

# Subcutaneous, Intramuscular, and Intraosseous Synovial Cyst Formation Around the Knee in Rheumatoid Arthritis/Systemic Lupus Erythematosus Overlap Syndrome

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A 58-year-old woman was diagnosed with rheumatoid arthritis (RA)/systemic lupus erythematosus overlap syndrome at 39 years of age. She had been treated with 10 mg daily doses of orally administered prednisolone since age 42. She noticed a small mass in the lateral aspect of her right knee at 53 years of age, which continued to enlarge gradually in the ensuing 5 years. Examination revealed a marked deformity of both hands and fingers, and bilateral hallux valgus deformities. A large, subcutaneous, cystic mass, measuring 13 × 7 × 5 cm, was noted in the lateral aspect of the knee. The mass was soft, smooth-surfaced, well defined, fluctuant, and slightly tender. Mild redness was observed in the overlying skin. The range of motion of the knee was slightly restricted, but joint effusion was minimal. In addition, the right distal thigh was diffusely swollen, and another mass, measuring 8 × 5 × 4 cm, was palpable in the quadriceps femoris muscle. The thigh mass was soft and ill defined. She also had a subcutaneous cystic mass 3 cm in diameter in the medial aspect of her right elbow, and diffuse swelling in her right buttock. She was afebrile.

Laboratory data showed C-reactive protein of 0.81 mg/dl (normal 0–0.6), rheumatoid factor 54 IU/ml (normal 0–15), and anti-DNA antibody of 21 IU/ml (normal 0–6). Cytologic examination of the aspirates from the subcutaneous mass in the lateral knee revealed numerous chronic inflammatory cells.

Radiographs of the knee revealed mild degenerative changes in the joint, and increased soft tissue density in the lateral aspect of the knee. Magnetic resonance imaging (MRI) examination revealed a large subcutaneous lesion, a multicystic lesion in the quadriceps femoris muscle, and an intraosseous lesion in the distal femur. The lesions showed homogeneous iso-signal intensity to muscle on T1-weighted images (Figure 1A), and markedly high signal intensity on T2-weighted images, suggesting a fluid collection (Figure 1B). Contrast-enhanced computed tomographic (CT) scans through the distal femur revealed a multicystic lesion with

low density. Contrast-enhanced CT scans through the knee revealed a subcutaneous lesion with low density in the lateral knee, a wall of which was enhanced (Figure 2). In addition, the CT scans revealed bone cysts in the patella and the femoral intercondylar area. MRI scans of the right hip revealed distended greater trochanteric bursitis.

The patient subsequently underwent excision of the subcutaneous, intramuscular, and femoral intraosseous lesions of the knee. Intraoperative findings revealed that the subcutaneous mass communicated with the anterolateral portion of the knee joint cavity, by a narrow stalk (Figure 3). The intramuscular mass also communicated with the suprapatellar pouch. The communication between the intraosseous lesions and the joint was not confirmed intraoperatively. Histologic specimens obtained at surgery showed inflamed synovial cysts consisting of hypertrophic synovial lining cells and fibrous connective tissues, admixed with numerous histiocytes, lymphocytes, and plasma cells (Figure 4). The cysts contained abundant fibrinoid material.

Bursal distention in the popliteal region is not an uncommon finding in patients with RA and degenerative osteoarthritis of the knee. However, development of multiple synovial cysts at various sites and in various organs is extremely unusual. There have been only a few such cases of this extraarticular manifestation of RA in the English language literature<sup>1-3</sup>. Setoyama, *et al*<sup>1</sup>, Chen, *et al*<sup>2</sup>, and Yasuda, *et al*<sup>3</sup> described isolated case reports of RA patients who had multiple extraarticular synovial cysts in the extremities. None of these cases, however, demonstrated multimodality imaging features of the lesions. It is interesting that most cases of extraarticular synovial cyst formation have been reported in Japanese RA patients, as in our case<sup>1-3</sup>. Chen, *et al* speculated that genetic or environmental factors might contribute to its development<sup>2</sup>.

To our knowledge, all previous reports of multiple extraarticular synovial cysts showed that there was no



Figure 1. Coronal MRI scans of the right knee show a large subcutaneous lesion in the lateral aspect of the knee, an intramuscular multicystic lesion, and an intraosseous lesion in the distal femur. The lesions show iso-signal intensity to muscle on T1-weighted images (A), and markedly high signal intensity on T2-weighted images (B).

