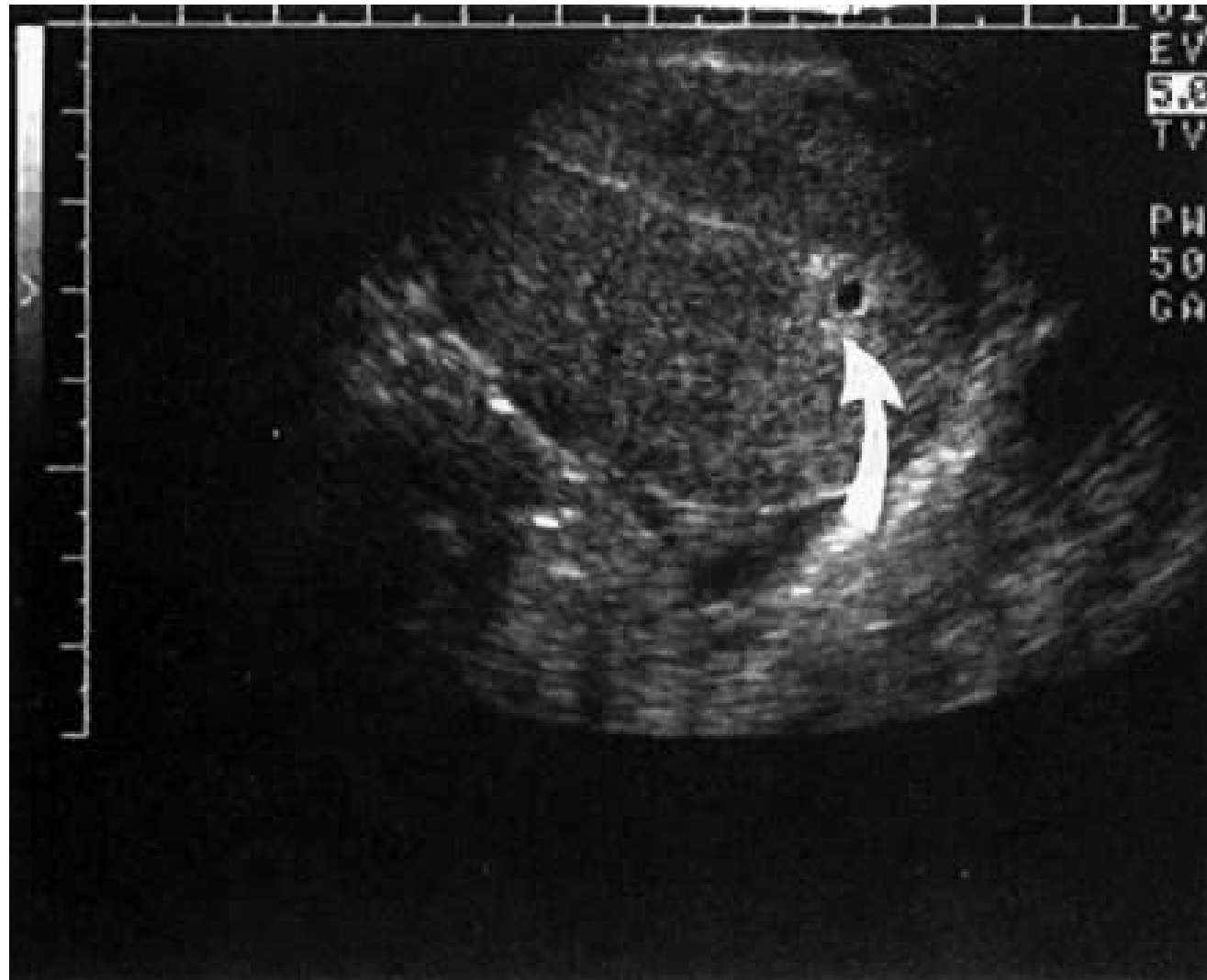
Standard

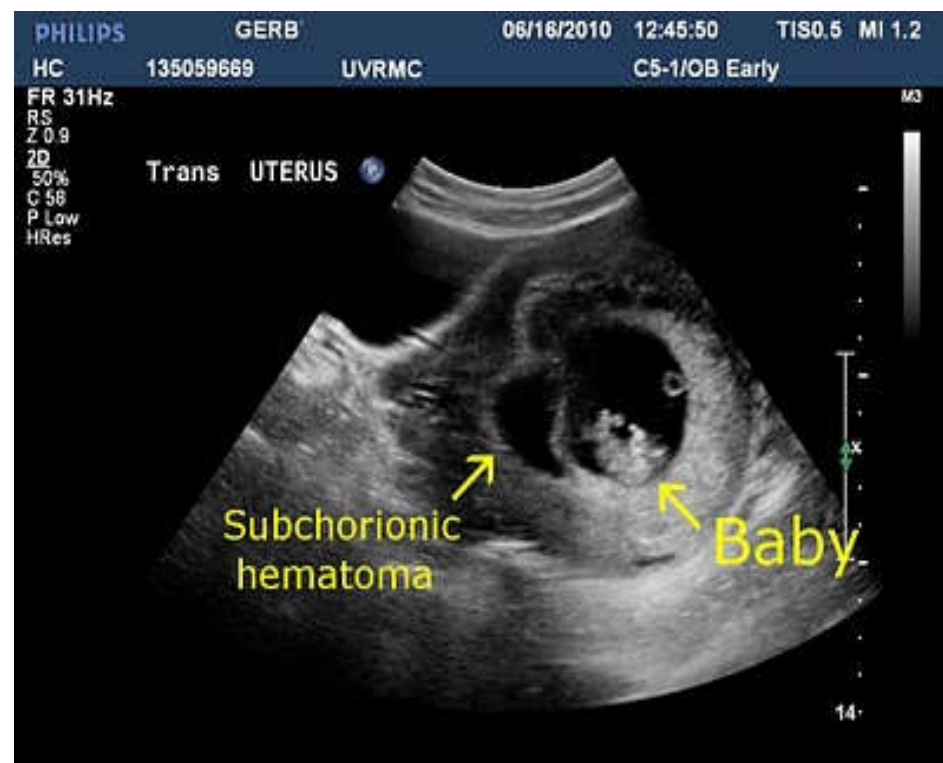


