The important role of Fetal ultrasound in ANC guideline

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Context

- MOH Goals by 2030
  - Reduce maternal death: to less than 70/100,000 lives births
  - Reduce Perinatal deaths:
    - Stillbirths : antepartum and intra partum stillbirths
    - Neonatal deaths
- Improve the quality of antenatal care (ANC)
- There is ANC guideline by WHO 2016, updated in 2022.

Antenatal care (ANC)

- Antenatal care is the care provided by skilled health professionals to pregnant women to ensure the health of mother and child during *pregnancy* and *childbirth*. ANC services provide a platform to deliver evidence-based interventions and counseling to pregnant women in order to **promote** a ***healthy pregnancy*** and ***safe delivery***.
- As of 2026, the World Health Organization (WHO) continues to uphold its comprehensive 2016 model for antenatal care (ANC), which emphasizes a "positive pregnancy experience" through at least **eight contacts** between pregnant women and health providers. These guidelines aim to **reduce mortality** and **improve quality of care**, with a strong focus on person-centered health, nutrition, and **early detection of risks.**

Sexual, reproductive, maternal, newborn, child and adolescent health policy survey 2018–2019: report

- Instead of the previously recommended **4 visits**, the WHO recommends **a minimum of eight contacts** to reduce perinatal mortality and improve women's experience of care
  - **First contact:** Recommended within the **first 12 weeks of gestation**.
  - **Subsequent contacts:** Scheduled at 20, 26, 30, 34, 36, 38, and 40 weeks of gestation.

Ultrasound scan

- Ultrasounds are considered safe during pregnancy, but should only be performed for medical reasons when necessary.
- Has been used as a screening test
- Different practices
- The main purpose is to **estimate gestational age (GA)**, improve pregnancy experience, and **detect fetal anomalies** or **multiple pregnancies**.
- **Accurate and precise GA** assessment supports appropriate ***time-sensitive interventions*** during pregnancy and management of pregnancy complications.

- **Essential Scan:** A single early ultrasound before 24 weeks is the primary recommendation.
- **Common Routine Scans:** In practice, many healthcare systems **offer two**, including a ***dating scan*** (**11-14 weeks**) and an ***anomaly scan*** (**18-22 weeks**).
- **High-Risk Pregnancies:** Additional scans may be required for complications like gestational diabetes, placenta issues, or twins.

Routine antenatal us examination: recommendation from WHO

- **The World Health Organization (WHO) recommends one ultrasound scan before 24 weeks of gestation for a routine, low-risk pregnancy to estimate gestational age, improve pregnancy experience, and detect fetal anomalies or multiple pregnancies.**

- In a ***first trimester*** US:
  - The Crown-Rump Length (**CRL**) to estimate **GA** (in general, this measurement is superior to gestational sac diameter for GA estimation)
  - Crown-rump length (CRL) is optimally measured ***after 10 weeks gestation*** but ***before 14 weeks gestation***.
- ***Second*** or ***third trimester:*** The following sonographic parameters are frequently used to estimate GA and assess fetal size
  - Bi-Parietal Diameter (**BPD**);
  - Head Circumference (**HC**);
  - Abdominal Circumference (**AC**); and
  - Femur Length (**FL**).

World Health Organization

World Health Organization

Box 1. Components of antenatal screening US

- Cardiac activity
- Fetal number
- Chorionicity if multiple pregnancy
- Gestational age
- Fetal size
- Presence of normal head, neck, face, spine, chest, heart, abdomen, abdominal wall, and extremities (more informative after 18 gestational weeks)
- Placental appearance and location (more informative after 18 weeks)

World Health Organization

WHO *Recommendations on Antenatal Care for a Positive Pregnancy Experience:* Ultrasound Examination

Highlights and Key Messages from the World Health Organization's 2016 Global Recommendations

January 2018

www.mcsprogram.org

Key Messages

- In its 2016 antenatal care (ANC) recommendations for pregnant women, the World Health Organization (WHO) recommends one ultrasound (US) scan before 24 weeks gestation to estimate gestational age (GA), improve detection of fetal anomalies and multiple pregnancies, reduce induction of labour for post-term pregnancy, and improve a woman's pregnancy experience.
- WHO does not recommend a routine US scan after 24 weeks gestation for pregnant women who had an early US scan. If an early US scan was not performed, then stakeholders may consider performing a scan later in pregnancy to identify the number of fetuses, fetal presentation, and placental location.
- One potential benefit of an early US scan performed correctly is the increased accuracy and precision of GA assessment, which facilitates appropriate management of threatened preterm birth and post-term pregnancies.
- Comprehensive health system support for a minimum standard of US services, appropriate referral, and management of complications identified by US are important components of implementing the new US recommendation.
- Implementing and scaling up this US recommendation in low-resource settings require addressing a variety of logistical, infrastructural, human capacity, and financial challenges.

