AN ATYPICAL OSTEOARTHRITIC KNEE COMPLICATION

Resident(s): Joanna Kee-Sampson
Attending(s): Sean K. Calhoun
Program/Dept(s): Atlantic Health System – Morristown Medical Center
CHIEF COMPLAINT & HPI

• Chief Complaint
  • Recurrent right knee swelling, pain and hemarthrosis.

• History of Present Illness
  • 67-year-old male with history of coronary artery disease presents with recurrent right knee hemarthrosis that began 9 months ago shortly after taking Plavix for coronary stents. At that time, arthrocentesis yielded 60-80mL of blood. Plavix was stopped but hemarthrosis recurred 3 days later. Thereafter he had large hemarthrosis occurring approximately every two months, each occurrence requiring arthrocentesis.
· Past Medical History
  · Lyme arthritis in his right knee, 5 years ago
  · Coronary artery disease
  · Atrial fibrillation

· Past Surgical History
  · CABG in 2007

· Family & Social History
  · Non-contributory

· Review of Systems
  · Negative

· Medications
  · Aspirin 81mg, Sotalol, Lisinopril, herbal supplements

· Allergies
  · NKDA
DIAGNOSTIC WORKUP

• Physical Exam
  • Afebrile
  • Lower extremities: no pain, swelling or redness at exam, normal ranges of motion bilaterally

• Laboratory Data
  • Hgb/Hct: 13.5/41.1
  • WBC: 6.09
  • Plt: 228

• Non-Invasive Imaging
DIAGNOSTIC WORKUP: QUESTION

- AP and lateral projections of the right knee demonstrate:

A) a joint effusion and tricompartmental osteoarthritis most severe at the lateral tibiofemoral compartment.

B) Subtle lucent lesion at the medial femoral condyle, without aggressive features.

C) An incomplete transverse fracture through the proximal tibia.

D) Normal knee anatomy without evidence of pathology.
THE CORRECT ANSWER IS A.

- AP and lateral projections of the right knee demonstrate:
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  B) Subtle lucent lesion at the medial femoral condyle, without aggressive features.
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  D) Normal knee anatomy without evidence of pathology.

CONTINUE WITH CASE
DIAGNOSTIC WORKUP: QUESTION

- Axial, coronal and sagittal PD fat sat images from MRI of the right knee demonstrate:

  A) Findings of chronic meniscal, ACL and PCL tears.

  B) Severe lateral tibiofemoral compartment arthrosis, hypertrophied synovium at the lateral knee, and a joint effusion.

  C) A well marginated fluid collection in the anterolateral aspect of the knee consistent with an ectopic popliteal cyst.

  D) Normal knee anatomy without evidence of pathology.
THE CORRECT ANSWER IS B.

- Axial, coronal and sagittal PD fat sat images from MRI of the right knee demonstrate:
  A) Findings of chronic meniscal, ACL and PCL tears.
  B) Severe lateral tibiofemoral compartment arthrosis, hypertrophied synovium at the lateral knee, and a joint effusion.
  C) A well-marginated fluid collection in the anterolateral aspect of the knee consistent with an ectopic popliteal cyst.
  D) Normal knee anatomy without evidence of pathology.

CONTINUE WITH CASE
DIAGNOSTIC WORKUP

- Patient went for RLE arteriogram performed at an outside institution, which demonstrated hypervascular blush and hyperemia at the lateral aspect of the knee joint. This was followed by arthroscopic synovial biopsy which demonstrated benign synovial tissue with reactive changes consistent with proliferative synovitis.
DIAGNOSIS

- Recurrent right knee hemarthrosis secondary to hypertrophic vascular synovium, likely related to severe osteoarthritis
INTERVENTION: OVERVIEW

1. Right lower extremity arteriogram
2. Selective arteriograms of inferior lateral geniculate and superior lateral geniculate arteries
3. Particle embolization of inferior lateral geniculate artery followed by coil embolization
4. Particle embolization of superior lateral geniculate artery followed by coil embolization

Image: Right lower extremity arteriogram demonstrates marked hypervascular blush at the lateral aspect of the knee, supplied by the superior lateral geniculate and inferior lateral geniculate arteries.
INTERVENTION: DETAILED

Procedure:

1. The left common femoral artery was accessed using a micropuncture needle, which was then exchanged over a wire for a 6 French sheath.

