CASE REPORT

Hirokazu Kobayashi · Shaw Akizuki Tsutomu Takizawa · Yukihiro Yasukawa · Jyun Kitahara

Three cases of pseudogout complicated with unicondylar knee arthroplasty

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Abstract Pseudogout is an uncommon complication of arthroplasty, so it is important to distinguish pseudogout from infection. We experienced three patients with the acute onset of pseudogout after unicondylar knee arthroplasty (UKA). Treatment with nonsteroidal anti-inflammatory drugs (NSAID) and cooling improved the symptoms of all three patients, and there have been no further episodes. Because there is a large area uncovered by the UKA prosthesis, it is necessary to keep in mind the possibility of pseudogout affecting the operated knee.

Keywords Complication · Pseudogout · Unicondylar knee arthroplasty

Introduction

We report three cases of pseudogout with symptoms resembling infection after unicondylar knee arthroplasty (UKA). When complications occur after UKA, this problem should be kept in mind, since it is important for pseudogout to be distinguished from infection.

Case reports

Case 1

The patient was a 74-year-old man with osteoarthrosis (OA) who underwent UKA of the left knee joint on April 5, 1994. Four weeks after surgery, severe pain, swelling, redness, and heat were suddenly noted in the left knee. Antibiotics were administered for suspected postoperative infection but did not produce any improvement of his symptoms. No calcium deposits were evident in the joints of this patient on X-ray films taken before and after surgery

H. Kobayashi \cdot S. Akizuki $(\boxdot) \cdot$ T. Takizawa \cdot Y. Yasukawa J. Kitahara

Department of Orthopaedic Surgery and Rehabilitation, Nagano Matsushiro General Hospital, Matsushiro183 Nagano, Japan e-mail: sakizuki@hosp.nagano-matsushiro.or.jp,

Fax: +81-26-2789167

(Fig. 1and 2). No calcium deposits were seen macroscopically in the joint on inspection during the operation. The synovial fluid was cloudy and pale yellow in color, and calcium pyrophosphate dihydrate (CPPD) crystals were detected that were refraction negative on polarized microscopy. Culture for bacteria was negative. Histological examination showed CPPD crystals within the synovial membrane resected during the operation in this patient (Fig. 3). There was a sudden increase of the C-reactive protein (CRP) level in this patient during the pseudogout attack, but the white blood cell count (WBC) remained within the normal range. CRP returned to normal within 1 week (Fig.4). He was diagnosed as having pseudogout and showed marked improvement of symptoms after treatment with a nonsteroidal anti-inflammatory drug (NSAID) and cooling. This patient has continued on a low dose of NSAID over the long term and has not experienced any repeat attacks.



Fig. 1 X-ray findings before surgery (case 1). No calcium deposits were evident in the joint of this patient on X-ray films taken before surgery



Fig. 2 X-ray findings after surgery (case 1). No calcium deposits were evident in the joint of this patient on X-ray films taken after surgery



Fig. 3 Histological findings (hematoxylin and $eosin, \times 50$). Histological examination showed calcium pyrophosphate dihydrate (CPPD) crystals in the synovial membrane in case 1

Case 2

The patient was a 79-year-old man with OA who underwent UKA of the right knee joint on May 24, 1995. No symptoms occurred postoperatively for several years, but suddenly severe pain, swelling, and redness of the right knee developed in January 1998. The synovial fluid was reddish-brown and bloody. It contained CPPD crystals that were refraction negative on polarized microscopy. Culture for bacteria was negative. Histological examination showed no CPPD crystals in the synovial membrane resected during the operation in this case. There was also a sudden increase in the CRP level in this patient during the pseudogout attack, but the WBC remained within the normal range. CRP decreased markedly after 3 days and returned to normal within 1 week (Fig.4). He was di-



Fig. 4 An electrolyte change. There was a sharp rise of the C-reactive protein level in all of the patients during the pseudogout attack, but the white blood cell count remained within the normal range

agnosed as having pseudogout and showed marked improvement of symptoms after treatment with NSAID and cooling.

Case 3

The patient was an 82-year-old man with OA who underwent bilateral UKA on April 7, 1998. Two weeks after surgery, he suddenly developed severe pain, swelling, and heat in both knees without any predisposing factors. He was given antibiotics for suspected infection, but showed no response. No calcium deposits were evident in the joints on X-ray films obtained before and after surgery. No calcium deposits were seen macroscopically in the joints on inspection during the operation. The synovial fluid was cloudy and pale yellow. It contained CPPD crystals that were refraction negative on polarized microscopy, while culture for bacteria was negative. Histological examination showed no CPPD crystals in the synovial membrane resected at the time of operation. There was again a sudden increase of CRP in this patient during the pseudogout attack, but the WBC remained normal. CRP decreased markedly after 3 days and returned to the normal range within 1 week (Fig. 4). He showed marked improvement of his symptoms after NSAID therapy and cooling.

Discussion

Postoperative infection is the most serious complication of arthroplasty and requires careful attention.

Pseudogout differs from septic arthritis and postoperative infection in that the patient's general condition is good relative to the local findings, and tapping of the joint fluid results in rapid improvement of symptoms. A definitive diagnosis of pseudogout can be made if CPPD crystals are detected in the joint fluid by polarized microscopy and if synovial fluid cultures are negative [4]. It is important to keep the possibility of postoperative pseudogout in mind, since symptoms improve dramatically in response to cooling and NSAID administration [1].

Pseudogout is classified into the following clinical types: A (pure pseudogout attacks), B (pseudorheumatoid arthritis), C (OA with pseudogout attacks), D (OA without pseudogout attacks), E (asymptomatic), F (pseudoneuropathic OA), G (monoarthritis), G+ (type G with attacks after trauma or surgery), H (hemarthrosis), I (isolated masses), Das (pseudoankylosing spondylitis), and Dp (spinal compression) [2, 6]. Cases 1 and 3 appeared to be type G+, while case 2 was type H.

Pseudogout attacks can occur during the treatment of trauma as well as before or after surgery. We had 1 patient who experienced pseudogout in the knee after surgery among 150 patients who underwent total hip arthroplasty, as well as 2 patients with pseudogout of the knee on the operated side before surgery and one with involvement of the contralateral knee after surgery among 300 patients who underwent total knee arthroplasty (TKA). There were also 3 patients with pseudogout in the operated knee before surgery among 140 patients who underwent high tibial osteotomy at our hospital [1]. However, none of them experienced pseudogout in the operated joint. In the series of 98 patients (134 knees) who underwent UKA at our hospital, we encountered 3 who developed pseudogout in the operated knee after surgery. Intraarticular calcium deposits were only seen in 20 knee joints (15%) of 11 patients before surgery in our hospital. However, no such deposits were observed on preoperative radiographs in any of the three patients described in the present report, nor were CPPD crystals seen postoperatively in pathology specimens from cases 2 and 3. The three patients described here accounted for 3% of our series of UKA cases and show that pseudogout can occur even when preoperative radiographs give no indication of the disease. Pseudogout is a very rare complication of arthroplasty according to the literature. Compared with TKA, there are some features predisposing to attacks of pseudogout after UKA: (1) the large area of unreplaced joint surface, (2) preservation of the meniscus and cruciate ligaments, and (3) the relatively good knee function as a result of a greater range of motion. The disease is easily mistaken for postoperative infection because the symptoms (local pain, swelling, and heat) and the characteristics of the synovial fluid resemble those found in infection [3, 5]. Therefore, it is important to keep in mind the possibility of postoperative pseudogout when diagnosing and treating arthroplasty patients.

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