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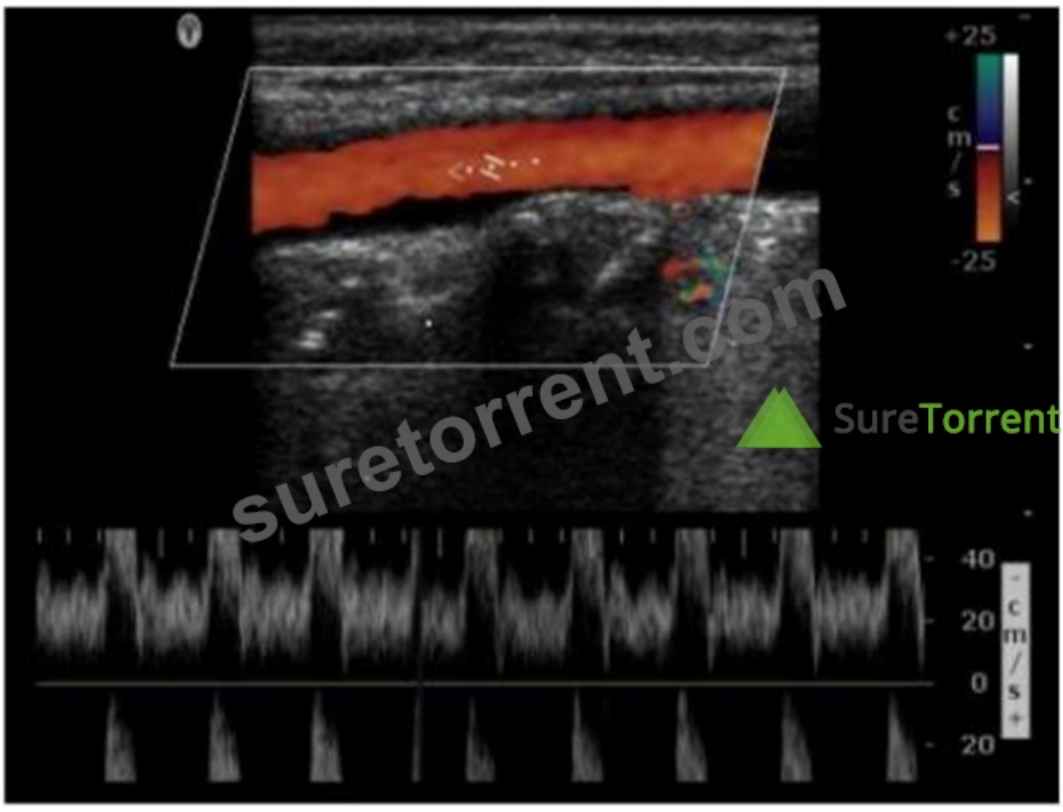
ARDMS SPI Exam Syllabus Topics:

Topic	Details
Topic 1	• Perform Ultrasound Examinations: This section of the exam measures skills of Sonographers and covers how to conduct ultrasound procedures while ensuring patient safety and diagnostic accuracy. It includes understanding of imaging protocols, ergonomics, patient care, and the interaction between sound and tissue. Candidates are expected to demonstrate abilities to manage patient encounters, apply 3D • 4D and contrast imaging concepts, identify and correct artifacts, and follow confidentiality and privacy standards throughout the scanning process.
Topic 2	• Optimize Sonographic Images: This section of the exam measures skills of Diagnostic Medical Sonographers and assesses their ability to enhance image quality using advanced optimization techniques. It includes understanding axial, lateral, elevational, and temporal resolution, as well as manipulating gain, depth, magnification, and dynamic range. Examinees are expected to apply harmonic imaging, spatial compounding, and gray-scale techniques to produce clear, accurate diagnostic images.

