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Abdomen Sonography Examination

ARDMS AB-Abdomen

Version Demo

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Topic Break Down

Topic	No. of Questions
Topic 1, Patient Care	5
Topic 2, Sonographic Principles and Instrumentation	13
Topic 3, Abdomen	153
Topic 4, Mix Questions	9
Total	180

QUESTION NO: 1

Which structure is located between the fundus of the stomach and the diaphragm?

A. Caudate lobe of the liver

B. Left lobe of the liver

C. Right kidney

D. Spleen

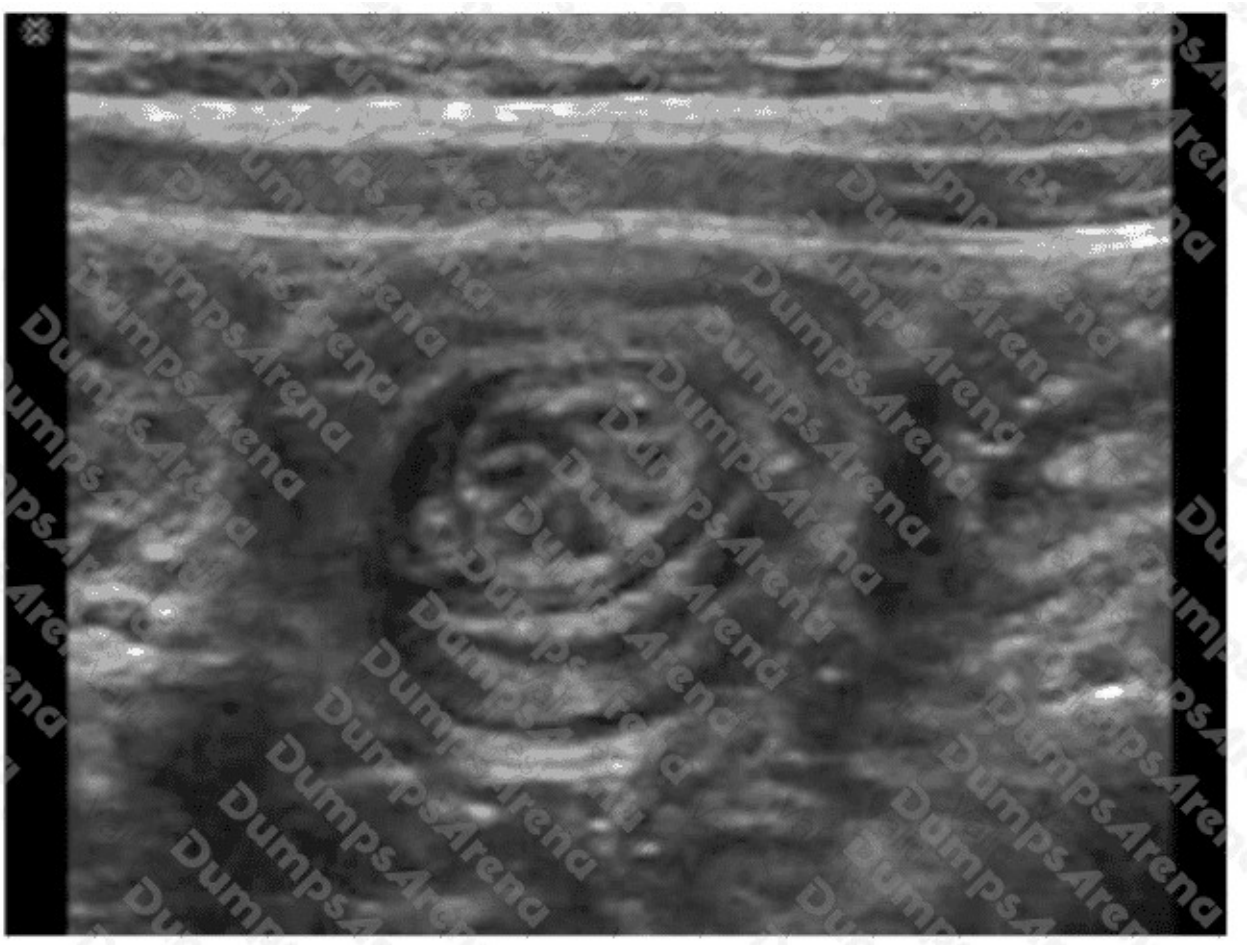
ANSWER: D

Explanation:

