



## Case report

# Treatment of postoperative sciatic nerve palsy after total hip arthroplasty for postoperative acetabular fracture: A case report



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## HIGHLIGHTS

- We report a case of total hip arthroplasty for postoperative acetabular fracture with postoperative sciatic nerve palsy.
- The sciatic nerve palsy tends to develop after total hip arthroplasty following osteosynthesis for acetabular fracture.
- It would have been beneficial to use MEP, as a decrease in amplitude would have alerted to the need for neurolysis surgery.

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## ABSTRACT

Acetabular fracture is usually treated with osteosynthesis. However, in the case of an intra-articular fracture, osteosynthesis can result in arthropathy of the hip joint and poor long-term results, hence, total hip arthroplasty is required. However, in total hip arthroplasty for postoperative acetabular fracture, sciatic nerve palsy tends to develop more commonly than after primary total hip arthroplasty. This is a case report of a 57-year-old Japanese male who had internal skeletal fixation for a left acetabular fracture that had occurred 2 years earlier. One year later, he developed coxarthrosis and severe pain of the hip joint and total hip arthroplasty was performed. After the second surgery, he experienced pain along the distribution of the sciatic nerve and weakness of the muscles innervated by the peroneal nerve, indicating sciatic nerve palsy. We performed a third operation, and divided adhesions around the sciatic nerve. Postoperatively, the anterior hip joint pain and the buttocks pain when the hip was flexed were improved. Abduction of the fifth toe was also improved. However, the footdrop and sensory disturbance were not improved. A year after the third operation, sensory disturbance was slightly improved but the footdrop was not improved. We believe the sciatic nerve palsy developed when we dislocated the hip joint as the sciatic nerve was excessively extended as the hip joint flexed and internally rotated. Sciatic nerve adhesion can occur easily in total hip replacement for postoperative acetabular fracture; hence, adhesiotomy should be conducted before performing hip dislocation to prevent injury caused by nerve tension. The patient agreed that the details of this case could be submitted for publication. The work has been reported in line with the CARE criteria and cite.

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## 1. Introduction

Acetabular fracture is usually treated with osteosynthesis. However, in the case of an intra-articular fracture, osteosynthesis can result in arthropathy of the hip joint and poor long-term results; hence, total hip arthroplasty is required. Infection,

dislocation, vascular injury, and nerve injury are generally the main complications in total hip arthroplasty. However, in total hip arthroplasty for postoperative acetabular fracture, sciatic nerve palsy tends to develop more commonly than after primary total hip arthroplasty [1,2].

We report a case of total hip arthroplasty for postoperative acetabular fracture with postoperative sciatic nerve palsy, and discuss steps to deal with sciatic nerve palsy. We surmise that the cause of sciatic nerve palsy was sciatic nerve adhesions after the primary operation.

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### 1.1. Presentation of case

In November 2012 a 57-year-old Japanese male sustained a left acetabular fracture that had occurred 2 years earlier (Fig. 1). Ten days later, osteosynthesis was performed for the left acetabular fracture. The osteosynthesis was done with a plate that was installed in the ischial tuberosity from the acetabular posterior wall. Postoperatively, bone union was obtained and he was able to walk with a cane. However, 1 year later he developed coxarthrosis and severe pain of the hip joint; his Japanese Orthopaedic Association (JOA) hip joint function score was 52. Radiographs showed stage 4 arthritis based on the JOA hip score, and there was no ectopic ossification. Sciatic nerve palsy had not developed after the initial injury and the first operation.

We conducted a second operation 1 year after the initial operation. A posterior approach was used to reconstruct the acetabular roof by total hip replacement. We removed hardware that was providing an obstacle to the total hip arthroplasty; several screws were removed, but the plate was not. We did not identify and release the sciatic nerve, as sciatic nerve palsy had not developed. The femoral head was posteriorly dislocated with adduction, internal rotation, and flexion of the hip joint. The acetabular and femoral head cartilage was injured. Cementless total hip arthroplasty was performed according to plan (Fig. 2).