Table 1. WHO recommendation on imaging ultrasound before 24 weeks of pregnancy

One ultrasound scan before 24 weeks of gestation is recommended for pregnant women to estimate gestational age, improve detection of fetal anomalies and multiple pregnancies, reduce induction of labour for post-term pregnancy, and improve a woman's pregnancy experience.

Remarks

- The evidence on effects of routine imaging ultrasound before 24 weeks of pregnancy has not changed materially since the 2016 recommendation. A newly identified large-cluster randomized controlled trial (RCT) conducted in low-resource settings was reviewed but was not found suitable for inclusion in meta-analysis, because it evaluated the effect of two imaging ultrasounds conducted in both the second and third trimesters (i.e. it did not address the guideline's participants, intervention, comparator, outcome [PICO] question).
- Implementation considerations associated with this recommendation have been significantly expanded based on the findings of a new qualitative evidence synthesis of the views and experiences of service users and health workers.[a]
- Ultrasound scan can guide subsequent care. When implementing or scaling up routine imaging ultrasound before 24 weeks of pregnancy, the purpose of imaging ultrasound should be to assess:
  - location of pregnancy (e.g. intrauterine)
  - cardiac activity
  - fetal size
  - gestational age
  - fetal number
  - chorionicity and amnionicity for multiple gestation.
- Where the skill set and health systems allow, the following, which are more informative after 18 weeks of pregnancy, may also be assessed:
  - presence of normal head, neck, face, spine, chest, heart, abdomen, abdominal wall and extremities
  - placental appearance and location, and umbilical cord.
- Those who perform obstetric ultrasound should have specialized training that is appropriate to the practice of screening ultrasound in pregnancy.
- Many pregnancy complications, including fetal malformations, may develop later in pregnancy or may not be detectable without appropriate ultrasound training and equipment.
- There remain some uncertainties around undesirable effects, including the risk of litigation, the potential for female feticide, the short- and long-term psychological impact of an inconclusive or adverse scan finding, and the potential for overuse of ultrasound scans (as a replacement for formal ANC contacts).

Outcomes of ANC ultrasound scan

Box 1: Outcomes of interest in ANC ultrasound scan interventions

Maternal outcomes	Fetal/neonatal outcomes
Maternal mortality	Small for gestational age
Caesarean section	Low birth weight
Induction of labour	Preterm birth
Detection of multiple gestation	Neonatal mortality
Detection of fetal anomaly	Stillbirth
Termination of pregnancy for fetal anomaly	Perinatal mortality
Maternal satisfaction	Congenital anomalies
Side-effects	

Do we have obstetric ultrasound guideline in Cambodia?

- Variable practice of US in different public and private sectors (no homogenous protocol)
- Non identified high risk or low risk pregnancy by health provider may lead to many ultrasounds or might not perform ultrasound in the correct moments of pregnancy
- Health workers may perform fetal ultrasound more often than necessity (every months)
- Population misunderstood the role of ultrasound in pregnancy (replace routine ANC) and got examination whenever they want (free time, not come by appointment).
- Ultrasound performed by non qualified sonographers can misdiagnosed the fetal anomaly and cause IMG (Medical termination of pregnancy) late in term of pregnancy or diagnosed at birth.