The spleen is the correct answer because it occupies the left upper quadrant in close relationship to both the gastric fundus and the left hemidiaphragm. Its visceral (gastric) surface is apposed to the fundus of the stomach, while its diaphragmatic surface lies directly against the diaphragm. Thus, in the left subphrenic region, the spleen is the solid organ that can be described as lying between these structures. This relationship is clinically and sonographically important: the spleen is evaluated through left intercostal acoustic windows beneath the diaphragm, and the adjacent gastric fundus may contain fluid or gas that affects visualization. The spleen is also connected to the stomach by the gastrosplenic ligament, which conveys the short gastric and left gastro-omental vessels and reinforces their close anatomic association. Standard anatomic descriptions identify the stomach and diaphragm among the spleen's key relations. See the NCBI Bookshelf review of splenic anatomy and TeachMeAnatomy's spleen anatomy overview.

QUESTION NO: 2

Which condition is most likely depicted in this image?



A. Bowel obstruction

B. Diverticulitis

C. Appendicitis

D. Intussusception

ANSWER: D

Explanation:

Intussusception is most likely depicted because the described sonographic appearance is the classic transverse “target” or “donut” sign. This sign consists of multiple concentric rings created when one segment of bowel telescopes into another, carrying mesenteric fat and vessels with it. On ultrasound, the layered bowel walls, mesentery, and central intussuscepted segment produce alternating hypoechoic and echogenic rings. This is a key diagnostic pattern for intussusception and is especially useful because ultrasound is highly accurate, does not use ionizing radiation, and can also assess for complications such as free fluid, impaired vascularity, or a pathologic lead point. Intussusception most often occurs at the ileocolic junction in infants and young children, although it may occur at other bowel locations and in adults. A longitudinal image may demonstrate the complementary pseudokidney or sandwich appearance, but the transverse target configuration is the hallmark finding. Timely recognition is important because intussusception can compromise venous and then arterial blood flow to the involved bowel, requiring prompt reduction or surgical management depending on clinical stability and imaging findings. The American College of Radiology identifies ultrasound as the preferred initial imaging examination when pediatric intussusception is suspected. See the ACR Appropriateness Criteria for abdominal pain in children and the NCBI StatPearls review of intussusception.

QUESTION NO: 3

What is the main purpose for performing focused abdominal sonography for trauma (FAST) exams?

A. Detection of free peritoneal fluid

B. Diagnosis of organ laceration

C. Detection of peritoneal air

D. Confirmation of peritoneal lavage findings

ANSWER: A

Explanation:

Detection of free peritoneal fluid is the main purpose of the FAST examination. FAST is a rapid, focused bedside ultrasound assessment performed in injured patients to identify abnormal free fluid in dependent intraperitoneal spaces, where blood may accumulate following blunt or penetrating trauma. Standard abdominal views evaluate the hepatorenal recess, splenorenal recess, and pelvis; the extended trauma examination may also assess the pericardial space for effusion and the pleural spaces for pneumothorax or hemothorax. In the appropriate trauma context, intraperitoneal free fluid is presumed to represent hemoperitoneum until proved otherwise, allowing the examination to quickly support triage and urgent management decisions. The examination is deliberately targeted rather than a comprehensive diagnostic survey of the abdominal organs. A negative study does not by itself exclude all traumatic injury, particularly when bleeding is limited, early, retroperitoneal, or contained within an organ. Nonetheless, the ability to rapidly identify free fluid without moving an unstable patient is the central clinical value of FAST. This intended use is reflected in the AIUM Practice Parameter for Focused Assessment With Sonography in Trauma and the ACEP FAST Sonoguide.

QUESTION NO: 4

Which renal condition is commonly associated with pyuria and leukocytosis?

