1. Which one of the following is a reliable sonographic sign of a monochorionic diamniotic twin pregnancy?

A. Thin membrane between sacs in the first trimester.
B. Twins of the same gender in separate sacs.
C. Lack of a “twin peak” or “delta” sign.
D. The placentas of each sac are contiguous with each other.

Rationales:
A. Correct. A thick membrane consists of 2 chorions and 2 amnions, which separate dichorionic twins. A thin membrane has no chorion, only 2 amnions. A thick membrane may appear thin later in pregnancy, but not in the first trimester.
B. Incorrect. If the twins are of different genders, they are dizygotic and thus dichorionic, diamniotic. If they are of the same gender they may be dizygotic as well as monozygotic.
C. Correct. A “twin peak sign” represents a beak-like tongue of placenta protruding between the two doublemembranes of a dichorionic diamniotic twin. It is not present in a monochorionic pregnancy, because the single chorion surrounds both sacs. However, this sign is not always seen in a dichorionic pregnancy.
D. Incorrect. Visualization of 2 separate placentas is consistent with a dichorionic pregnancy. However, 2 separate placentas that abut each other may be indistinguishable in appearance from a single placenta.

Citations:
2. Concerning the umbilical artery systolic/diastolic (S/D) ratio, which one of the following is TRUE?

   A. The angle of insonation must be kept between 45 and 60 degrees.
   B. The degree of S/D ratio abnormality correlates with the extent of fetal compromise
   C. An S/D ratio of greater than 4 is abnormal after 30 weeks.
   D. Absent diastolic flow is of no concern prior to 20 weeks.

Rationales:
A. Incorrect. The S/D ratio compares the amplitude of peak systole to end diastole, so that the angle of insonation is unimportant as long as an adequate signal can be obtained.
B. Incorrect. They do not correlate.
C. Correct. The 90th percentile S/D ratio at 30 weeks is 3.8, and this value keeps dropping as placental resistance continues to decrease with further fetal maturation. An S/D ratio of 4 is considered abnormal after 30 weeks.
D. Incorrect. It is abnormal. There should be diastolic flow between 15 and 20 weeks.

Citations:
Callen PW. *Ultrasonography in Obstetrics and Gynecology*. WB Saunders.

3. Concerning echogenic intracardiac focus on OB ultrasound, which one is CORRECT?

   A. Majority are located in the right ventricle
   B. Strong association with trisomy 18
   C. Represents focal fat of ventricular wall
   D. Most commonly seen as normal variant

Rationales:
A. Incorrect. 90% of echogenic intracardiac foci are located in the left ventricle.
B. Incorrect. There is an association of trisomy 13 and 21 with echogenic intracardiac focus but not with trisomy 18.
C. Incorrect. Echogenic intracardiac focus is felt to represent microcalcifications of papillary muscles.
D. Correct. Echogenic intracardiac focus is most commonly seen as a normal variant but should prompt careful examination for other abnormalities.

Citations:
4. Which of the following is a TRUE statement concerning ultrasound of the endometrium in premenopausal women?

A. The endometrium can normally measure up to 13 mm in thickness.
B. Endometrial fluid should be included in the measurement of endometrial thickness.
C. The hypoechoic halo surrounding the endometrium should be included in the measurement of endometrial thickness.
D. The thickness of the endometrium will vary during the menstrual cycle but echogenicity will not change.

Rationales:
A. Correct. The endometrium can normally measure up to 15 mm during the secretory phase of menstrual cycle.
B. Incorrect. Endometrial fluid should not be included in the measurement of endometrial thickness. The individual walls should be measured separately and added together for final measurement.
C. Incorrect. Thickness and echogenicity of endometrium will change throughout the menstrual cycle.
D. Incorrect. The hypoechoic halo surrounding the endometrium is felt to represent the compact layer of the myometrium and should not be included in measurements of the endometrium.

Citations:
5. At what hCG level should you expect to visualize an intrauterine gestational sac?

A. 50 IU (IRP)
B. 500 IU (IRP)
C. 2000 IU (IRP)
D. 10,000 IU (IRP)

Rationales:
C. Correct. A intrauterine gestational sac should typically be visualized when the hCG is 2000 IU IRP.