CALCIFIC
FIBROID

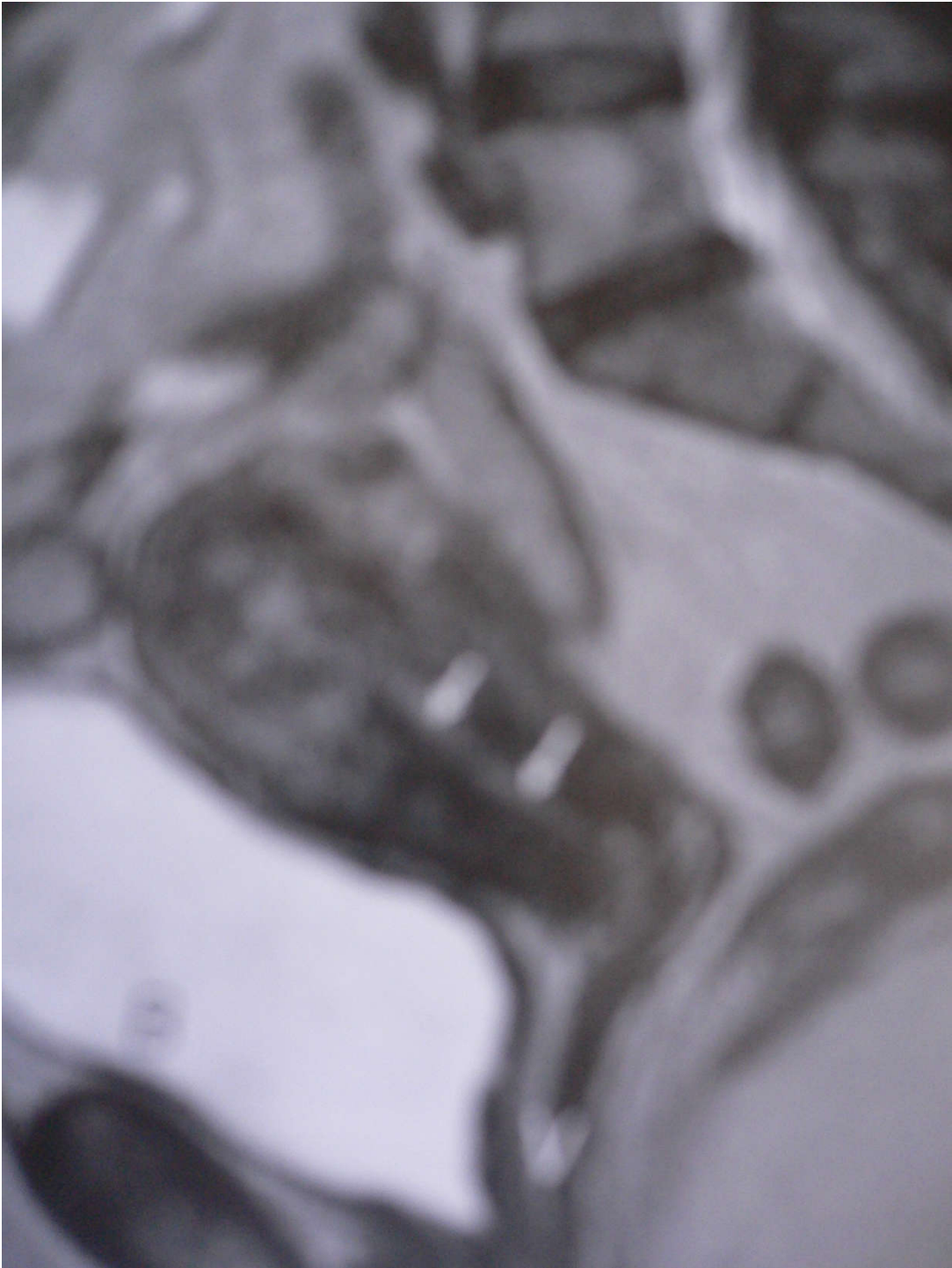