A. Nephrocalcinosis

B. Staghorn calculus

C. Renal cell carcinoma

D. Acute pyelonephritis

ANSWER: D

Explanation:

Acute pyelonephritis is correct because it is an acute bacterial infection involving the renal pelvis and renal parenchyma. Pyuria, meaning white blood cells in the urine, is a common laboratory finding because infection produces an inflammatory response within the urinary tract. Leukocytosis in the peripheral blood likewise reflects the systemic inflammatory response to bacterial infection and is especially common when the infection is clinically significant. Patients may also have fever, chills, flank pain, costovertebral-angle tenderness, dysuria, urinary frequency, and bacteriuria. Urinalysis often demonstrates leukocyte esterase and may show nitrites when the causative organism reduces nitrate; urine culture helps identify the organism and guide antimicrobial treatment. In abdominal sonography, the kidneys can appear normal in uncomplicated acute pyelonephritis, but possible findings in more substantial disease include renal enlargement, altered parenchymal echogenicity, reduced corticomedullary differentiation, focal areas of decreased echogenicity, or impaired perfusion on Doppler assessment. Imaging is particularly useful when symptoms are severe, do not improve as expected, or complications such as obstruction or abscess are suspected. See the NCBI StatPearls review of acute pyelonephritis and the Merck Manual professional overview of pyelonephritis.

QUESTION NO: 5

Which vascular condition is most commonly associated with a wandering spleen?

A. Infarction

B. Torsion

C. Rupture

D. Portal hypertension

ANSWER: B

Explanation:

Torsion is the characteristic vascular complication of a wandering spleen. A wandering spleen has excessive mobility because its normal peritoneal ligamentous attachments are absent, underdeveloped, or lax. This allows the spleen to migrate from its usual left upper-quadrant position and, importantly, permits rotation of the splenic vascular pedicle. Pedicle torsion can obstruct venous outflow first, causing splenic congestion and enlargement; progressive twisting may then compromise arterial inflow, producing ischemia and potentially splenic infarction. On ultrasound, the spleen may be absent from its expected location and identified elsewhere in the abdomen or pelvis. Color and spectral Doppler evaluation of splenic hilar vessels is important because diminished, absent, or abnormal flow supports vascular compromise from torsion. Recognition is clinically important because acute torsion may require urgent surgical management, with splenopexy used when viable splenic tissue can be preserved. The association of wandering spleen with torsion is consistently emphasized in radiology references and clinical reviews. See Radiopaedia: Wandering spleen and StatPearls: Splenic Torsion.

QUESTION NO: 6

Which retroperitoneal finding is most likely associated with trauma?

A. Neuroblastoma

B. Fibrosis

C. Urinoma

D. Adenoma

ANSWER: C

Explanation:

Urinoma is the correct finding because it is an encapsulated or loculated collection of extravasated urine, most often located in the perirenal or retroperitoneal spaces after disruption of the urinary collecting system. Blunt or penetrating abdominal trauma can injure the kidney, renal pelvis, ureter, or ureteropelvic junction, allowing urine to leak into surrounding retroperitoneal tissues. On ultrasound, a urinoma may appear as an anechoic or complex fluid collection adjacent to the kidney; its appearance can vary with the age of the collection and associated hemorrhage or infection. In the trauma setting, identification of perinephric fluid or a suspected urinoma should prompt correlation with contrast-enhanced CT and delayed excretory-phase imaging, which can demonstrate active urinary extravasation and define the site and extent of collecting-system injury. Urinomas may also occur after urinary tract procedures or with obstruction, but trauma is a classic and clinically important cause. The American Urological Association notes that CT with delayed imaging is indicated when renal trauma raises concern for collecting-system injury and urinary extravasation. See the American Urological Association Urotrauma Guideline and the Radiopaedia urinoma reference.

QUESTION NO: 7

Which adjustment would most likely improve visualization of a small superficial tubular structure such as a peripheral artery?