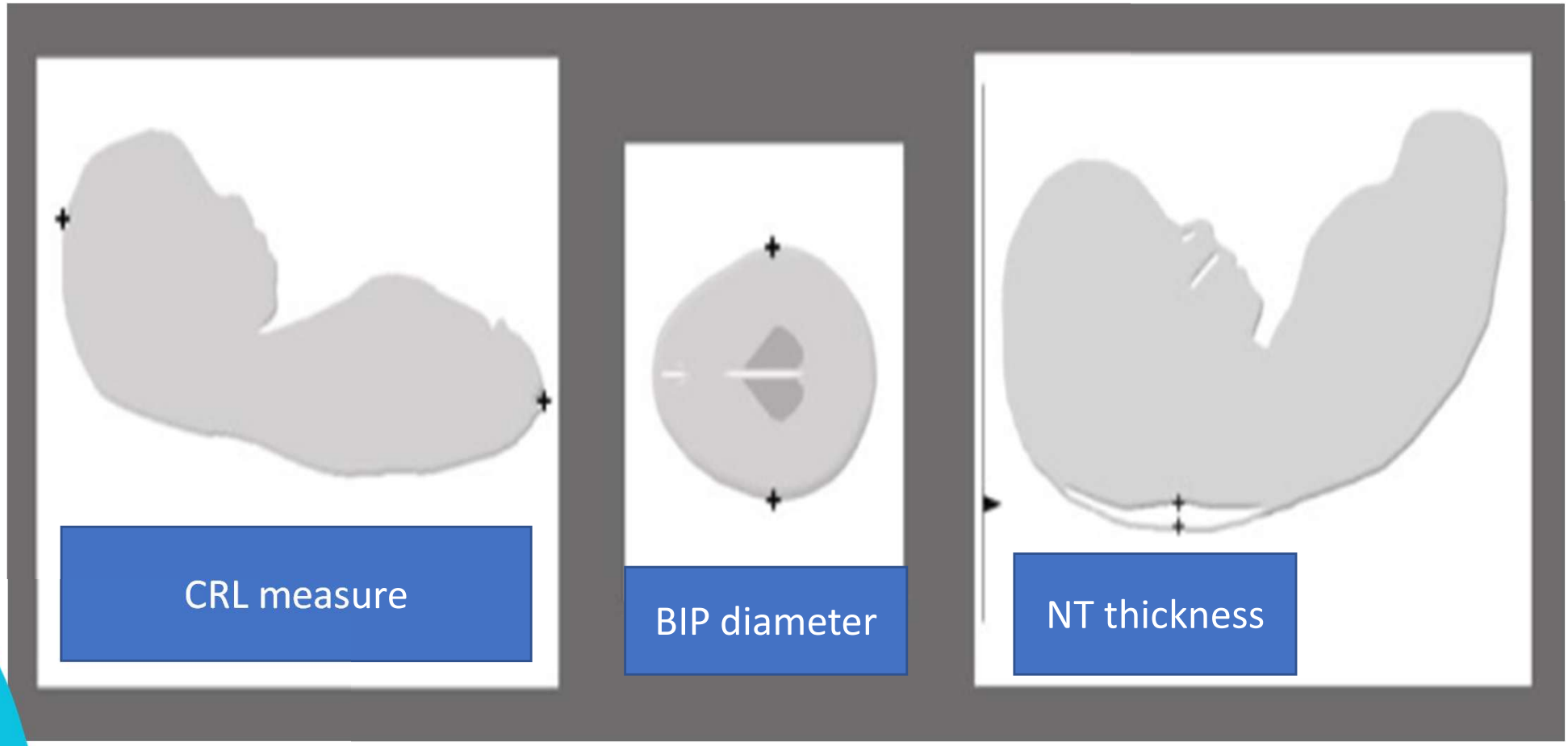
French College of Fetal Ultrasound (CFEF)

- For a normal, low-risk pregnancy, the French College of Fetal Ultrasound (CFEF) generally recommends **three routine ultrasound scans**, with one conducted in each trimester (T1,T2,T3)
- These three mandatory scans are considered the standard to monitor fetal development, confirm anatomy, and ensure the pregnancy is proceeding normally
- **First Trimester Scan (11–14 weeks):** Primarily for dating the pregnancy, measuring the nuchal translucency, and checking for early fetal anomalies.
- **Second Trimester Scan (21–24 weeks):** This is the main anomaly scan ("morphology scan" or "TIFFA/Targeted Imaging For Fetal Anomalies") to thoroughly evaluate the baby's organs, structure, and placental location.
- **Third Trimester Scan (30–32 weeks):** Focuses on fetal growth, amniotic fluid, and placental function to plan for labor and delivery.
- **High-Risk Pregnancies:** If the pregnancy is not considered low-risk, more than three scans may be medically indicated.
- **Optional Early Scan:** While the 11-14 week scan is the first "routine" scan, a "dating" scan is often done earlier (6-8 weeks) to confirm viability.

