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CASE REPORT

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A case of spontaneous hemoarthrosis after a total knee arthroplasty

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Abstract A 63-year-old woman with osteoarthritis had undergone right total knee arthroplasty. Nineteen months later, the patient presented with a recurrent hemoarthrosis. Open arthrotomy revealed hypertrophic synovium with small clots in the suprapatellar pouch, but entrapment of synovial tissues could not be observed. Histological examination of the extirpated specimen showed fibrous hypertrophy of synovium. The patient has no symptoms 51 months after surgery.

Key words Hemoarthrosis · Hypertrophic synovium · Osteoarthritis · Total knee arthroplasty

Case report

A 63-year-old woman with osteoarthritis had undergone right total knee arthroplasty (Hi-tech knee II: flat surface, uncemented, cruciate-retaining type). There were no intraoperative complications, and the patient made an uneventful recovery. Preoperative alignment was 10.0° varus and changed to 1.0° valgus postoperatively. The Japanese Othopaedic Association (JOA) score improved from 45 points to 80 points.

Nineteen months after arthroplasty, the patient presented with acute swelling and pain in the right knee (see Fig. 1). The aspiration of fluid from the right knee in the outpatient clinic revealed a large hemoarthrosis. She could not think of any provoking cause of acute swelling and pain in the right knee. However, she had lasting pain in the left osteoarthritic knee, and she had been pulling her weight on her right leg when she walked. Despite the conservative therapy such as aspiration, cooling, and cast immobilization, three acute swellings of the right knee had been observed for 4 months, and she was admitted to the orthopedic department. There was no history of trauma and anticoagulation medication besides high-blood pressure. On physical examination, she was afebrile. Swelling at the right knee joint was found, but there was neither tenderness nor erythema around the right knee. The range of motion was between 5° and 110°. The JOA score decreased to 55 points.

Laboratory tests showed a white blood cell count of 4700/μl, hemoglobin of 12.0 g/dl, platelet of 234×10^3/μl, and C-reactive protein (CRP) level of 0.1 mg/dl. The coagulation time and bleeding time were 10 min 30 s and 3 min 0 s, respectively. The Lumpel–Reede test was negative. The prothrombin test and activated partial thromboplastin time showed 91% and 38.9 s. Forty-five milliliters of fluid was aspirated from the right knee. There was no growth on the culture of a specimen of the fluid.

Arthroscopic exploration was performed, but the bleeding sites could not be confirmed in the right knee joint. Open exploration was then performed through a medial parapatellar arthrotomy. In the suprapatellar pouch, the hypertrophic synovium was observed with small clots, but entrapment of synovial tissues could not be observed (Fig. 2). A formal synovectomy was performed with excision of the hypertrophic synovium. The polyethylene insert was exchanged to confirm the condition of the posterior capsule. There were no other abnormalities in the knee joint. The removed polyethylene insert showed no deformity or delamination. The patient now has no symptoms 51 months after surgery.

Discussion

Recurrent hemoarthrosis after total knee arthroplasty is uncommon. The incidence has been reported to be from 0.3%[1] to 0.5%.[2] In our series of primary total knee arthroplasties on up to 1000 cases, this is the first case of hemoarthrosis. The incidence is considered to be 0.1% in our series, which is compatible with previous reports. In

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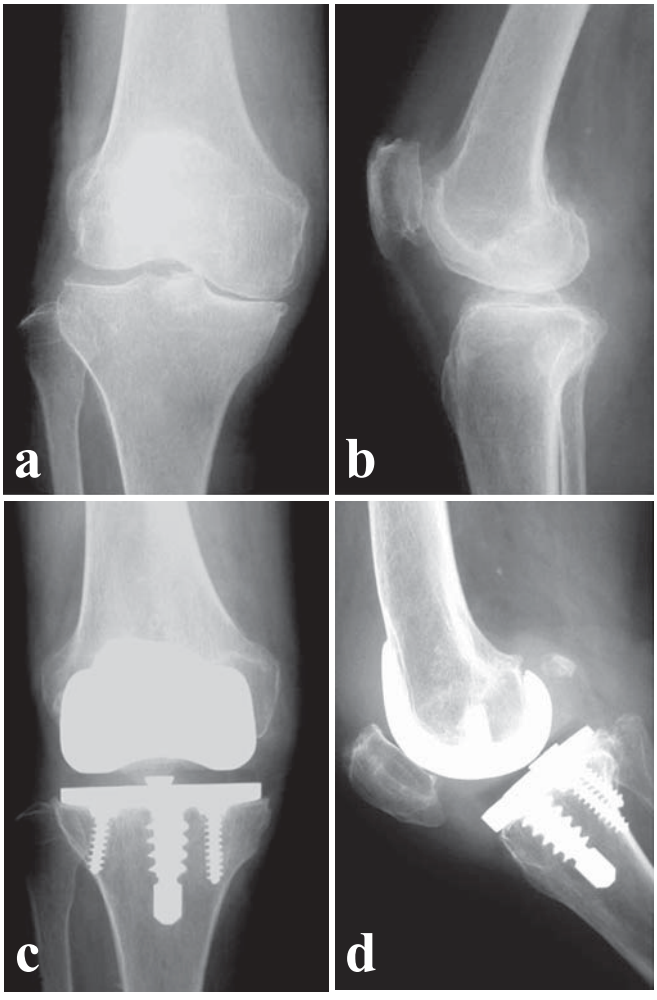

Fig. 1. **a,b** Preoperative radiographs of a 63-year-old woman. This film shows a typical medial-type osteoarthritic knee. **c,d** Radiographs at the first medical examination of our clinic. Her prosthesis is stable. A lateral view shows joint effusion in suprapatellar pouch and posterior capsule