A. Decreasing frame rate

B. Decreasing transducer wavelength

C. Decreasing slice width

D. Decreasing power output

ANSWER: C

Explanation:

Decreasing slice width is the best adjustment because a thinner ultrasound imaging plane improves elevational (slice-thickness) resolution. Elevational resolution determines how well the system distinguishes structures that lie at slightly different positions perpendicular to the displayed image plane. When the slice is relatively thick, echoes from adjacent off-plane tissues can be included in the same displayed region. This partial-volume averaging can blur the margins of a small vessel, make its lumen less distinct, and create the appearance of unwanted internal echoes. Narrowing the slice width reduces these off-axis contributions and better confines received echoes to the intended imaging plane. For a superficial peripheral artery, this produces sharper vessel walls and more reliable delineation of the small tubular lumen. This principle is particularly important when assessing small-caliber vessels, where even minor loss of detail can obscure the lumen or mimic pathology. The ARDMS Abdomen examination content outline includes image optimization and resolution concepts among the knowledge areas evaluated; see the ARDMS Abdomen Examination Content Outline. Additional ultrasound-physics discussion of resolution and beam dimensions is available from NCBI Bookshelf.

QUESTION NO: 8

In which position should a patient be placed when internal echoes are seen within a fluid-filled bladder?

A. Erect

B. Trendelenburg

C. Lateral decubitus

D. Fowler

ANSWER: C

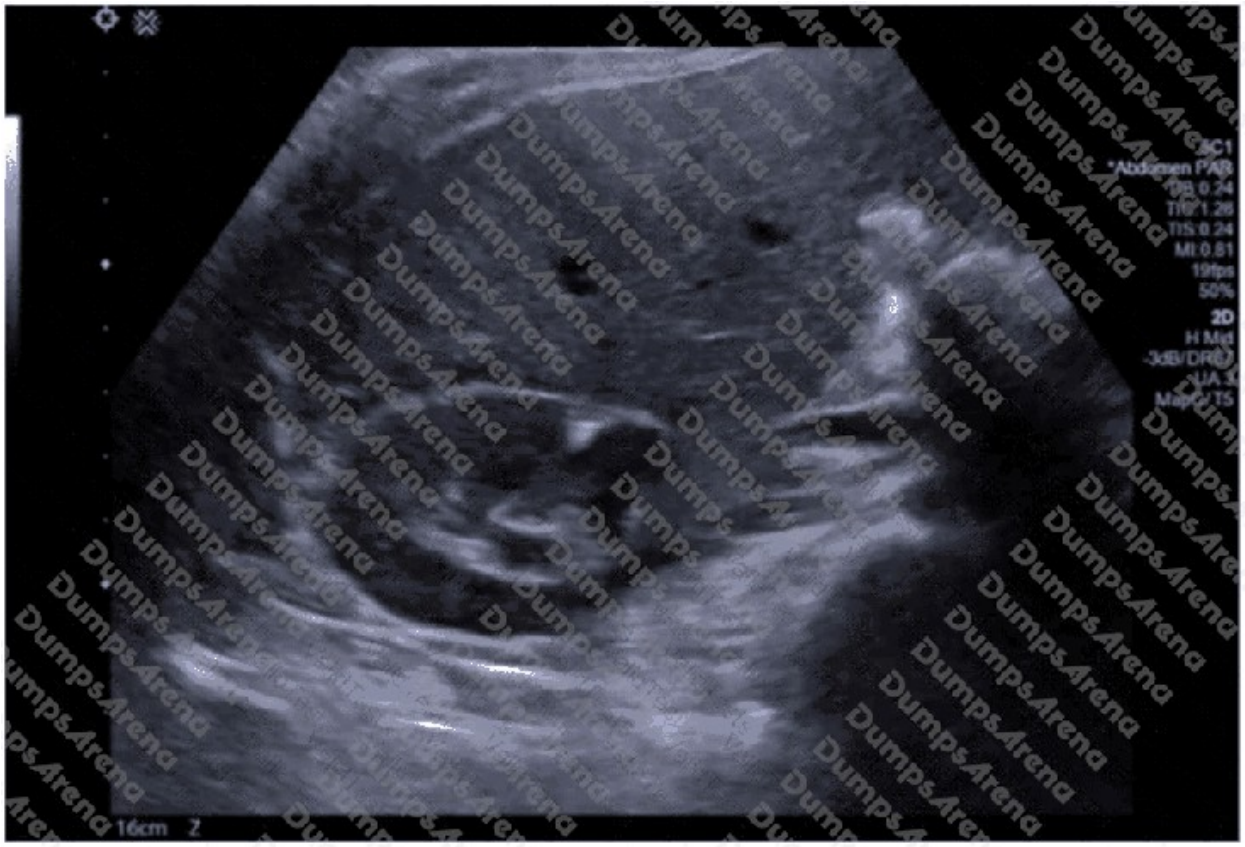
Explanation:

Lateral decubitus positioning is appropriate when internal echoes are identified in an otherwise fluid-filled urinary bladder. Repositioning the patient allows the sonographer to assess whether the echoes are gravity dependent and mobile. Mobile, dependent material may redistribute to the new dependent portion of the bladder, supporting the observation that the finding is suspended or sedimented intraluminal material rather than a fixed abnormality. This dynamic assessment is an important part of bladder sonography because the appearance and location of low-level echoes can change with patient position. The examination should include real-time observation after repositioning, with documentation of the echoes' movement or dependent layering when present. Maintaining adequate bladder distention is also important so the bladder lumen and wall can be evaluated clearly in more than one plane. Dynamic positional assessment complements grayscale imaging and helps characterize intravesical findings without relying solely on their appearance in a single supine view. Guidance on evaluating the urinary bladder as part of a complete renal/urinary tract ultrasound examination is available in the AIUM Practice Parameter for the Performance of an Ultrasound Examination of the Kidneys and Bladder. Additional bladder-ultrasound technique and normal imaging context are provided by Radiopaedia's ultrasound of the bladder reference.

QUESTION NO: 9 - (SIMULATION)

Identify the congenital anomaly.

Using your mouse, place the cursor on the appropriate region of the image and then left-click the mouse button to indicate your selection.



ANSWER: See the explanation for the answer

Explanation:

Answer: Horseshoe kidney.

Click on the renal parenchymal isthmus—the tissue bridge joining the lower poles of the kidneys across the midline (anterior to the great vessels/spine). This fusion of the kidneys is the characteristic appearance of a horseshoe kidney.

QUESTION NO: 10

Which complication would be associated with retroperitoneal fibrosis?

A. Aortic stenosis

B. Portal hypertension

C. Venous thrombosis

D. Hydronephrosis

ANSWER: D

Explanation:

Hydronephrosis is correct because retroperitoneal fibrosis produces an infiltrative plaque of fibrous tissue in the retroperitoneum, most often centered around the infrarenal aorta and iliac vessels. As this tissue extends, it commonly encases and constricts one or both ureters. Ureteral narrowing impedes the normal drainage of urine from the renal pelvis into the bladder, leading to dilation of the renal collecting system—hydronephrosis. The obstruction may be unilateral or bilateral; bilateral involvement is clinically important because persistent obstruction can reduce renal function and cause renal failure if it is not recognized and relieved. On sonography, the relevant complication is identified by pelvicalyceal dilatation, with the examination also helping assess whether one or both kidneys are affected. Retroperitoneal fibrosis itself can be difficult to fully characterize with ultrasound, so CT or MRI is commonly used to define the retroperitoneal soft-tissue process and its relationship to the ureters. The characteristic association between retroperitoneal fibrosis, ureteral obstruction, and hydronephrosis is described by the NCBI StatPearls review of retroperitoneal fibrosis and the Merck Manual Professional discussion of retroperitoneal fibrosis.

QUESTION NO: 11

A well-defined hepatic lesion is anechoic, has a thin imperceptible wall, and demonstrates posterior acoustic enhancement. No internal Doppler signal is identified. Which lesion is most likely?

A. Simple hepatic cyst

B. Hepatic abscess

C. Necrotic metastasis

D. Cavernous hemangioma

ANSWER: A

Explanation:

A simple hepatic cyst is the most likely diagnosis. Simple cysts contain clear fluid and characteristically appear anechoic with a thin wall and posterior acoustic enhancement. They should not contain septations, mural nodules, internal vascularity, or solid components. A hepatic abscess and a necrotic metastasis may contain fluid but are more often complex, with internal echoes, irregular walls, or peripheral hyperemia. A cavernous hemangioma is usually a solid echogenic lesion rather than an anechoic structure with enhancement.

