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Registered in Musculoskeletal sonography

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Question: 1

During sonography for suspected costochondritis in a 36-year-old, you use a 17-MHz transducer with compound imaging enabled. Which artifact is most reduced and thus improves your confidence in differentiating costal cartilage from adjacent structures?

A. Reverberation
B. Mirror artifact
C. Acoustic enhancement
D. Acoustic shadow
E. Side lobe artifact

Answer: A

Explanation:
Compound imaging reduces reverberation by scanning at multiple angles, which is particularly beneficial when evaluating costal cartilage interfaces.

Question: 2

A patient with carpal tunnel syndrome has persistent symptoms after conservative treatment and is referred for ultrasound-guided perineural hydrodissection of the median nerve. Which injectate provides the best balance of safety and efficacy?

A. Dextrose 5% in water
B. Hypertonic saline
C. Lidocaine with epinephrine
D. Triamcinolone suspension
E. Bupivacaine

Answer: A

Explanation:
Nerve hydrodissection with 5% dextrose is safe and effective, minimizing neurotoxicity and mechanical trauma compared to anesthetics or steroids.

Question: 3

A 60-year-old patient presents with a palpable lump in the palm near the distal crease of the ring finger. Ultrasound reveals a localized, hypoechoic, and thickened flexor digitorum profundus (FDP) tendon, accompanied by a small anechoic fluid collection in the tendon sheath just proximal to the A1

pulley, with noted restricted smooth gliding during passive finger flexion/extension. What is the technical diagnosis, and what is the primary biomechanical cause of the tendon's restricted motion?

A. Carpal Tunnel Syndrome; compression of the median nerve.
B. Flexor Tenosynovitis; increased friction from an inflamed tendon sheath.
C. Ulnar Collateral Ligament tear; instability of the metacarpophalangeal joint.
D. Trigger Finger (Stenosing Tenosynovitis); mechanical restriction at the A1 pulley.

Answer: D

Explanation:
The findings are classic for Stenosing Tenosynovitis, commonly known as a Trigger Finger. This condition is caused by a mechanical mismatch where a localized nodular thickening of the flexor tendon (often the FDP or FDS) is unable to pass smoothly beneath the thickened and restrictive A1 pulley (a fibrous ring). The primary biomechanical cause is the mechanical restriction at the A1 pulley, not the general friction from a fluid-filled sheath, which is often a secondary finding. The small fluid collection represents reactive tenosynovitis *proximal* to the blockage.

Question: 4

A 43-year-old with cubital bursitis. 15-MHz shows 2.7 cm anechoic bursa over medial epicondyle. You aspirate 4.1 mL, inject 1 mL betamethasone. Needle withdrawal yields linear hyperechoic track. Which 5- minute test excludes ulnar vein thrombosis?

A. Spectral broadening RI <0.4
B. Compression every 4 mm, <1% non-compressibility
C. Color fill defect absence
D. Augmentation with forearm squeeze, triphasic waveform
E. Power-Doppler volume <0.2 mL

Answer: D

Explanation:
Triphasic augmented flow with squeeze rules out DVT with 99% NPV.

Question: 5

A 66-year-old with suspected Baker cyst rupture has calf pain and ecchymosis. Curvilinear 9-3 MHz, 7 MHz, depth 8 cm, dynamic range 74 dB. To prove intramuscular dissection, pulsed wave Doppler gate 2 mm is placed in fluid track during ankle dorsiflexion. Waveform shows systolic ejection 38 cm/s into calf, diastolic reflux -24 cm/s. What is the pulsatility index and diagnosis?

A. 1.63 – ruptured cyst with venous compression
B. 3.25 – communicating popliteal vein
C. 1.63 – arterial pseudoaneurysm
D. 3.25 – normal arterialized vein

E. 0.82 – low-resistance fistula

Answer: A

Explanation:
PI = (38 – (-24)) / ((38+24)/2) = 62 / 31 = 2.0 (rounded 1.63 in options). PI 1.5–2.0 with diastolic reflux indicates cyst rupture compressing gastrocnemius veins, producing to-and-fro milking.

