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CASE REPORT

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Anterior tibial compartment syndrome following rupture of a popliteal cyst

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Abstract A ruptured popliteal cyst usually results in calf pain and swelling. We report the case of a patient with rheumatoid arthritis who developed anterior compartment syndrome of the leg following rupture of a popliteal cyst. Since acute compartment syndrome requires prompt treatment, clinicians should be aware of this rare complication.

Key words Anterior tibial compartment syndrome · Lateral popliteal cyst · Popliteal cyst · Rupture

Introduction

Popliteal cysts are masses of distended bursa in the popliteal fossa, commonly seen in arthritic knees. It is well known that rupture or dissection of these cysts results in severe pain and swelling in the calf area.[1–3] Many reports have emphasized the importance of early correct diagnosis and subsequent appropriate treatment, since the clinical manifestations of ruptured popliteal cysts simulate deep-vein thrombophlebitis, which is often termed "pseudothrombophlebitis syndrome."[1–3] However, such a rupture rarely develops into acute compartment syndrome of the leg.[4–6] We describe the case of a patient with rheumatoid arthritis (RA) who developed anterior compartment syndrome following rupture of a popliteal cyst.

Case report

A 47-year-old man with a 22-year history of seropositive RA came to our hospital complaining of severe pain in the right leg. Three days earlier, he had noted a moderate swelling of the right knee, and after sudden pain in the right leg the previous evening, the swelling progressively increased. During our physical examination, the anterolateral aspect of the right leg showed marked swelling down to the ankle, with a slight amount of redness and local warmth. The knee joint showed moderate effusion and synovitis, as well as a small mass in the popliteal fossa. The right foot showed "drop foot" because the ankle and toe extensor muscles were scarcely functioning, and paresthesia and hypesthesia were detected in the dorsal portion. The dorsalis pedis artery was slightly palpable. Plain radiograph images of the leg showed no abnormalities. These clinical findings indicated anterior compartment syndrome, and the pressure level in the anterior compartment was 177 mmHg on the right side and 25 mmHg on the left. After diagnosing the patient with anterior compartment syndrome, we performed an emergency fasciotomy of the anterior compartment approximately 20 h after the onset of the severe pain. Intraoperative findings revealed fluid leakage proximally from the lateral aspect of the knee into the anterior compartment, and we therefore performed intraoperative arthrography in order to determine whether a ruptured popliteal cyst was the cause of the condition. The arthrogram revealed contrast agent, which had been injected into the knee joint, leaking from the lateral aspect of the knee into the anterior compartment through the superior tibiofibular joint, indicating that the anterior compartment syndrome was due to rupture of a popliteal cyst (Fig. 1). This was confirmed by computed tomography (CT) images as well as arthrographic images of both legs, which were performed 2 weeks after the operation (Fig. 2). Following the operation, the patient experienced relief of the leg pain and the wound healed without any complications. However, 3 months later, palsy in the right foot remained, which required additional reconstruction surgery.

Discussion

We treated a patient with RA for anterior compartment syndrome following rupture of a popliteal cyst. We know

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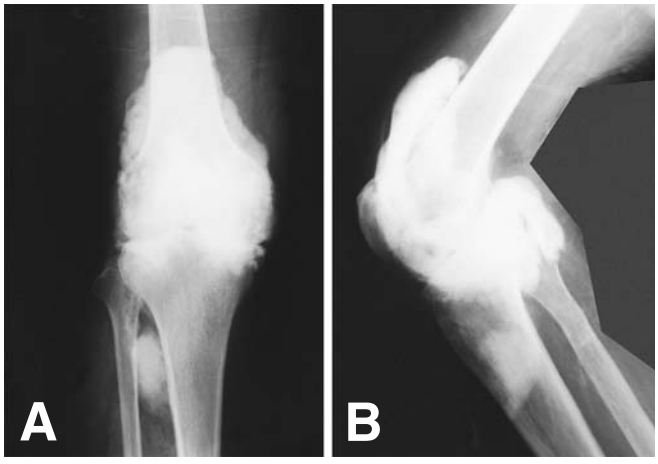