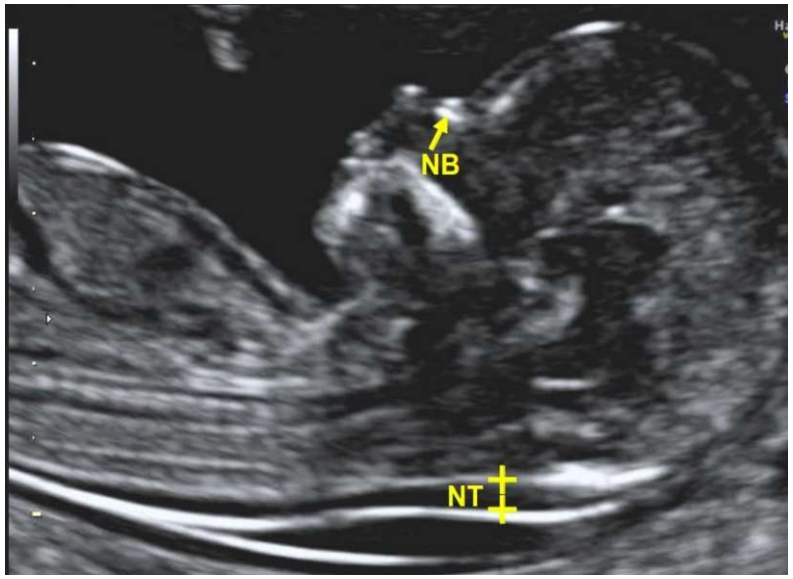
1st trimester ultrasound

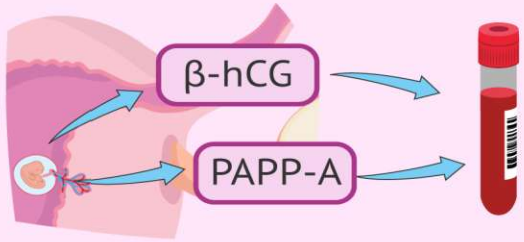
- CFEF (Comité Français d'Echographie Fœtale)
- 11-13 weeks6days
- Determine the due date of pregnancy (EDD/Estimated Date of Delivery)
- Detection of multiple pregnancy : determine the chorionic for further follow up
- Early fetal morphology: head, neck, thorax, abdomen, pelvis, and extremities)
- Screening the aneuploidy by measuring the nuchal translucency (11-13weeks6days where CRL 45-84mm) associated with maternal blood tests (1st trimester combined test)