1995, Oishi et al.[1] and Kindsfater et al.[3] reported the entity of recurrent hemoarthrosis. Fifty-three cases[1–9] of recurrent hemoarthrosis have been reported, except cases of pigmented villonodular synovitis,[10] hemophilia,[16] and implant failure[11] (Table 1). Twelve cases could not demonstrate causes because conservative treatments were performed. Entrapment of the proliferative synovial tissue in the patellofemoral or femorotibial joints caused hemoarthrosis in 16 (30.2%) in 53 cases. Open synovectomy or arthroscopic synovectomy improved the symptoms in 34 (64.2%) cases. Three (5.7%) of 53 cases showed hypertrophy of genicular artery, or hypervascularization around the joint. All three cases were treated successfully with embolization. Nevertheless, the causes of hemoarthrosis remained unclear in 19 (35.8%) of 53 cases. Proliferative synovial tissues were often observed with unknown origin. Instability of ligament balance, loosening of component, and minor trauma are thought to be important factors inducing synovial proliferation. Furthermore, hypertension, diabetes mellitus, and anticoagulant therapy often make the hypertrophic synovium fragile. The level of activities of daily living is considered to be an important factor for recurrent hemoarthrosis because 51 of 53 (96.2%) cases had osteoarthritis.

In our case, histological examination showed fibrous hypertophy of synovium, mild inflammation, and deposit of hemosiderin. Instability in ligament balance, loosening of component, and entrapment of synovial tissues could not be observed. The combination of hypertension, high activity, and laterality of our patient's right leg in weight bearing for the left osteoarthritic knee may have caused hemoarthrosis. However, hypertrophy of genicular arteries and hypervascularization around the knee joint cannot be excluded because of the lack of angiography.

The initial treatment of hemoarthrosis is conservative with aspiration, cooling, and cast immobilization. Any anticoagulants should be discontinued if possible. Under bibliographical consideration, 10 of 59 cases were treated with

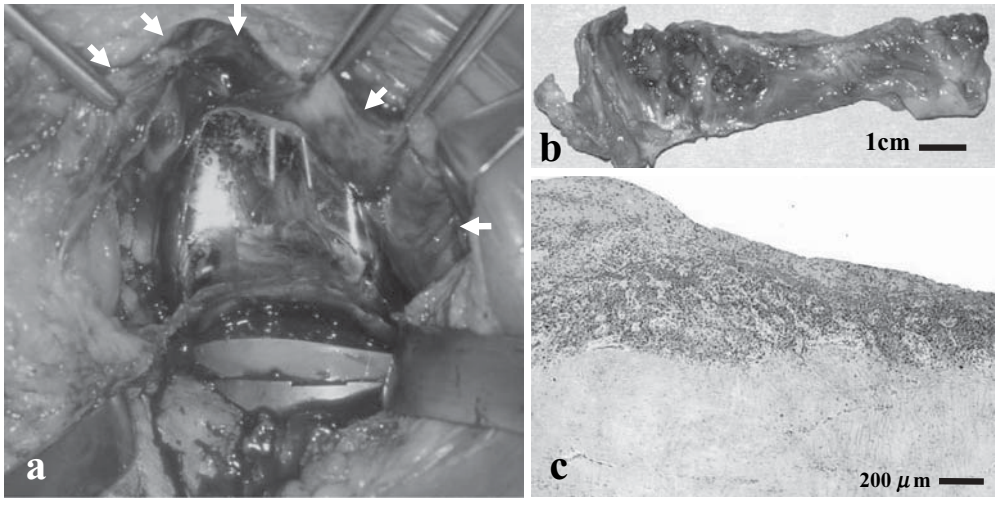

Fig. 2. **a** Intraoperative photograph. A hypertrophic synovium was observed in suprapatellar pouch (*arrows*). **b** An extirpated specimen. **c** Hypertrophic synovium, mild inflammation, and deposit of hemosiderin were observed (H&E stain, ×40)

Table 1. Case reports on hemoarthrosis

First author[Ref.]	Year	Cases	Causes
Oishi[1]	1995	1	Entrapment of proliferative synovial tissue in the patellofemoral joint
Kindsfater[3]	1995	30	9 (entrapment), 12 (unknown), 9 (conservative)
Worland[2]	1996	7	4 (entrapment), 3 (unknown)
Katsimihas[4]	2001	1	Hypertrophy of a superior genicular artery with lifelong warfarin therapy
Cunningham[5]	2001	1	Hypertrophy of a superior lateral genicular artery due to an oversized femoral component
Goto[6]	2002	1	Unknown
Pham[7]	2003	1	Hypervascularization around the knee joint
Pritsch[8]	2003	1	Hypertrophy of a superior lateral genicular artery
Ohdera[9]	2004	10	4 (unknown), 2 (entrapment), 1 (unstable knee), 3 (conservative)

anticoagulants. Four of 13 cases had to continue their treatment of inherent disease after hemoarthrosis. Six of 13 cases showed recurrent hemoarthrosis after discontinuation of anticoagulants. In the case of recurrent hemoarthrosis, synovectomy is a common treatment. Arthroscopic synovectomy has the advantage of controlling bleeding if bleeding points can be confirmed.[13] However, 7 of 11 cases caused recurrent hemoarthroses after arthroscopic synovectomy. In our case, arthroscopic observation failed to find bleeding sites and open synovectomy was performed to acquire complete remission.

Recently, angiography and embolization have been reported to be less invasive and effective for the treatment of recurrent hemoarthrosis. This procedure will be considered in the diagnosis and the treatment of recurrent hemoarthrosis before arthrotomy.

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