QUESTION NO: 12

Which clinical indication is most consistent with the finding depicted in this image?

A. Trauma

B. Focal pain

C. Palpable abnormality

D. Decreased range of motion

ANSWER: A

Explanation:

Trauma is the clinical indication most consistent with the depicted sonographic appearance. Traumatic injury can disrupt the normal organized fibrillar architecture of muscle or tendon and produce a heterogeneous region with hypoechoic or anechoic fluid from edema or hemorrhage. Depending on injury severity and timing, sonography may demonstrate a focal defect, irregular or separated tissue margins, fluid within the disrupted fibers, and a surrounding hematoma. These findings are commonly evaluated after a direct blow, sudden forceful contraction, laceration, or other acute injury. Ultrasound is useful because it can identify fluid and tissue disruption dynamically, assess the extent of an injury, and help correlate the abnormality directly with the site of injury. The American College of Radiology notes that ultrasound can be used in the evaluation of soft-tissue injury, including assessment for tendon and muscle abnormalities in an appropriate clinical setting. Further guidance on diagnostic ultrasound examination and documentation is available from the AIUM. See the ACR Appropriateness Criteria for acute hand and wrist trauma and the AIUM Practice Parameters.

QUESTION NO: 13

Which parameter is most likely increased distal to a renal artery stenosis?

A. Resistive index

B. Pulsatility index

C. Acceleration time

D. Spectral broadening

ANSWER: C

Explanation:

Acceleration time is increased distal to a hemodynamically significant renal artery stenosis. A stenosis limits and delays transmission of the normal systolic pressure and flow pulse into the downstream renal arterial bed. Consequently, intrarenal segmental or interlobar arterial Doppler waveforms demonstrate a delayed systolic upstroke, commonly described as a *tardus-parvus* waveform: “tardus” denotes the prolonged time required to reach peak systolic velocity, and “parvus” describes the reduced systolic amplitude. Measuring acceleration time from the onset of systolic flow to the systolic peak

therefore provides an indirect assessment for a proximal renal artery obstruction when direct visualization or velocity sampling of the stenotic segment is limited. In renal Doppler practice, an intrarenal acceleration time exceeding approximately 0.07 seconds is a recognized supportive indirect criterion for significant renal artery stenosis, although it must be interpreted with the waveform appearance, clinical context, and technical factors. This hemodynamic response reflects delayed downstream systolic acceleration rather than simply a localized velocity change at the stenosis. See the AIUM Practice Parameter for the Performance of an Ultrasound Examination of the Abdomen and/or Retroperitoneum and the review of renal artery Doppler criteria in Doppler ultrasound and renal artery stenosis: An overview.

QUESTION NO: 14

Based on this image, what is the most likely clinical indication for the examination?