Citations:
Mehta TS, Levine D, Beckwith B. Treatment of ectopic pregnancy: is a human chorionic gonadotropin level of 2,000 mIU/mL a reasonable threshold? Radiology 1997;205:569-573.
6. Concerning polyhydramnios, which of the following is CORRECT?

A. Is not diagnosed in the first trimester.
B. When associated with UPJ obstruction, it results in low urine output.
C. Diabetes mellitus is a frequent cause of increased amniotic fluid.
D. Polyhydramnios rarely spontaneously resolves.

Rationales:
A. Incorrect. Polyhydramnios, an excessive accumulation of amniotic fluid may occur throughout the pregnancy.
B. Incorrect. Paradoxically, polyhydramnios associated with UPJ obstruction results in high urine output.
C. Correct. Diabetes mellitus is a common cause of polyhydramnios and frequently involves patients with poor diabetic control.
D. Incorrect. Polyhydramnios frequently resolves spontaneously. These pregnancies are not associated with increase in either morbidity or mortality.

Citations:
7. You are shown Doppler images of the main, left, and right hepatic arteries (Figure 1, Figure 2 and Figure 3) in a patient who underwent a liver transplant two months ago. What is the most likely diagnosis?

A. Proximal hepatic artery stenosis  
B. Distal hepatic artery stenosis  
C. Hepatic venous anastomotic stricture  
D. Transplant rejection

Rationales:
A. **Correct.** A tardus parvus waveform is present, as is apparent from the shape of the waveform and the resistive indices below 0.4. This indicates a stenosis upstream from where these waveforms were obtained, typically at the hepatic artery anastomosis in a liver transplant patient.

B. **Incorrect.** Hepatic artery stenoses produce focally elevated velocities at the point of narrowing and diminished diastolic flow if interrogated proximal to the narrowing.

C. **Incorrect.** This abnormality typically does not produce hepatic arterial waveform changes. It is evident in the hepatic venous waveforms, which typically become monophasic.

D. **Incorrect.** Liver transplant rejection may not be evident on ultrasound, but if rejection is present and hepatic waveforms are abnormal, the abnormality is typically a higher resistance waveform than normal in the hepatic artery.
8. In a patient with a prior history of papillary thyroid cancer, which of the following features of a neck lymph node would most likely be considered benign?

A. Cystic change
B. Fatty hilum
C. Microcalcifications
D. Increased vascularity

Rationales:
A. Incorrect. This typically indicates necrosis in a malignant lymph node.
B. Correct. This is a feature of normal neck nodes.
C. Incorrect. This is a feature of metastatic papillary cancer.
D. Incorrect. This often indicates malignancy.
9. You are shown two images from a carotid ultrasound in a 65-year old male. What is the most likely etiology of this waveform in the carotid arteries?

A. Proximal carotid stenosis  
B. Aortic regurgitation  
C. Aortic stenosis  
D. Cardiac arrhythmia

Rationales:
A. Incorrect. Proximal carotid stenosis or aortic stenosis will demonstrate a tardus parvus waveform.
B. Correct. Bilateral carotid artery waveforms demonstrate reversal of diastolic flow which is seen in aortic regurgitation (insufficiency). Proximal carotid stenosis or aortic stenosis will demonstrate a tardus parvus waveform.
C. Incorrect. Aortic stenosis gives rise to a tardus parvus waveform in both carotid arteries.
D. Incorrect. Arrhythmias usually appear as irregular pulses, with different appearances depending on the type of arrhythmia.

10. Considering isolated pancreas transplantation:

A. The organ is typically transplanted in an extraperitoneal location.  
B. The ultrasound identification of a partial thrombus in the transplanted splenic vein requires immediate re-operation.  
C. Enteric drainage is the preferred conduit for managing pancreatic endocrine secretions.  
D. Anastomotic pseudoaneurysm formation is most often caused by leaking digestive enzymes.

Rationales:
A. Incorrect. Intraperitoneal.  
B. Incorrect. Quite common with the decreased flow after the spleen is removed.  
C. Incorrect. It's the exocrine secretions.  
D. Correct.