

SMRT Student Scope Submission

Title and Author(s)
Title: Avascular Necrosis Authors: Chad Hovseth Supervisor Name / Affiliation: Adam Stevens, University of Nebraska Medical Center Date of Submission: May 4, 2006
Introduction or Patient History
☐ This is a 53-year-old, African-American male with an extensive medical history. He was diagnosed with HIV/AIDS in 1997 and has had various opportunistic infections since then. He has Kaposi sarcoma of the right thigh which is currently being treated with electron beam treatment. Liver lesions have been found and appear to be consistent with Kaposi metastases. The patient has also been diagnosed with Hepatitis B, osteoporosis, perianal herpes simplex, PCP pneumonia, and esophageal candidiasis. Due to shoulder pain a series of shoulder x-rays were performed and displayed a subchondral fracture of the right humeral head consistent with avascular necrosis (AVN). His physician referred him to Orthopedics to treat the AVN. His orthopedic physician in turn ordered an MRI of the same shoulder to discover the extent of the AVN
Patient Preparation and Scan Set up
☐ This procedure was completed on a GE 1.5 tesla scanner. Prior to the exam, the patient was screened consistent with safety guidelines. After screening the patient, he was positioned supine and headfirst. An appropriate surface shoulder coil was firmly positioned on his right shoulder. The use of table straps allowed for the reduction of motion artifact. The patient was given earplugs and an emergency squeeze bulb for his safety.
MR Imaging Parameters
☐

Series	TR	TE	Slice Thickness	FOV	Signal Averages	Matrix
3 plane loc.	366.6	13.6	5mm skip2.5	48cm	1	256x128
Axial Proton Density w/ Fat Saturation	3400	39.5	3mm skip .5	14cm	4	320x224
Coronal Proton Density w/ Fat Saturation	3000	41.7	4mm skip .5	14cm	4	320x224
Coronal T2	3816	98	4mm skip .5	14cm	4	320x224
Sagittal T2	4066	98	4mm skip .5	14cm	4	320x224
Coronal T1	366	13	4mm skip .5	14cm	4	320x224

Findings and Discussions



This set proton density images visualizes avascular necrosis (AVN) of the right humeral head. The affected area includes the superior medial humeral head and almost the entire articular surface with a diameter of approximately 3.0cm. Low signal from inside the bone tissue represents the necrosis. The necrotic tissue is somewhat diffuse with an irregular shape and undefined borders. An associated subchondral fracture with findings of early collapse and possible fragmentation was also found. Edema is also seen in the bone tissue, with an intrasubstance tear of the supraspinatus tendon. Irregularities of the posterior superior labrum most likely represent a tear.

Conclusions



AVN is a condition resulting from the loss of blood supply to osseous tissue. This can be a temporary or permanent process which is not fully understood at this point. Most commonly AVN is caused by trauma, corticosteroids, excessive alcohol use, and blood coagulation disorders. AVN may be diagnosed by a variety of tests such as x-ray, CT, bone density, and biopsy, but the most sensitive exam of detection is MRI. Depending on the severity, AVN can weaken the bones ability to bear weight, resulting in collapse of the tissue. When the tissue becomes necrotic it goes through a process of liquefaction. This in turn has low signal on T1 weighted images, and high signal on T2 weighted images. AVN is most commonly found in the femoral head, but may also be present in the shoulder and knee joints. Treatment is based on the severity of the necrosis and ranges from different medications to total joint replacement.

References



Damjanov, Ivan. Pathology for the Health Related Professions. Copyright 2000. Saunders.

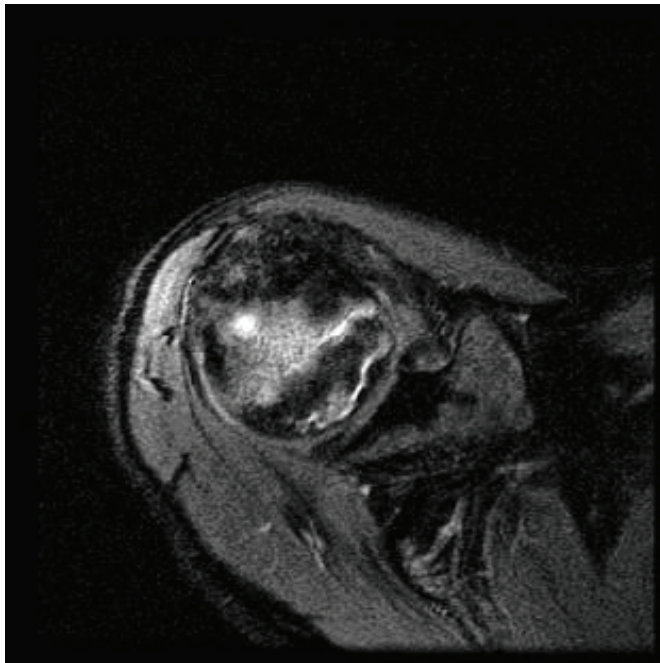
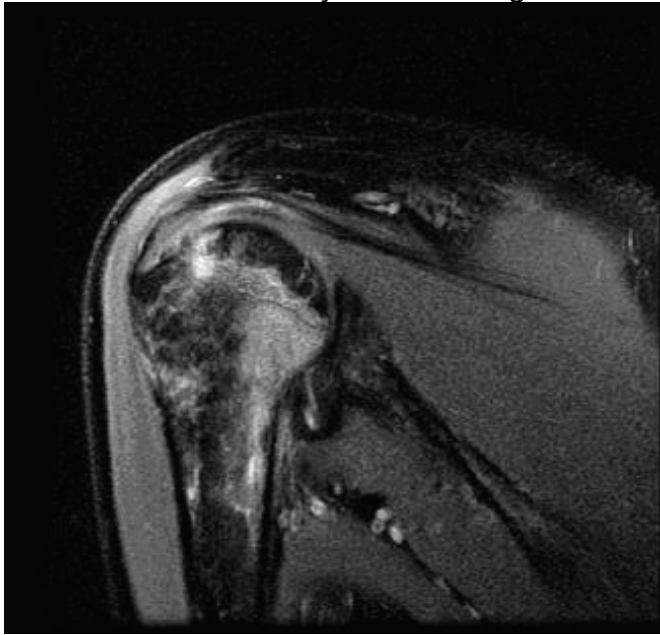
Walker MD, Craig. MRI dictation report, staff physician. University of Nebraska Medical Center. 13 Nov. 2005.

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www.rad.washington.edu/mskbook/.

Images



Coronal Proton Density Fat Sat image.



Axial Proton Density Fat Sat image showing AVN.