Sciatic nerve palsy developed postoperatively. The patient had pain along the sciatic nerve distribution, and a footdrop or weakness of the muscles innervated by the peroneal nerve. He started gait training with a brace. One year after the second operation, the pain along the sciatic nerve distribution had improved, and sensory disturbance was slightly improved, but the muscle weakness or footdrop had not improved. The patient did not have hip joint pain, and he was able to walk with a brace without a cane. JOA hip joint function score was 77. There was no ectopic ossification seen radiographically. Tinel's sign was noted on his buttocks, and he had buttocks pain when his hip joint was flexed, especially in the sitting position. He had pain in the anterior surface of the hip joint, and had not been able to return to his work delivering mail. Therefore, neurolysis surgery was planned.

The third operation was performed using the Kocher-Langenbeck approach 2 years after the second operation. We identified the sciatic nerve, and conducted neurolysis surgery from the greater sciatic foramen to the insertion of the gluteus maximus. The sciatic nerve was entirely adhered, and was narrower than the intact part. Adhesion in the proximal fracture department circumference was especially severe and showed sciatic nerve appanation (Fig. 3). Before neurolysis surgery, the sciatic nerve was immobile, and was under tension at hip joint flexion. After



Fig. 1. Radiograph showing a left acetabular fracture.

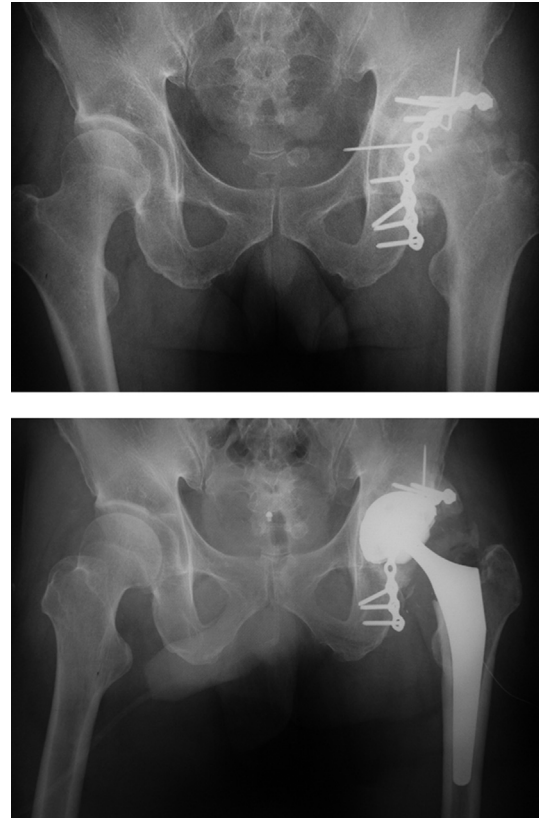


Fig. 2. Radiograph showing stage 4 arthritis, based on Japanese Orthopaedic Association radiographic hip score. No ectopic ossification was observed. We removed hardware that was preventing us from conducting the total hip arthroplasty. Several screws were removed, but not the plate. Cementless total hip arthroplasty was performed according to plan.

neurolysis, the sciatic nerve had moved forward, and was not under tension even at hip joint flexion. We performed intraoperative motor-evoked potential (MEP) testing using the transcutaneous nerve stimulation method. Before neurolysis there was waveform disappearance at hip joint flexion; after the neurolysis there were small waveforms at hip joint flexion.

Postoperatively, the anterior hip joint pain and the buttocks pain when the hip was flexed were improved. Abduction of the fifth toe was also improved. However, the footdrop and sensory disturbance were not improved. A year after the third operation, sensory

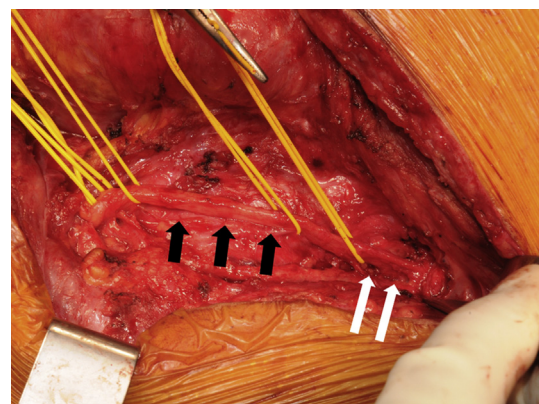


Fig. 3. Sciatic nerve (black arrow) was entirely adhered and narrower than the intact part. Adhesion in the proximal fracture department circumference was especially severe (white arrow).

disturbance was slightly improved but the footdrop was not improved; the patient was undergoing rehabilitation and was still not able to return to work.