A. Abnormal prenatal ultrasound

B. Neonatal hyperbilirubinemia

C. Red currant jelly stools

D. Projectile vomiting

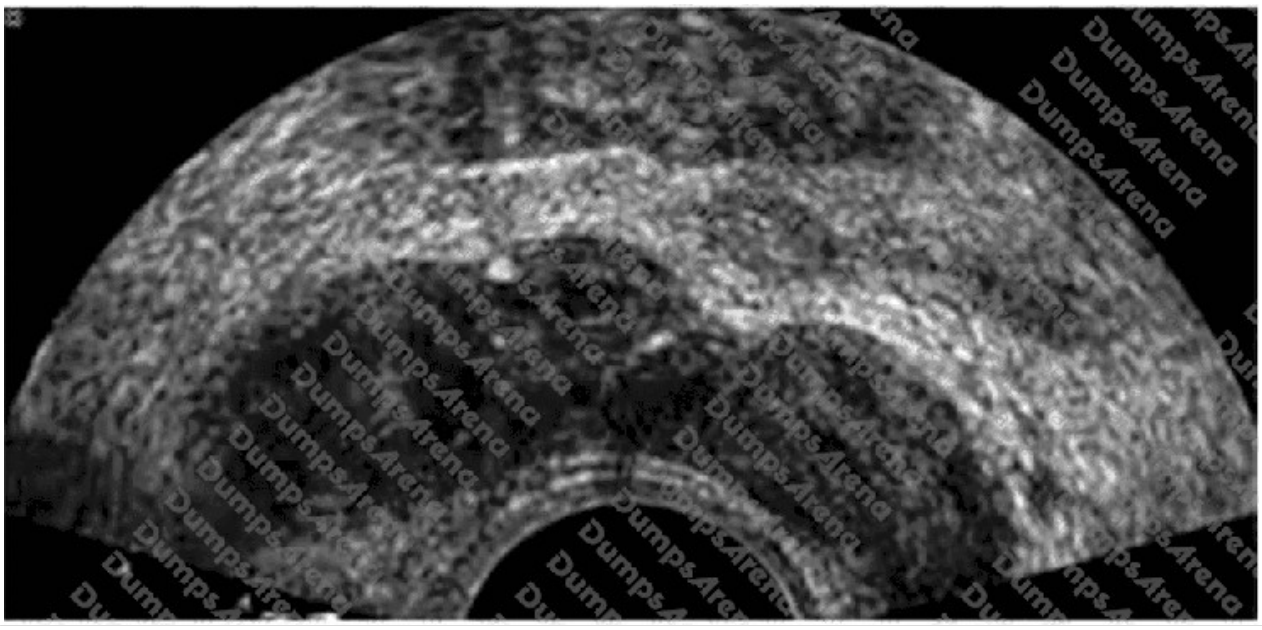
ANSWER: D

Explanation:

Projectile vomiting is the most likely clinical indication because the described sonographic appearance is characteristic of hypertrophic pyloric stenosis. This disorder results from progressive hypertrophy of the pyloric muscularis, which narrows and elongates the gastric outlet. On transverse imaging, the thickened muscle surrounding the central mucosa produces the classic target or doughnut appearance; longitudinal imaging may demonstrate an elongated pyloric canal. Gastric contents cannot pass efficiently into the duodenum, so affected infants—typically several weeks old—develop progressively forceful, nonbilious vomiting after feeds. The vomiting is often described as projectile and can lead to dehydration, poor weight gain, and hypochloremic, hypokalemic metabolic alkalosis if prolonged. Ultrasound is the preferred initial examination when this presentation raises concern for pyloric stenosis because it directly evaluates pyloric morphology and dynamic passage through the channel without ionizing radiation. The American College of Radiology identifies ultrasound as usually appropriate for an infant older than 2 weeks and up to 3 months with new-onset nonbilious vomiting and suspected hypertrophic pyloric stenosis. See the ACR Appropriateness Criteria: Vomiting in Infants and the AIUM Practice Parameter for the Performance of an Ultrasound Examination of the Pylorus.

QUESTION NO: 15

Which anatomical area of the male reproductive system is demonstrated in this endorectal image?



A. Urethra

B. Prostate base

C. Seminal vesicles

D. Ejaculatory ducts

ANSWER: C

Explanation:

Seminal vesicles is correct. On transverse endorectal sonography, the paired seminal vesicles are identified posterior and superior to the prostate base. They commonly appear as symmetric, oval-to-lobulated hypoechoic structures on either side of the midline, sometimes with visible internal echoes or septations related to their folded glandular architecture. Their bilateral location at the superior posterior prostate is the key anatomic relationship demonstrated in this image. Endorectal imaging provides high-resolution visualization of the prostate and adjacent seminal vesicles because the transducer is positioned immediately anterior to these structures within the rectum. Recognizing the seminal vesicles is important when establishing the superior extent of a prostate examination and when assessing the male reproductive tract for enlargement, cystic change, inflammation, obstruction, or invasion by adjacent disease. The expected transverse appearance is particularly useful because both vesicles can be compared for symmetry and size in the same plane. The anatomic position of the seminal vesicles relative to the prostate is described in the NCBI Bookshelf review of male reproductive anatomy. Endorectal ultrasound technique and evaluation of the prostate and surrounding structures are addressed in the AIUM transrectal ultrasound practice parameter.