Topic 3	• Manage Ultrasound Transducers: This section of the exam measures skills of Ultrasound Technicians and focuses on the management and proper use of different types of transducers. It evaluates knowledge of transducer components, frequency selection, and application of various 2D, 3D, 4D, and nonimaging transducer concepts. Candidates must show they can choose the appropriate transducer for specific examinations and make necessary frequency adjustments to ensure image quality.
Topic 4	• Provide Clinical Safety and Quality Assurance: This section of the exam measures skills of Clinical Ultrasound Supervisors and focuses on maintaining safety and quality standards in ultrasound practice. It includes infection control protocols, transducer and machine integrity checks, and quality assurance testing using tissue-mimicking phantoms. The section also requires familiarity with statistical parameters like sensitivity and specificity to evaluate diagnostic performance and ensure consistent, reliable imaging outcomes.
Topic 5	• Apply Doppler Concepts: This section of the exam measures skills of Vascular Sonographers and evaluates understanding and application of Doppler ultrasound principles. It includes knowledge of Doppler angle, flow dynamics, and color and spectral Doppler imaging. The section also covers eliminating aliasing, interpreting waveforms, applying continuous and pulsed wave Doppler, and optimizing Doppler gain and scale to accurately measure blood flow and velocity within vessels.

ARDMS Sonography Principles and Instrumentation Sample Questions (Q34-Q39):

NEW QUESTION # 34
Which adjustment would eliminate aliasing in the Doppler waveform in this image?



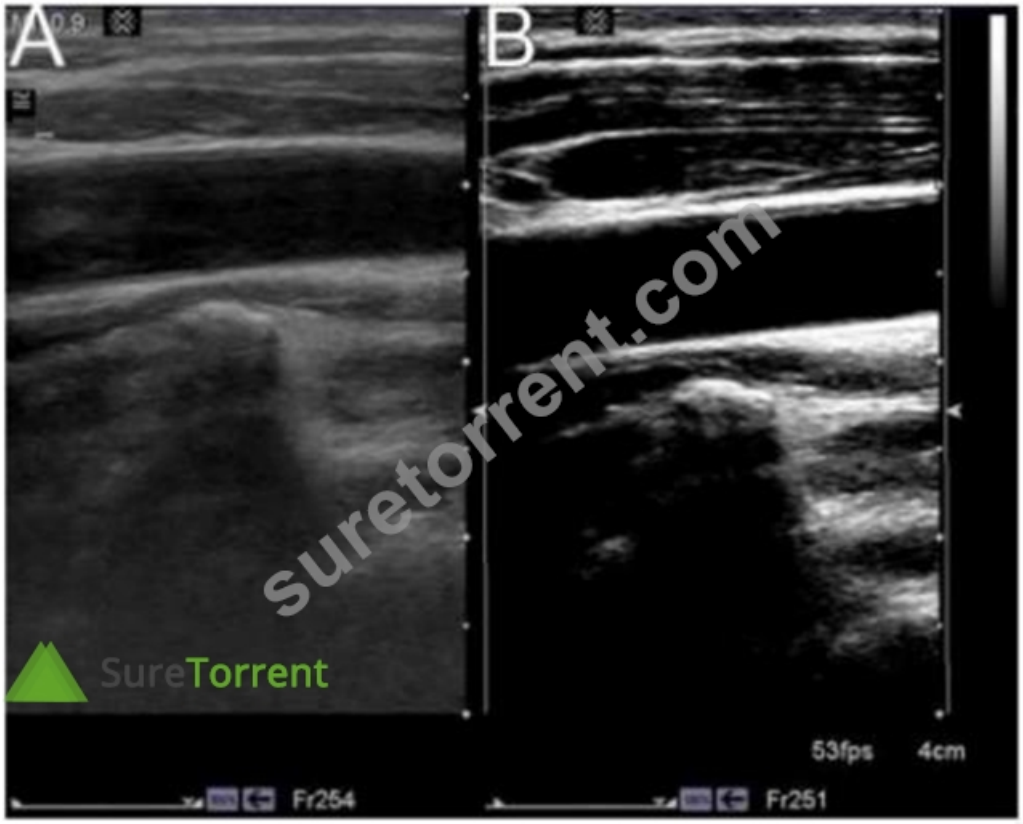
- A. Increase velocity scale.
- B. Increase sample size.
- C. Decrease Doppler gain.
- D. Decrease wall filter.