## 2. Discussion

Acetabular fracture is usually treated with osteosynthesis. However, this can result in arthropathy of the hip joint and poor long-term results [1,2]. As a result, total hip arthroplasty is often required. This can cause problems, as sciatic nerve palsy tends to develop more commonly after total hip arthroplasty following osteosynthesis for acetabular fracture than after primary total hip arthroplasty [1]. We report a case of total hip arthroplasty for postoperative acetabular fracture with postoperative sciatic nerve palsy.

There are four situations in which sciatic nerve palsy can occur. The first is direct nerve injury during posterior hip joint dislocation at the time of injury. The second is iatrogenic nerve palsy during osteosynthesis because of direct or indirect injury caused by traction [3]. Third, heterotopic ossification can occur after an operation or injury [3,4], causing sciatic nerve palsy to occur several months after the injury or operation [4]. Fourth, sciatic nerve palsy often occurs when secondary surgery such as total hip arthroplasty is performed [1]. Our case comes under this fourth category. If we had noticed symptoms of sciatic nerve disorder before the total hip arthroplasty, we would have performed neurolysis surgery. In our case, the patient had coxalgia, but no sciatic nerve palsy. Osteosynthesis for the posterior wall fracture had been done one year previously using the Kocher-Langenbeck approach, with a long osteosynthesis plate placed from the greater sciatic notch to the ischial tuberosity. We did not confirm the position of the sciatic nerve at that time, but it is likely that the sciatic nerve was near the osteosynthesis plate. The sciatic nerve may have interfered with the osteosynthesis plate postoperatively, become covered in scar tissue, and lost mobility. In the third operation, the sciatic nerve was seriously adhered. The operative approach may have directly damaged the sciatic nerve. However, the damage was more likely to have occurred when we dislocated the hip joint, as the sciatic nerve can be easily injured due to excessive extension when the hip joint is flexed and internally rotated. In the third operation, the sciatic nerve was found to be almost entirely covered in adhesions, and was narrower than the intact part. Adhesion in the area of the initial proximal fracture was especially severe and showed sciatic nerve appanation; before the neurolysis surgery, the sciatic nerve was immobile, and was under tension during hip joint flexion.

We used MEP when we performed the third neurolysis operation. It would have been beneficial to use MEP for the total hip arthroplasty, as a decrease in amplitude during hip dislocation would have alerted us to the need for neurolysis surgery. Before neurolysis, there was waveform disappearance at hip joint flexion, while there were small waveforms at hip joint flexion after the neurolysis. It is unknown whether this is neurologically significant; however, after neurolysis the patient had improved anterior hip joint pain and buttocks pain, and improved abduction of the fifth toe. There seemed to be improvement in nerve conduction, but improvement of the dropfoot will take more time. We will continue to follow the patient's progress, as changes may develop over the next 2 years [4].

## 3. Conclusions

This was a case of total hip arthroplasty for postoperative acetabular fracture with postoperative sciatic nerve palsy. Even if

there is no neuropathy, sciatic adhesion can occur in total hip replacement for postoperative acetabular fracture; hence, nervous adhesiotomy should be conducted before performing hip dislocation to prevent injury caused by nerve tension. And it would have been beneficial to use MEP for the total hip arthroplasty, as a decrease in amplitude during hip dislocation would have alerted us to the need for neurolysis surgery.

## Ethical approval

This case report is written based on institutional ethical committee.

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No funds were received in support of this study. No benefits in any form have been or will be received from a commercial party related directly or indirectly to the subject of this manuscript.

## Author contribution

Please specify the contribution of each author to the paper, e.g. study design, data collections, data analysis, writing. Others, who have contributed in other ways should be listed as contributors.

AK conceived the study, participated in its design and coordination, and drafted the manuscript. KK helped to draft the manuscript. OO helped to draft the manuscript. AM helped to draft the manuscript. IM helped to draft the manuscript. All authors read and approved the final manuscript.

## Conflict of interest

No funds were received in support of this study. No benefits in any form have been or will be received from a commercial party related directly or indirectly to the subject of this manuscript.

## Guarantor

Akio Kanda.

## Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

## Competing interests

The authors declare that they have no competing interests.

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