**AN ADAPTED EVIDENCE-BASED CLINICAL PRACTICE GUIDELINE**

**ON**

**THE FIRST TRIMESTER FETAL MORPHOLOGY ULTRASOUND SCAN**

**Overview**

This is an adapted evidence-based clinical practice guideline for the first trimester fetal morphology ultrasound scan.

**Guideline adapter**

**This guideline has been adapted by the Egyptian Universities Obstetrics & Gynecology Guideline Working Group (EUOBGYN-GWG).**

**Release date**

July 2023

**GUIDELINE ADAPTATION METHODOLOGY**

This guideline was produced in accordance with the ADAPTE methodology and procedure for the adaptation of evidence-based clinical practice guidelines published by the ADAPTE Group (Fervers B, et al., Adaptation of clinical guidelines: literature review and proposition for a framework and procedure. Int J Qual Health Care 2006; 18(3): 167-176).

**sources of the guideline**

**This guideline was adapted from:**

1. International Society of Ultrasound in Obstetrics and Gynecology; Bilardo CM, Chaoui R, Hyett JA, Kagan KO, Karim JN, Papageorghiou AT, Poon LC, Salomon LJ, Syngelaki A, Nicolaides KH. ISUOG Practice Guidelines (updated): performance of 11-14-week ultrasound scan. Ultrasound Obstet Gynecol. 2023 Jan;61(1):127-143. doi: 10.1002/uog.26106. PMID: 36594739.
2. Volpe N, Sen C, Turan S, Sepulveda W, Khalil A, Rolnik DL, De Robertis V, Volpe P, Gil MM, Chaveeva P, Dagklis T, Pooh R, Kosinski P, Cruz J, Huertas E, D' Antonio F, Rodriguez Calvo J, Daneva Markova A. First trimester examination of fetal anatomy: clinical practice guideline by the World Association of Perinatal Medicine (WAPM) and the Perinatal Medicine Foundation (PMF). J Perinat Med. 2022 Apr 25;50(7):863-877. doi: 10.1515/jpm-2022-0125. PMID: 35452577.

# Introduction

* The main goal of a pregnancy ultrasounds is to provide accurate information which will facilitate delivery of optimized antenatal care, ensuring the best possible outcomes for mother and fetus.
* In early pregnancy, it is important to confirm viability, establish gestational age accurately, determine the number of fetuses and, in the presence of a multiple pregnancy, assess chorionicity and amnionicity.
* Towards the end of the first trimester, the scan also offers an opportunity to detect major fetal abnormalities and, in healthcare systems that offer first-trimester aneuploidy screening, to measure the nuchal translucency (NT) thickness.
* However, many major malformations may develop later in pregnancy or may not be detected even with appropriate equipment and in the most experienced of hands.

# When Should a First-Trimester Ultrasound Scan Be Performed?

* If an earlier first-trimester ultrasound scan has not been done, it is advisable to offer the first scan when gestational age is estimated to be between 11+0 and 14+0weeks’gestation, as this provides an opportunity to achieve the aforementioned aims, i.e., confirm viability, establish gestational age accurately, determine the number of viable fetuses and, if requested, evaluate fetal anatomy and risk of aneuploidy.
* Before starting the examination, a healthcare provider should counsel the woman/couple regarding the potential benefits and limitations of the first-trimester ultrasound scan.

# Who Should Perform the First-Trimester Ultrasound Scan?

* Individuals who perform obstetric scans routinely should have specialized training that is appropriate to the practice of diagnostic ultrasound for pregnant women.
* To achieve optimal results from routine ultrasound examinations, it is suggested that scans should be performed by individuals who fulfill the following criteria:
  + Have completed training in the use of diagnostic ultrasonography and related safety issues;
  + Participate in continuing medical education activities;
  + Follow established appropriate care pathways for suspicious or abnormal findings;
  + Participate regularly in established quality-assurance programs.

# What Ultrasonographic Equipment Should Be Used?

It is recommended to use equipment that undergoes regular maintenance and servicing and has at least the following capabilities:

* Real-time, grayscale two-dimensional (2D) ultrasound;
* Color (power) and spectral Doppler;
* M-mode;
* Transabdominal ultrasound transducers;
* Transvaginal ultrasound transducers;
* Adjustable acoustic power output controls with output display standards;
* Freeze frame and zoom capabilities;
* Electronic calipers;
* Capacity to print/store images.