Answer: A

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:
Aliasing occurs when Doppler frequency shifts exceed the Nyquist limit (which equals half the pulse repetition frequency). Increasing the velocity scale (which increases PRF) raises the Nyquist limit, reducing or eliminating aliasing.
Principles and Instrumentation state:
"Aliasing in pulsed-wave Doppler can be corrected by increasing the pulse repetition frequency (velocity scale), allowing higher velocities to be displayed without wraparound." Decreasing gain affects amplitude, not aliasing.
Wall filter adjustments remove low-velocity signals, not aliasing.
Increasing sample size affects spatial resolution and may reduce frame rate but does not address aliasing.
Therefore, the correct answer is C: Increase velocity scale.
-

NEW QUESTION # 35
Which statement characterizes the primary difference between image A and image B?



- A. Image A demonstrates a wider scale of contrast.
- B. Image A demonstrates a lower overall gain setting.
- C. Image A demonstrates a shallower field of view.
- D. Image A demonstrates a better axial resolution.

Answer: B

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
In image A, the structures appear darker with less overall brightness compared to image B. This indicates that the overall gain (receiver amplification) is set lower in image A, resulting in a dimmer image. Gain controls how much the returning echoes are amplified after detection.
According to Principles and Instrumentation:
"Overall gain amplifies all returning echoes equally. A lower gain setting results in a darker image, while higher gain brightens the display." Axial resolution (A) is primarily dependent on frequency and pulse length, not visible here.
Field of view (C) appears similar between both images.
Contrast scale (D) refers to dynamic range, not directly indicated here.
Therefore, the correct answer is B: Image A demonstrates a lower overall gain setting.
-

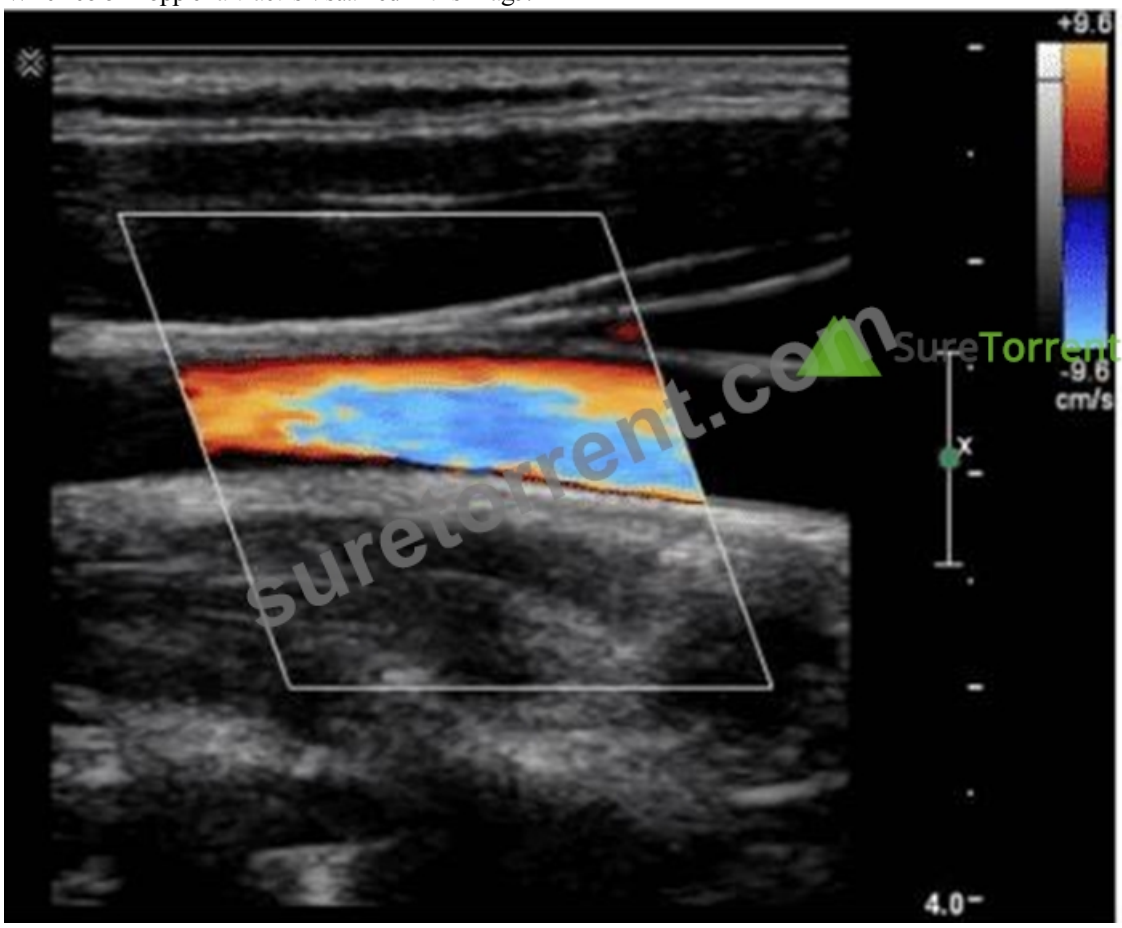
NEW QUESTION # 36
Which Doppler control adjustment could eliminate the end-diastolic velocity in the Doppler spectrum?