2. A 5 French Omniflush catheter was advanced over the bifurcation to the right common femoral artery and a right lower extremity arteriogram was performed. Hypervascular blush and hyperemia was evident at the lateral knee, which appeared to be supplied by the superior lateral geniculate and inferior lateral geniculate arteries.

3. The Omniflush catheter was exchanged for a 5 French angled glide catheter over a wire, and was advanced to the popliteal artery positioned at the origin of the right inferior lateral geniculate artery. Selective arteriogram was performed, demonstrating significant supply to the lateral compartment with hypervascular blush and hyperemia. There was no evidence of an AVM or pseudoaneurysm.

4. A Progreat microcatheter was advanced coaxially through the glide catheter and particle embolization of the inferior lateral geniculate artery was performed using 1mL of 500-700 micron tris-acryl gelatin microspheres. This was followed by placement of four 3x5mm microcoils at the main branch, several centimeters from its origin.

Image A: Selective arteriogram of inferior lateral geniculate artery demonstrates significant supply to the lateral knee with hypervascular blush.

Image B: Post embolization with particles and coils. Popliteal arteriogram demonstrates no remaining flow to the inferior lateral geniculate artery.
**Procedure:**

5. Repeat right popliteal arteriogram demonstrated a hypertrophied superior lateral geniculate artery, with retrograde filling to the inferior lateral geniculate artery to the level of the embolization coils.

6. The Progreat microcatheter was advanced coaxially through the glide catheter to the descending portion of the superior lateral geniculate artery, and selective arteriogram was performed. This showed moderate hypervascularity at the lateral aspect of the joint.

7. The vessel was then embolized with <1mL of 500-700 micron tris-acryl gelatin microspheres, followed by three 2x5mm microcoils, then one 4x7mm microcoil in the descending portion of the superior lateral geniculate artery.

8. Repeat popliteal arteriogram showed significantly diminished hypervascularity to the lateral knee. Completion arteriography demonstrated patent three-vessel runoff and patent dorsalis pedis and posterior tibial arteries. Sterile dressings were applied after removal of catheters and guidewires.

*Image C: Selective arteriogram of the descending portion of the superior lateral geniculate artery demonstrates moderate hyperemia to the lateral joint. Image D: Post embolization arteriogram demonstrates significant diminished hypervascularity to the lateral knee.*
CLINICAL FOLLOW UP

- The patient did well and has not had any additional episodes of hemarthrosis to date.
Summary

67-year old man with hypertrophic vascular synovium presents with recurrent right knee hemarthrosis which began shortly after taking Plavix, subsequently treated successfully with transarterial embolization (TAE). The patient did well and has not had any additional episodes of hemarthrosis to date.

Teaching points:

1. Hypertrophic vascular synovium can lead to knee hemarthrosis, either spontaneously or after trauma, because of the friability of the tissue and fragility of the vessels. This can be exacerbated by anticoagulant medication.

2. Arthritides (degenerative/inflammatory/infectious) are some of the underlying causes of synovial hypertrophy. It has also been described to occur as a late complication of knee arthroplasty, with hemarthrosis occurring when the prosthesis/cement impinges on the hypertrophic synovial tissues.

3. The angiographic features of hypertrophic vascular synovium are hypertrophic feeding arteries and a hypervascular blush around the joint.

4. Selective TAE is a good alternative to surgery and less invasive than synovectomy for the treatment of knee hemarthrosis related to hypertrophic vascular synovium, when conservative treatments fails.
REFERENCES