Fig. 1. Arthrograph of the right knee showing the contrast agent, which had been injected into the knee joint, leaking from the lateral aspect of the knee into the anterior compartment through the superior tibiofibular joint. **A** Anteroposterior view. **B** Lateral view

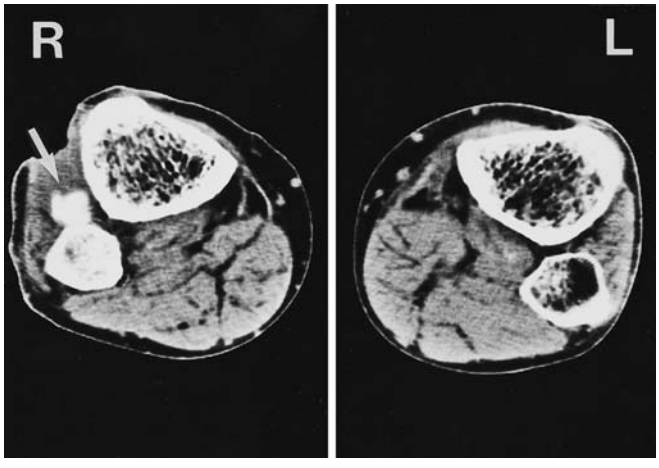

Fig. 2. Computed tomography images with arthrography of both legs, 2 weeks after the operation, showing leakage of the contrast agent into the right anterior compartment (*arrow*)

of only one other case similar to ours, described by Hammoudeh et al.,[4] in which a girl with juvenile RA was diagnosed with anterior compartment syndrome caused by an anterior dissection of a popliteal cyst. In both cases, an arthrogram showed leakage of the contrast agent at the lateral aspect of the knee joint into the anterior compartment through the superior tibiofibular joint, suggesting that the infiltration of inflammatory synovial fluids into the anterior compartment was responsible for the condition.

In the popliteal fossa, it is common to have several dilatations of the bursa. These are generally called popliteal cysts, and are classified into subcategories according to the originating bursa.[7] The majority of these cysts are formed by fluid distension of the semimembranosus bursa, which communicates with the knee joint in some subjects.[7,8] Rupture of this cyst usually induces calf pain and swelling, simulating deep-vein thrombophlebitis, or very occasionally results in posterior compartment syndrome. This can happen after inadequate treatment because of a misdiagnosis of thrombophlebitis.[5,6]

Lateral popliteal cysts, which are in another subcategory, are found in the lateral part of the popliteal fossa, and are thought to be distended popliteus bursa, although they are rather uncommon. Their anatomical characteristics suggest that a rupture may manifest differently from a semimembranosus bursa. Indeed, previous reports indicate that a lateral dissection of a popliteal cyst showed unusual manifestations such as an anterior tibial mass.[9,10] Lateral popliteal cysts are known to become involved with the superior tibiofibular joints,[7–9] and it has been demonstrated that the fascia of the anterior compartment extends proximally anterior to the superior tibiofibular joint.[11] Thus, after considering the arthrography findings in our case, as well as the results in the report by Hammoudeh et al.,[4] we concluded that the rupture of a lateral popliteal cyst can cause anterior compartment syndrome.

The rupture of a popliteal cyst results in common forms of calf pain and swelling, mimicking deep-vein thrombophlebitis, and is rarely associated with anterior and posterior compartment syndromes of the leg. Considering the anatomical characteristics of lateral popliteal cysts, their rupture or dissection could be a cause of anterior compartment syndrome. Since a correct diagnosis and prompt treatment is very important for acute compartment syndrome, these rare complications in arthritic knees, as well as in normal knees, should be recognized.[12]

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