- A. Increased Doppler gain
- B. Increased velocity scale
- C. Increased wall filter
- D. Increased packet size

Answer: C

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
The end-diastolic velocity represents the lower velocity portion of the Doppler waveform. The wall filter (or high-pass filter) removes low-frequency Doppler shifts from the spectral display. When the wall filter is increased, it filters out these low-velocity signals - including diastolic flow components. According to sonography Principles and Instrumentation reference materials:
"The wall filter eliminates low-velocity signals from the Doppler spectrum. Increasing the wall filter may completely eliminate end-diastolic velocities, especially in low-resistance arterial flow." Therefore, the correct answer is D: Increased wall filter.
-

NEW QUESTION # 37
Which color Doppler artifact is visualized in this image?



- A. Twinkle
- B. Bleed
- C. Aliasing
- D. Ghosting

Answer: C

Explanation:

The color Doppler image shows an artifact where high-velocity blood flow exceeds the Nyquist limit, resulting in color wrap-around or aliasing. This artifact is visualized as a mosaic pattern of colors that abruptly change, indicating that the velocity exceeds the color Doppler scale's maximum. Aliasing occurs when the sampling rate (pulse repetition frequency) is insufficient to accurately capture the high velocities, causing the display to cycle back to lower velocities.
References:
ARDMS Sonography Principles & Instrumentation Guidelines
Hagen-Ansert SL. Textbook of Diagnostic Ultrasonography. 8th ed. St. Louis, MO: Mosby; 2017.

NEW QUESTION # 38
What is the result of increasing the wall filter setting during Doppler sampling?

- A. Reduced display of low-frequency shifts
- B. Diminished aliasing
- C. Decreased bandwidth
- D. Creation of spectral broadening

Answer: A

Explanation:
Comprehensive and Detailed Explanation From Exact Extract:
The wall filter in Doppler ultrasound is designed to eliminate low-frequency signals, typically associated with motion artifacts such as vessel wall or tissue motion. These low-frequency signals are not part of the desired blood flow signal and can interfere with accurate Doppler display.
When the wall filter setting is increased, it removes these low-frequency signals from the Doppler spectrum.
However, increasing the wall filter too much can also eliminate true low-velocity flow information, leading to a loss of clinically relevant data.
This principle is described in official sonography Principles and Instrumentation references:
"Increasing the wall filter will reduce the display of low-frequency Doppler shifts, which are typically associated with slow-moving structures. These low-frequency signals can represent either slow blood flow or tissue motion artifacts." Therefore, the correct answer isD: Reduced display of low-frequency shifts.

NEW QUESTION # 39
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