History: 61 year old man with total knee arthroplasty (TKA) performed 2011 with subsequent partial synovectomy and wash out for infection in November 2013. Presents in December 2013 with a new, bloody effusion aspirated in the referring physician’s office. Imaging shown was obtained in December 2013.
Multiple axial PD images
Multiple axial PD images
Two coronal images obtained during the early phases of a magnetic resonance angiogram of the right knee
Ultrasound with Power Doppler of the right knee
Findings

Initial MRI demonstrates intermediate signal within a large joint effusion in the setting of a prior TKA. The multiple axial images then demonstrate a high T2 weighted signal mass at the lateral aspect of the suprapatellar pouch. MRA demonstrates an “early filling” mass at the superolateral aspect of the knee arising from the superior lateral genicular artery. A dense amount of early staining is also see of the adjacent synovium. The ultrasound demonstrates bidirectional flow within the mass that demonstrates arterial waveform on the Doppler study.
Large joint effusion containing intermediate signal debris
Mass about the suprapatellar pouch
Mass “filling in” during early phase of MRA

Dense, early staining of lateral synovium
Bidirectional flow with a swirling or yin-yang type configuration

Arterial waveform
Diagnosis: Pseudoaneurysm following total knee arthroplasty with recurrent hemarthrosis

Recurrent hemarthrosis following total knee arthroplasty is occasionally related to pseudoaneurysm (psA) formation as in this case which then can bleed and cause a hyperemia of adjacent, friable synovium. The psA can be seen in this case as the early filling mass on the angiographic study and by the mass showing bidirectional flow on the Doppler ultrasound. This bidirectional flow is often described as a yin-yang appearance and is characteristic. Within the psA there is arterial flow which at the neck may become particularly turbulent. The early staining synovium relates to a local hyperemia and proliferation of the synovium. Most cases of recurrent hemarthrosis following TKA are less well understood and do not have an associated psA. They are postulated to be secondary to bleeding that causes hyperemic, friable synovium to proliferate and subsequently bleed, leading to a vicious cycle. The PD images of this study show the intermediate hemorrhagic debris as well as the high T2 weighted signal mass which represents the psA. As in this case, psA can be treated with transcatheter embolization typically yielding resolution of the problem. In the setting of recurrent hemarthrosis without psA and with a dense staining synovium, transcatheter embolization can be attempted if a dominant vessel is found. Arthroscopic synovectomy may be attempted if there is staining of the synovium without a dominant vessel.
Resources