# How Should the Scan Be Documented?

* An examination report should be produced as an electronic and/or paper document.
* The document should be stored locally and, in accordance with local protocol, made available to the woman and referring healthcare provider.
* The aim of these guidelines is to propose a standardized approach to the evaluation of fetal anatomy at 11+0 to 14+0 weeks’ gestation to improve the prenatal detection of severe anomalies.
* With this scope, the main fetal structures that could be included in an anatomical ultrasound survey in the first trimester were listed in addition to some technical issues in ultrasound examination **(Table 1-3)**.
* Two levels of screening are described, presenting both a checklist of "minimum requirements" for a basic structural survey at 11+0 to 14+0 weeks’ gestation **(Table 1)** and a more advanced level of "best practice" for comprehensive detailed examination of the fetus in the first trimester **(Table 2)**.

# Head And Brain

* Skull and head shape, midline echo, and brain hemispheres, including lateral ventricles and choroid plexuses, should always be evaluated at the routine first-trimester examination. These structures should be preferably assessed on axial planes.
* The measurements of the biparietal diameter and head circumference are not recommended on a routine basis but could be helpful.
* The cranial posterior fossa should be evaluated routinely on the midsagittal plane, showing three distinguished anechoic spaces similar in size. The measurement of the ratio between the width of the brainstem and the space behind it (BS/BSOB) is not recommended on a routine basis but could be helpful when the three spaces seem abnormal.
* Doppler studies should not be included in the standard evaluation of the fetal brain in the first trimester.

# Face

* The fetal profile should be routinely evaluated in the first trimester, on the midsagittal view of the fetal head.
* The evaluation of fetal eye orbits and bony palate is not recommended on a routine basis but suggested during the first trimester fetal anatomic survey.
* The evaluation of the upper lip is not routinely recommended in the first trimester.

# Neck

* The NT should be routinely measured on the midsagittal plane during the first-trimester evaluation.

# Thorax

* The lung fields should be routinely evaluated on axial planes during the first trimester evaluation.
* The diaphragm and rib cage evaluation are not routinely recommended.

# Heart

* Heartbeat, heart rate, cardiac situs, size, and position should be routinely evaluated in the first trimester.
* Evaluation of the four chambers view is recommended but limited to the visualization of four distinct chambers, looking balanced. Color Doppler could be useful to implement the visualization and the assessment of this view.
* The visualization of the 3-vessel or arches view (V-sign) on the axial plane by color Doppler is suggested but not mandatory in the first trimester.
* The evaluation of the superior and inferior vena cava is not routinely recommended in the first trimester.
* The evaluation of the ductus venosus and the measurement of its blood flow velocity should not be considered as part of the routine anatomic survey but included only for aneuploidies screening if established by the local screening strategy.

# Gastro-Intestinal tract (GIT) / Abdominal wall

* Stomach and abdominal cord insertion should be routinely evaluated during the first-trimester scan, preferably on axial planes.
* The abdominal circumference measurement, including the visualization of the umbilical vein, is not recommended as part of the standard anatomic survey.
* The evaluation of the bowel is not recommended in routine evaluation. Still, if any images suggesting dilation of the bowel, other cystic structures, or masses are noticed, the patient should be referred for advanced evaluation.

# Urinary Tract and Genitalia

* The bladder should be routinely evaluated during the first-trimester anatomy survey, either on axial or sagittal planes, and measured only if appearing larger than usual on midsagittal view.
* Peri-vesical/umbilical arteries should also be evaluated, with the support of color Doppler, on the axial plane.
* The visualization of the kidneys is not recommended on a routine basis but suggested during the first-trimester anatomic survey. Kidneys could be preferably evaluated on axial or coronal planes.
* The visualization of the genital tubercle is not recommended on a routine basis, but suggested on a midsagittal view if feasible.

# Spine

* The fetal spine should be routinely evaluated in the first trimester.
* The midsagittal evaluation of the spine is considered the best option to define if the spine has a straight appearance and the overlying skin is uninterrupted. However, a coronal approach could be easier to obtain and use to assess the vertebrae but suboptimal to evaluate the skin.
* The evaluation of medullary structures, such as the conus medullaris, is not recommended in the first trimester.

# Limbs

* The presence of the three segments of the limbs, including hands and feet, should be routinely assessed.
* Active fetal movements should also be visualized and reported routinely.
* The evaluation of the fingers and toes is not recommended as part of the standard anatomic survey.
* The measurement of the femur and humerus is not recommended in the first trimester.

# Technical Issues

**Table 1** Minimum requirements for scan at 11+0 to 14+0weeks’gestation

**Table 2** Detailed fetal scan at 11+0 to 14+0weeks’ gestation

**Table 3** Selected first-trimester screening strategies for trisomy 21 and other abnormalities