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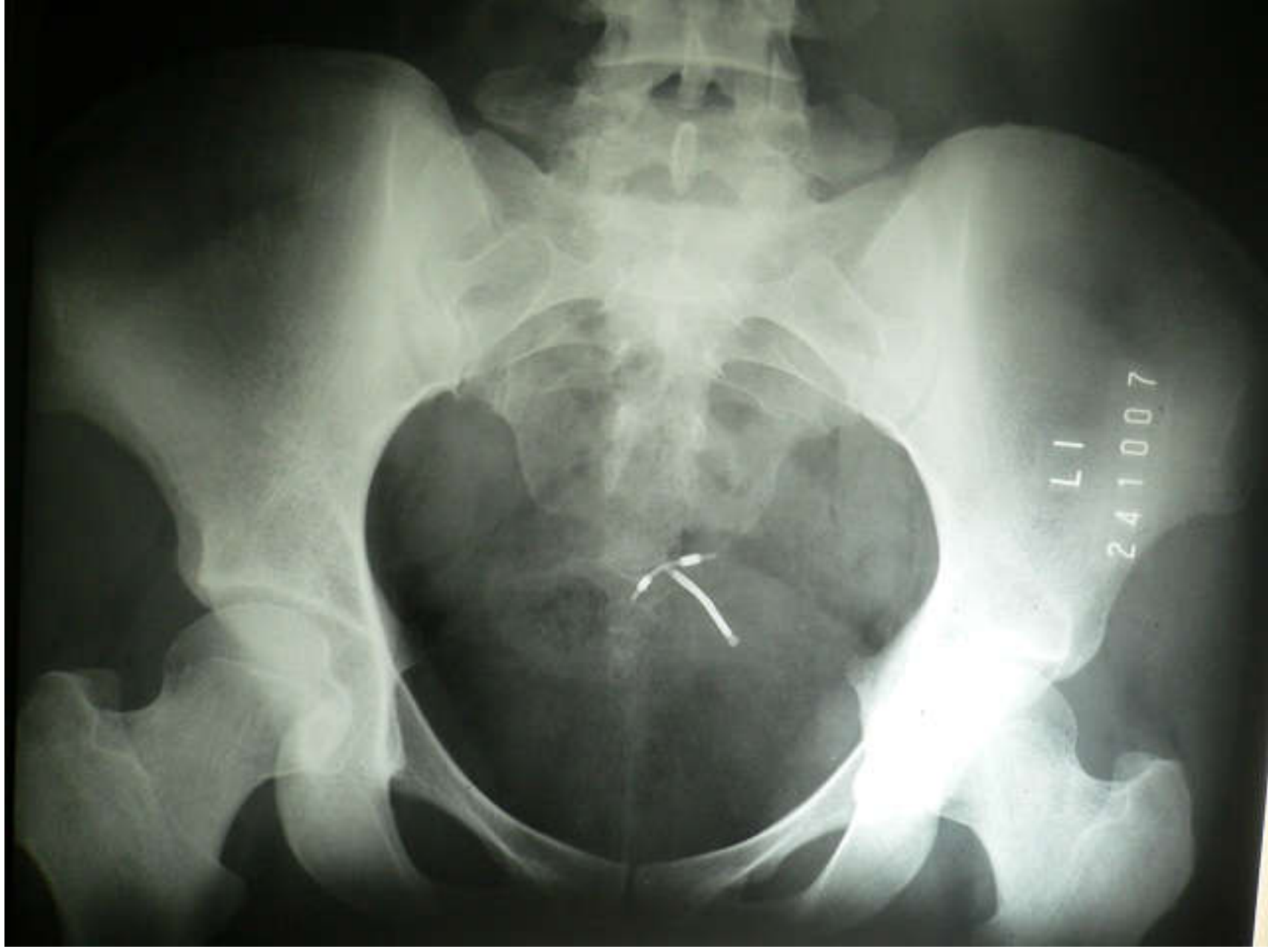
Early GS













