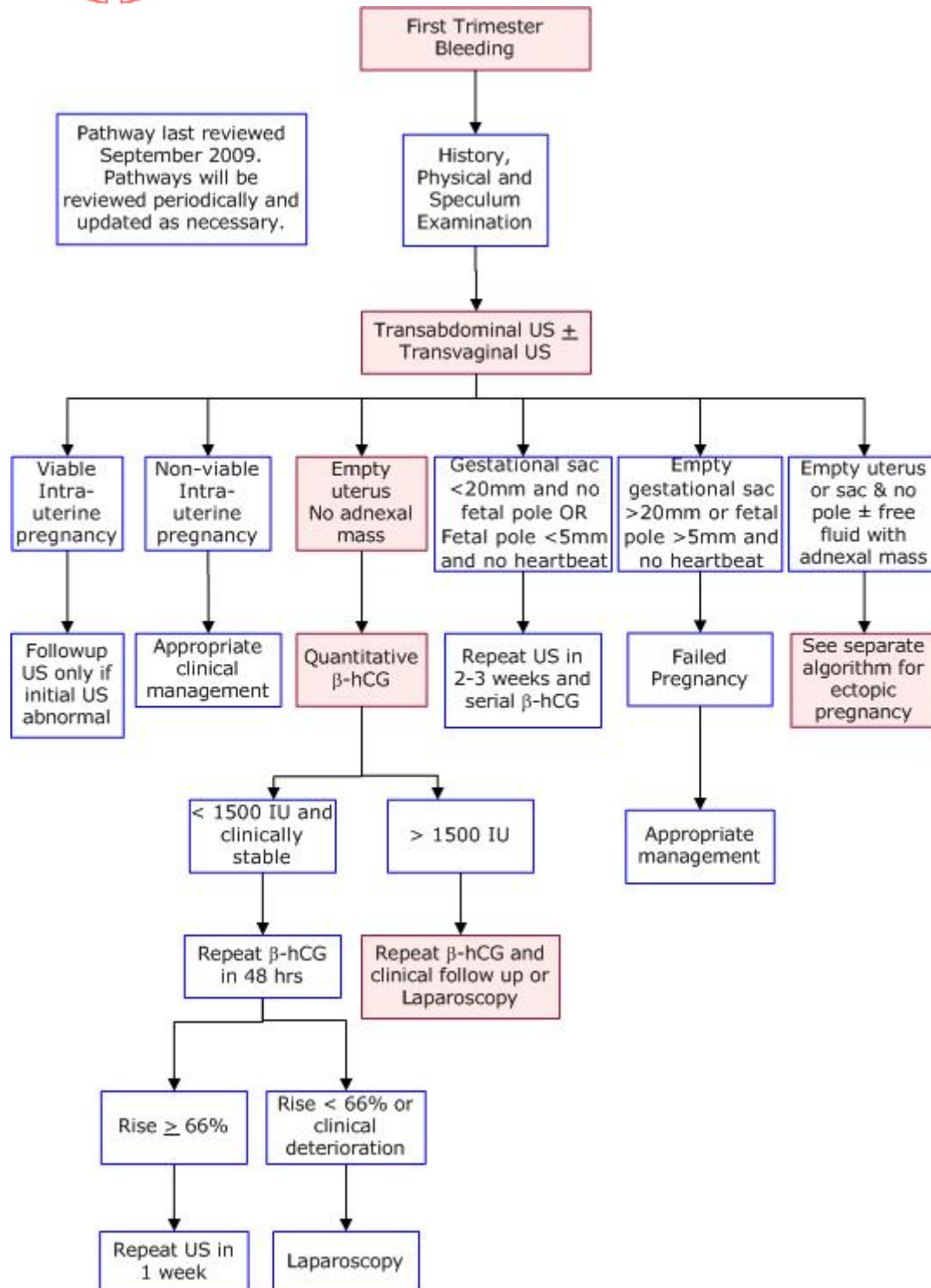




DIAGNOSTIC IMAGING PATHWAYS

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ULTRASOUND IN THE FIRST TRIMESTER OF PREGNANCY

- Ultrasound in the first trimester is not routinely recommended but is often performed for the following indications: [1-5](#)
 - a. Assessment of gestational age and sac.
 - b. Detection of early pregnancy failure.
 - c. Assessment of fetal number.

- d. Detection of fetal abnormalities.
- e. Nuchal translucency.
- f. Assessment of ovaries, uterus and adnexa.
- g. Exclusion or confirmation of ectopic pregnancy.

TRANSABDOMINAL ULTRASOUND

- Useful screening test for early pregnancy complications such as threatened abortion, ectopic pregnancy, blighted ovum, trophoblastic disease etc. [6,7](#)
- Correlation of sonographic findings with simultaneous maternal serum human chorionic gonadotropin (β -HCG) levels is useful in evaluation of early pregnancy complications, particularly when a living embryo is not visualised. [7,8](#)
- Allows identification of an intrauterine pregnancy, which is the single most important finding for the exclusion of ectopic gestation as the presence of both intra- and extra-uterine pregnancy, is very rare. [7](#)
- Enables examination of fetal anatomy and measurement of nuchal translucency, thus allowing detection of majority of fetal structural and chromosomal abnormalities in early pregnancy. [9-11](#)
- Allows assessment of the outcome of early first-trimester pregnancies with slow embryonic heart rates (embryonic heart rate of <70 bpm is associated with fetal demise in 100% of patients; and if the embryonic heart rate is <90 bpm in the first trimester, close follow-up of the pregnancy is recommended). [12](#)
- Follow-up second trimester US may still be required, as heart and spinal defects can still be missed on first trimester US. [9](#)

TRANSVAGINAL ULTRASOUND

- More sensitive than transabdominal ultrasonography and has a lower discriminatory zone (the range of serum concentrations above which gestational sac can be visualised consistently), allowing earlier diagnoses of intrauterine or ectopic pregnancies. [8,13-15](#)
- Superior to transabdominal US for visualising fetal anatomy and detecting fetal structural and chromosomal abnormalities. [10,11,16](#)
- The normal intrauterine pregnancy is visible transvaginally by approximately 5 weeks from the first day of the last menstrual period. [2,3](#)
- With regards to suspected ectopic pregnancy, patients with indeterminate ultrasonographic findings (ie. no evidence of intrauterine or ectopic pregnancy) require further evaluation with quantitative β -hCG levels +/- follow-up US or laparoscopy. [14,17-19](#)

SERUM HUMAN CHORIONIC GONADOTROPHIN (β -hCG) LEVELS

- Serum β -hCG levels double approximately every 48 hours in 85% of normal intrauterine pregnancies of between 4 and 6 weeks' gestation. [19](#)
- 80% of ectopic pregnancies are associated with a rise in β -hCG of less than 66%. [18,19](#)
- Levels of 1000-1500 iu/l should be associated with the presence of an intrauterine gestation on transvaginal US (6000-6500 iu/l for transabdominal), although in multiple pregnancy this level may be higher. [8](#)
- Levels of more than 1000 iu/l with no gestation sac can also be seen following spontaneous abortion, emphasising the need to interpret single β -hCG measurements in the context of the clinical history and findings. [19](#)

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