25 yo M with right ankle pain for the past 5 years.
Primary Synovial Osteochondromatosis

• debate as to whether a metaplastic or benign neoplastic process

• can also involve tendon sheaths and bursae

• wide age range but typically affects pt in 3rd-5th decades, M > F

• symptoms often insidious and gradually progressive; avg delay of dx is 5 yrs

• monarticular, rarely more than 1 joint

• knee most common joint (50-65%), followed by hip, shoulder, elbow, ankle
Pathogenesis and Pathologic Features

• 1\textsuperscript{st} phase: active formation of hyaline cartilaginous bodies within synovium with no loose bodies

• 2\textsuperscript{nd} phase: both synovial cartilaginous proliferation and shedding of intra-articular bodies

• 3\textsuperscript{rd} phase: complete shedding of numerous intra-articular bodies and inactive synovial proliferation

• No evidence in the literature that PSOC actually progresses through these three stages in any definite order
**Pathogenesis and Pathologic Features**

- subsynovial cartilage neoplasia, synovial hyperplasia, and production of synovial bodies
- loose bodies can continue to grow nourished by synovial fluid
- synovial bodies typically similar in size and shape; range from few mm to several cm
- fusion or coalescence of bodies may occur
- at microscopy lobules of hyaline cartilage surrounded by synovial lining
- low-grade chondrosarcoma can be particularly difficult to differentiate due to both having hypercellular and atypical hyaline cartilage features


Imaging: Radiographs

- classically multiple (> 5) calcified or ossified bodies of similar shape and size, evenly distributed, normal joint space

- normal in 5%-30% when purely cartilaginous

- chronic disease or multiple recurrences may lead to 2nd oa

- bone erosion in less capacious joints (hip, wrist, ankle)

- juxta-articular osteopenia not typically present unless the result of disuse

Imaging: MR

- purely cartilaginous nodules with no calcification
  - high water content of hyaline cartilage
  - intermediate to low on T1 and high on T2
  - may be mistaken for joint effusion or mass
  - contrast administration will demonstrate peripheral and septal enhancement with nonenhancing cartilage

- calcification (most common)
  - low on T1 and T2, more conspicuous on GRE

- endochondral ossification
  - high signal relative to fat and peripheral low signal

Differential Diagnosis

- **secondary synovial osteochondromatosis**
  - older age, extensive deg changes
  - fewer bodies and variable size
  - several rings of calcifications on radiographs

- **infectious or inflammatory arthritis**
  - rheumatoid arthritis, MAI, coccidioidomycosis, sarcoidosis
  - tiny, uniform size
  - contain no mineralization
  - more commonly layer dependently
  - intermediate on T1 and low on T2

- **PVNS**
  - more confluent and frond like
  - dark signal and blooming of hemosiderin deposits

http://radsource.us/primary-synovial-chondromatosis/
Malignant Transformation

- rare
- largest series in the literature, reported by Davis et al. (53 cases) 5% prevalence
- synovial chondrosarcoma may arise as the 1º condition but vast majority related to preexisting disease
- rapid increase in size of lesion or rapidly deteriorating clinical course → biopsy
- most are low grade and can be histologically similar to synovial osteochondromatosis
- may be difficult to distinguish between recurrence and transformation
  - true cortical erosion with marrow invasion and permeation

Treatment

• treatment of choice is surgical resection (synovectomy and removal of bodies)

• controversy regarding surgical treatment
  – conflicting results may be explained by differing phases
  – phase 1: synovectomy
  – phase 2: synovectomy and chondral body removal
  – phase 3: removal of bodies and no synovectomy

• extra-articular disease (whether 1° or due to extension) is important to detect as it **can not** be treated arthroscopically

• overall recurrence for intra-articular disease ranged from 3-23% and higher rates for extra-articular

• recurrence typically within 5 years after initial resection
References