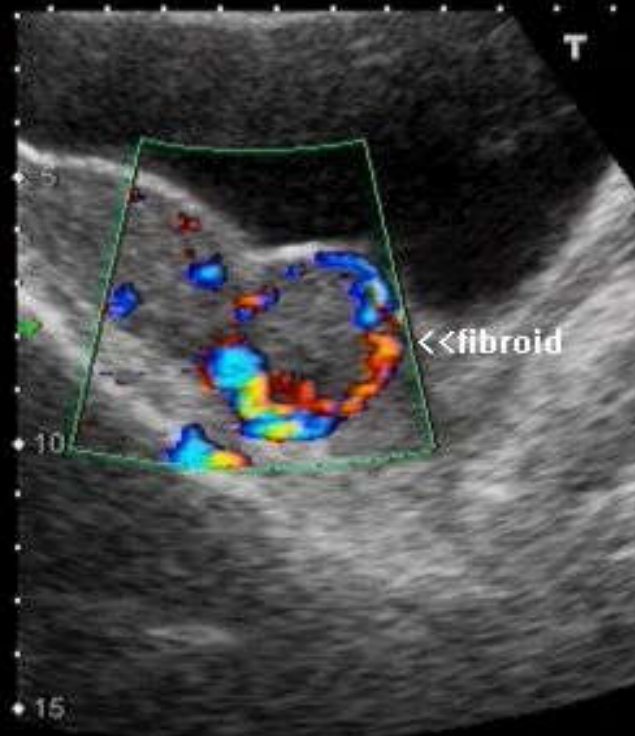
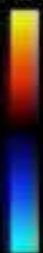
TOSHIBA

ARORA Ultrasound Centre, Ferozepur

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P100
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T5.0
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88
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6C3
T4.6
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DR65
2DG
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CF
2.5
C PRF
4.8k
C 18
202