First trimester fetal ultrasound



Aneuploidy screening



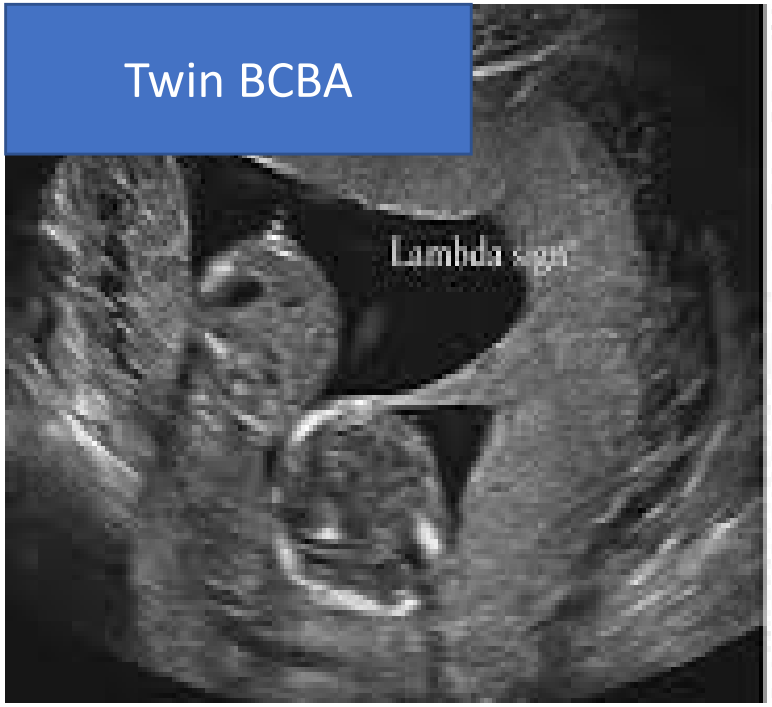


HCG and PAPP-A hormone tests

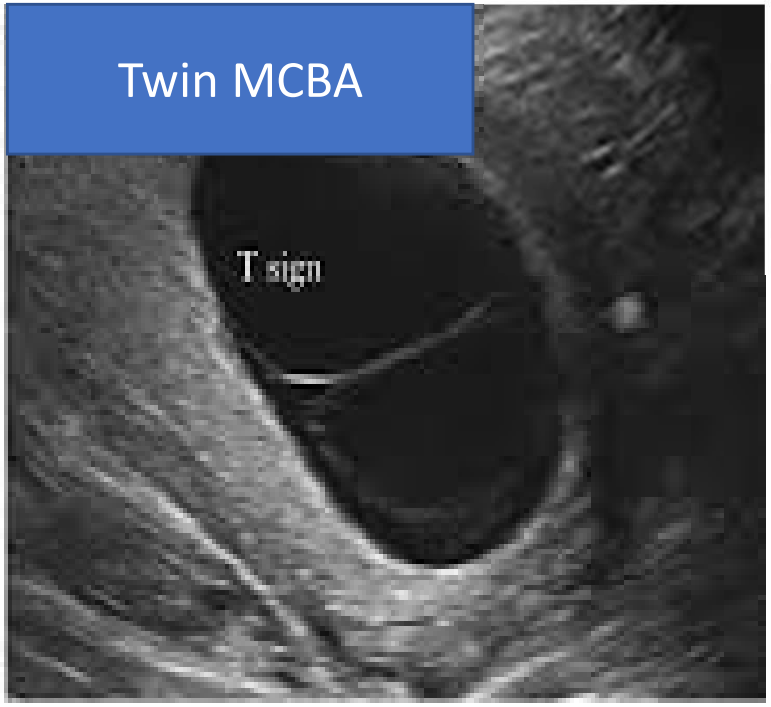
Measuring nuchal translucency

Twin pregnancy

Twin BCBA



Twin MCBA



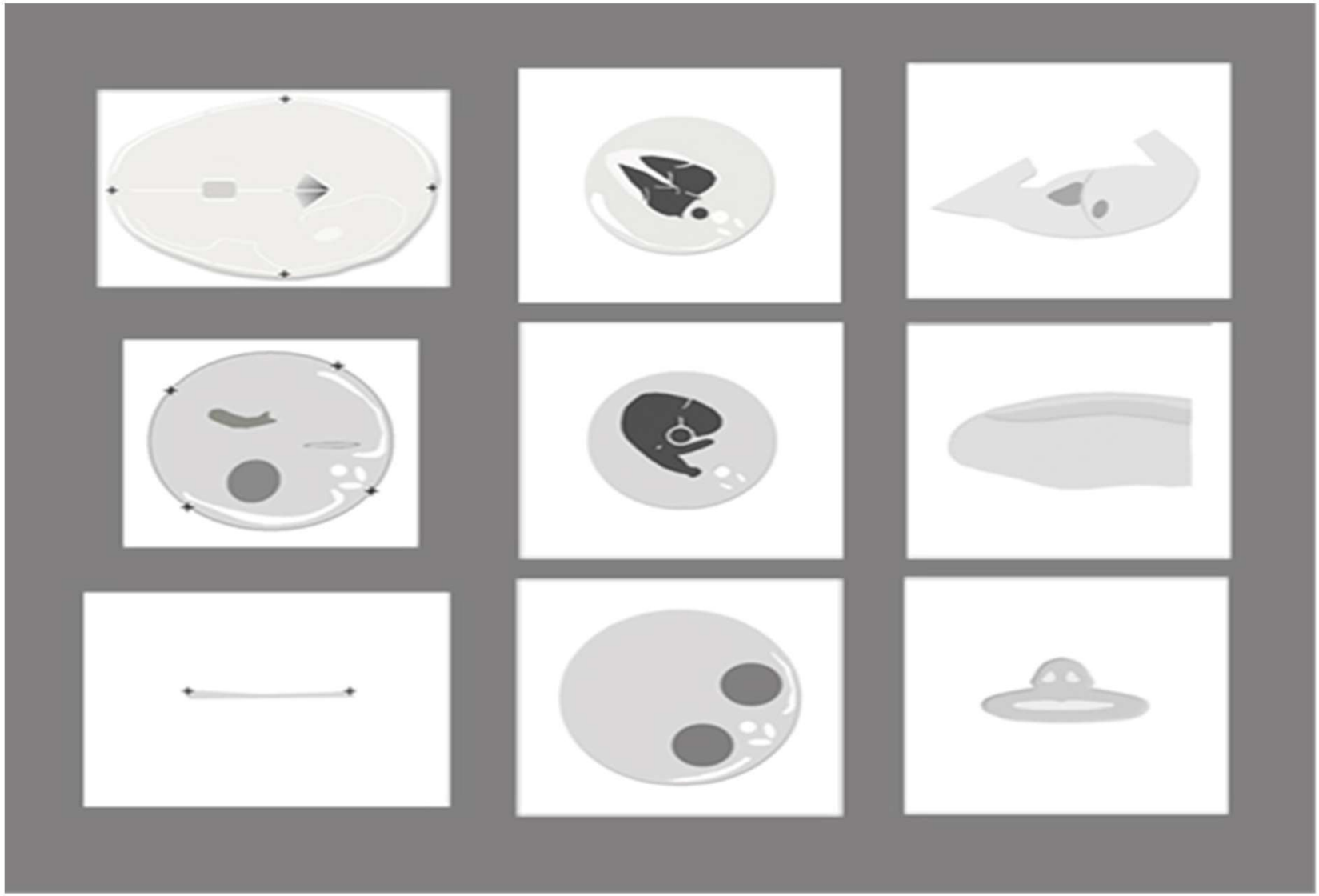
The diagnosis of Chorionicity help obstetrician how to follow up the pregnancy