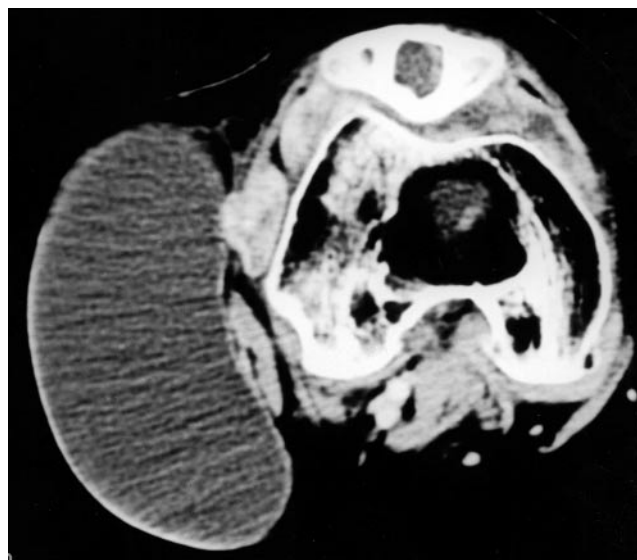


Figure 2. A contrast-enhanced CT scan shows a subcutaneous lesion with low density in the lateral knee, and bone cysts in the patella and the femoral intercondylar area.

evidence of communication between the cysts and the joint cavities<sup>1-3</sup>. Yasuda, *et al* suggested that the multiple cysts originated in superficial bursae secondary to rheumatoid inflammation and localized stress<sup>3</sup>. In the present case, however, careful intraoperative observations revealed that the subcutaneous and intramuscular cysts had communications with the knee joint space, as illustrated in Figure 3. We believe that some “extraarticular” cysts result from prolapse of the joint synovial membrane<sup>4</sup>.

#### REFERENCES

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Figure 3. A photograph at surgery shows a subcutaneous synovial cyst communicating with the knee joint cavity by a narrow stalk (arrow).

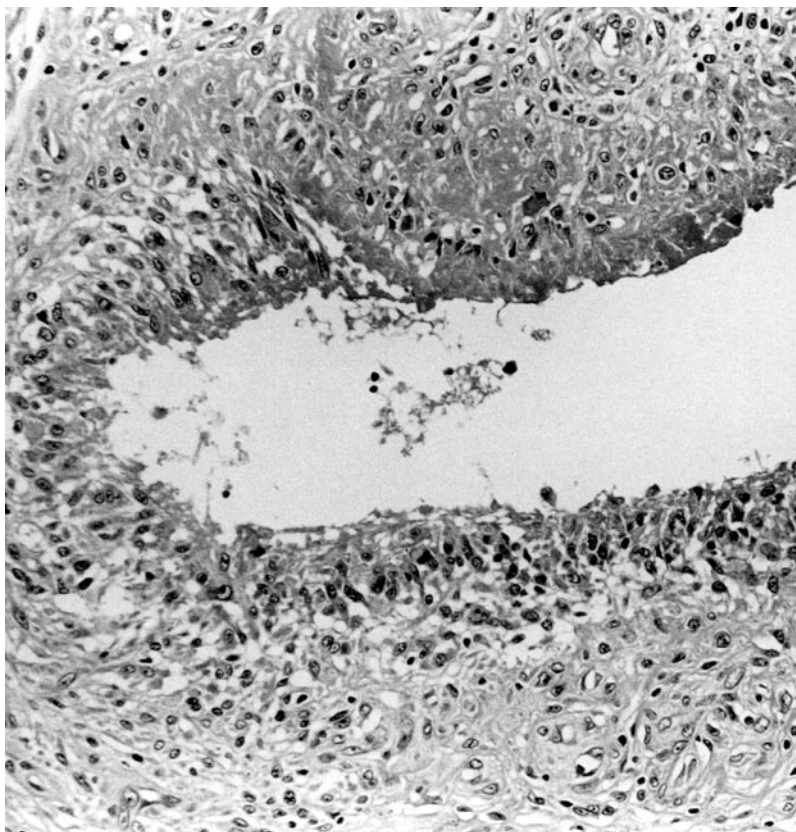


Figure 4. Histologic specimens of the subcutaneous synovial cyst consist of hypertrophic synovial lining cells and fibrous connective tissues, and numerous inflammatory cells (H&E stain, original magnification  $\times 200$ ).