QUESTION NO: 16

Which common congenital anomaly is typically seen as a cystic midline anterior neck structure?

A. Branchial cleft cyst

B. Cystic hygroma

C. Thyroglossal duct cyst

D. Cystic follicular adenoma

ANSWER: C

Explanation:

Thyroglossal duct cyst is correct because it is the most common congenital cystic lesion of the neck and characteristically occurs in the anterior midline neck. During embryologic development, the thyroid gland descends from the foramen cecum at the base of the tongue to its final pretracheal position through the thyroglossal duct. Persistence of any portion of this tract can form a fluid-containing cyst. Although a thyroglossal duct cyst may occur anywhere along the course of thyroid descent, it is most often identified at or just inferior to the hyoid bone. On sonography, its appearance ranges from a simple, well-circumscribed anechoic cyst to a more complex cyst with internal echoes or septations when infection, inflammation, or proteinaceous material is present. Its central or near-central location, relationship to the hyoid, and potential movement with swallowing or tongue protrusion are useful diagnostic clinical features. Accurate recognition is important because imaging also helps confirm the presence of a normally located thyroid gland before surgical treatment. See the NCBI StatPearls review of thyroglossal duct cysts and the RadiologyInfo overview of thyroid ultrasound.

QUESTION NO: 17

Which clinical finding is most likely associated with the splenic pathology demonstrated in this image?

A. Trauma

B. Sickle cell anemia

C. Immunocompromised

D. Portal hypertension

ANSWER: B

Explanation:

Sickle cell anemia is most likely associated with the described splenic appearance of a small, heterogeneous echogenic spleen containing calcifications. In sickle cell disease, recurrent microvascular vaso-occlusion causes repeated splenic infarctions. Healing of these infarcts produces fibrosis, contraction, and dystrophic calcification. Over time, the spleen progressively involutes and may become functionally absent, a process termed autosplenectomy. This typically develops during childhood in patients with severe sickling disorders and results in impaired splenic immune function, particularly reduced clearance of encapsulated organisms.

On sonography, chronic splenic involvement may appear as reduced splenic volume with an irregular contour, increased echogenicity from fibrosis, and scattered or coarse calcified foci that can create acoustic shadowing. These chronic structural changes reflect the cumulative effect of repeated ischemic injury rather than a single acute event. Recognition of this pattern is clinically important because functional asplenia affects infection risk and preventive care, including vaccination strategies. The association between sickle cell disease, splenic infarction, and eventual autosplenectomy is well established in hematology and radiology references. See the NCBI Bookshelf review of sickle cell disease and the Radiopaedia overview of autosplenectomy.

QUESTION NO: 18

What is the location of the left lobe of the thyroid gland?

A. Anterior to the left jugular vein

B. Posterior to the longus colli muscle

C. Anterolateral to the esophagus

D. Anterior to the trachea

ANSWER: C

Explanation:

Anterolateral to the esophagus is correct. The thyroid consists of right and left lobes positioned alongside the upper trachea, joined in the midline by the isthmus. Because the cervical esophagus deviates slightly leftward as it descends, it is a particularly important posterior-medial landmark when evaluating the left thyroid lobe with transverse sonography. Thus, the left lobe lies anterior and lateral to the esophagus. On an appropriate transverse image, the esophagus may be identified just posterior to the medial aspect of the left thyroid as a variable target-like or collapsed structure, often with echogenic mucosa and a relatively hypoechoic muscular wall. Recognizing this relationship helps the sonographer distinguish the esophagus from a posterior thyroid lesion or an extrathyroidal mass and supports accurate assessment of the posterior margin of the gland. The longus colli muscle is a deeper posterior landmark, while the carotid artery and internal jugular vein are lateral vascular landmarks. Standard thyroid scanning includes transverse imaging that demonstrates the thyroid lobes in relation to the trachea and adjacent neck structures. See the thyroid anatomy review in StatPearls: Anatomy, Head and Neck, Thyroid and the AIUM Practice Parameter for the Performance of a Thyroid and Parathyroid Ultrasound Examination.