Knowing the type of twin help sonographer to find the specific complications of each twin

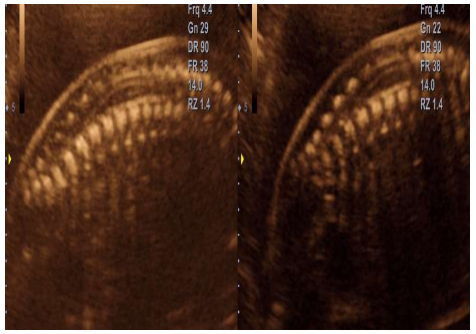
2nd trimester ultrasound

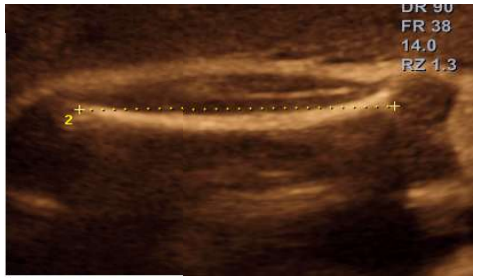
- Number of fetus
- Presentation
- Fetal weight (SGA) and Fetal growth screening (IUGR) and management
- Fetal annexes especially placenta location (low lying placenta, placenta accreta spectrum)
- Fetal anatomy screening/fetal abnormality
- Fetal well-being (amniotic fluid, fetal movements, Doppler..)

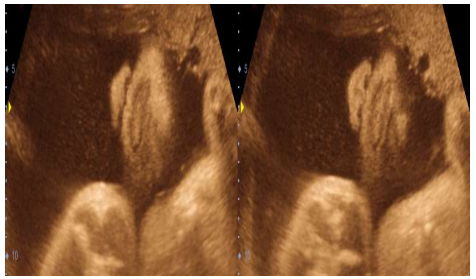
2nd trimester fetal ultrasound



Recommended iconography







3th trimester ultrasound

- CFEF
- The same as second trimester ultrasound
- May seek for some abnormalities not seen in second trimester ultrasound.
- The same iconographic as 2nd trimester ultrasound.

Others obstetric ultrasounds

- transvaginal ultrasound for measuring the length of cervix (CL) in prediction the risk of preterm labor and delivery.
- Ultrasound performed at 18 weeks for early screening of congenital heart disease (CHD) in high risk women
- Ultrasound performed at 28 weeks for follow up fetal growth
- Doppler fetal: for surveillance of IUGR.
- Ultrasound can be used in delivery room for others necessities.

Obstetric ultrasound and public health

- Screening test : high sensitivity, high specificity
- Clinical use: include in ANC package
- Variables practices : balance cost-benefit
- High sensitivity in fetal abnormality screening
- Need standard of performance
- Need qualified health worker to perform
- Help to determine the risk during pregnancy
- Follow up and help clinical decision-making during antenatal care
- Orientation the place for delivery

Discussion

- Qualified ANC can not be alone, ultrasound should be included in the package, but the national guideline or protocol is needed
- WHO recommendation if limited resources or the French recommendation if available/affordable.
- Consider the training center (lecture and simulation) for qualified ultrasound.

Conclusion

- In low risk pregnancy, ultrasound is complementary to routine ANC to ensure the healthy pregnancy and increase woman satisfaction and confidence.
- Otherwise, High risk pregnancy diagnosed by qualified ANC and ultrasound help in decision-making to appropriate delivery place (role of in utero transfer) and reduce the maternal and perinatal mortality.

Thank you