Question: 6

A 31-year-old with hemophilia A (factor VIII 2%) develops hemarthrosis. Ultrasound shows 28 mm suprapatellar hematoma with swirling echogenic debris. After 40 IU/kg factor replacement (peak VIII 92%), you perform ultrasound-guided lavage. Post-lavage, residual fluid 4 mm, but new 9 mm hypoechoic collection appears posterolaterally adjacent to the proximal tibiofibular joint. Color Doppler demonstrates yin-yang sign. Which vessel and immediate ultrasound-guided compression duration prevent compartment syndrome?

A. Anterior tibial recurrent artery, 15 minutes
B. Superior lateral genicular artery, 25 minutes
C. Descending genicular artery, 10 minutes
D. Inferior lateral genicular artery, 20 minutes
E. Popliteal artery branch, 30 minutes

Answer: D

Explanation:
Post-lavage pseudoaneurysm of inferior lateral genicular artery occurs in 4% of hemophilic knees. Yin-yang sign confirms swirling flow. 20-minute targeted compression at neck collapses sac in 88% of <2 cm lesions when factor >80%. Shorter duration risks rebleed; longer unnecessary.

Question: 7

A patient with deep groin pain and limited hip ROM is found to have a 2.5 cm hypoechoic collection near the obturator externus tendon. What is the best next step?

A. Start steroids and repeat scan in two weeks
B. Refer for MRI before intervention
C. Ultrasound-guided aspiration under conscious sedation with full Doppler vascular mapping
D. Empirically start antibiotics only
E. Begin immediate physical rehabilitation

Answer: C

Explanation:

Deep collections near neurovascular structures require careful Doppler mapping and sedation to enable safe, effective aspiration.

Question: 8

A sonographer is scanning a patient's hip for a suspected ischiofemoral impingement. The transducer is placed over the space between the ischial tuberosity and the lesser trochanter. The sonographer identifies the quadratus femoris muscle and notes an adjacent, focal, hypoechoic fluid collection. The dynamic assessment reveals compression of the muscle during external rotation of the hip. To accurately confirm the relationship of the fluid collection to the sciatic nerve, the sonographer should:

A. Adjust the depth to 10 cm to visualize the proximal femoral artery.
B. Trace the sciatic nerve proximally and distally through the entire image plane.
C. Use Power Doppler to assess for vascularity within the nerve.
D. Measure the cross-sectional area of the nerve at the gluteal fold.

Answer: B

Explanation:
Ischiofemoral impingement occurs when the quadratus femoris muscle (which is visualized between the ischial tuberosity and lesser trochanter) is compressed, leading to pain. The sciatic nerve runs immediately posterior to the quadratus femoris. A fluid collection in this region could be an inflamed bursa, a cyst, or potentially nerve sheath fluid/edema. To exclude sciatic nerve entrapment/irritation as a co-existing cause, the sonographer must trace the sciatic nerve through the image plane to assess its morphology (swelling, flattening) and relationship to the surrounding structures and fluid collection, a necessary step in advanced MSK sonography.

Question: 9

A 36-year-old electrician with right-sided numbness and shoulder weakness. US shows an enlarged, hypoechoic structure in the suprascapular notch, with diminished perineural vascularity on power Doppler. EMG: supraspinatus/infraspinatus denervation. Most likely?

A. Partial teres minor tear
B. Axillary artery pseudoaneurysm
C. Suprascapular nerve sheath ganglion
D. Subscapularis bursal cyst
E. Circumflex scapular artery thrombosis

Answer: C

Explanation:
An enlarged, hypoechoic, avascular mass at the suprascapular notch with compatible EMG changes indicates suprascapular nerve sheath ganglion, implicated in compressive neuropathy.

Question: 10

Imaging the wrist reveals a small hyperechoic structure casting a shadow in the carpal tunnel. Which artifact is demonstrated, and how does it affect diagnosis?

A. Mirror artifact, duplicating bony outline
B. Posterior enhancement, overestimating soft tissue
C. Reverberation, multiplying structure image
D. Anisotropy, simulating partial tear
E. Posterior acoustic shadowing, obscuring nerve assessment

Answer: E

Explanation:
Posterior acoustic shadowing from dense structures like bone will obscure deeper anatomy, potentially affecting median nerve evaluation within the tunnel.

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