Free 32

CINE REVIEW ▶



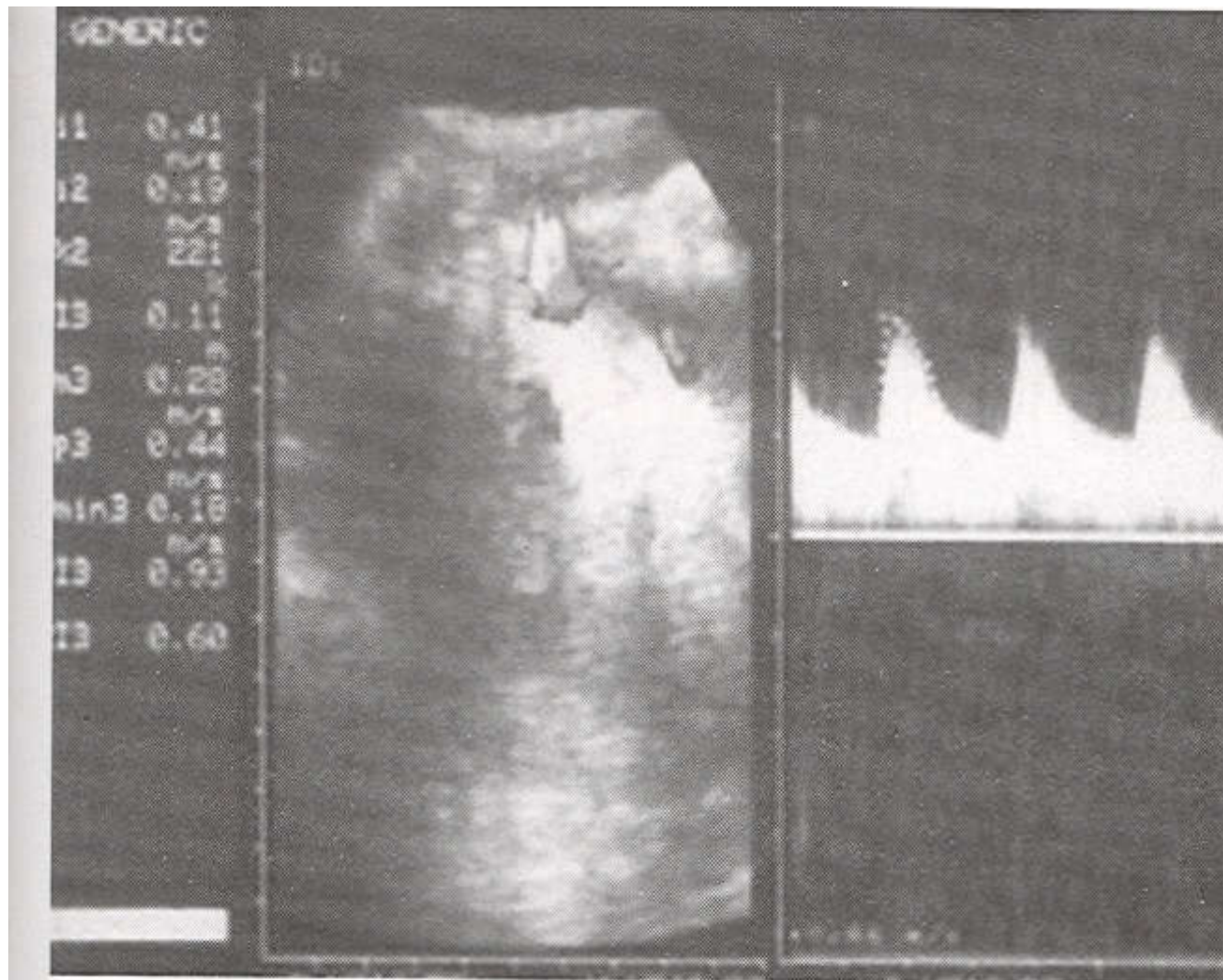


Figure 3: Normal umbilical artery waveform.

Thank you