Joint Diseases and Related Surgery

Jt Dis Relat Surg
2024;35(2):433-438

CASE REPORT

Ipsilateral above-knee amputation in patient with recurrent dislocation after total hip arthroplasty: A case report

Ming Li, MD, Zhenglin Di, MD, Leling Feng, MD

Department of Joint Surgery, Ningbo No. 6 Hospital, Ningbo, China

ABSTRACT

Amputation secondary to vascular complications of recurrent dislocations after total hip arthroplasty (THA) is an extremely rare. We describe an unusual case of above-knee amputation resulting from vascular complications after recurrent dislocations of a THA. A 63-year-old male patient with walking pain and limp has a history of acetabular fracture and central dislocation of the femoral head. He was diagnosed as post-traumatic arthritis and subluxation of the femoral head and suffered from four similar dislocations in 210 days after the THA. The patient received conservative treatment after every hip dislocation. However, four months after the fourth reduction, the emergent femoral artery and popliteal artery exploration and catheter thrombectomy were performed at another hospital. An ipsilateral above-knee amputation was done after sepsis and failure of the revascularization procedure. Clinicians should be cognizant that above-knee amputation resulting from vascular complications after recurrent dislocations of a THA may occur. The lack of adherence to critical treatment may have led to the severe outcome of amputation. In conclusion, patient education and compliance are essential for both the treatment of hip dislocations and arterial occlusion. More active and effective measures should be used to prevent such catastrophic events.

Keywords: Amputation, patient compliance, recurrent dislocation, thrombosis, total hip arthroplasty.

Amputation secondary to vascular complications of recurrent dislocations after total hip arthroplasty (THA) is an extremely rare, but serious complication. We describe an unusual case of an above-knee amputation being performed for arterial occlusion, which occurred due to recurrent dislocations after THA. The lessons and possible causes of the recurrent dislocations and amputation are discussed.

In this article, we report a case of ipsilateral above-knee amputation in a patient with recurrent dislocation after total hip arthroplasty.

CASE REPORT

A 63-year-old male farmer was injured in a car accident, resulting in a left acetabular fracture with central dislocation of the femoral head, bilateral proximal tibia fracture, and left patella fracture. He underwent open reductions and internal fixations of the fractures. He had a 20-year history of smoking and drinking, but denied having a history of hypertension, diabetes, and other cardiovascular and cerebrovascular diseases. Nine months later, he had walking pain in the left hip joint and a limp. At the time of his admission, his symptoms were so severe that daily walking was extremely painful without external support. The examination of his left hip revealed multiple scars, all of which were well healed. The patient had tenderness in the groin area and limited movement of the left hip joint. According to manual tests, the Allis sign, 4-word sign, and Trendelenburg sign were positive. Shortening of the left lower limb was noted in the standing position. Plain radiographs revealed post-traumatic arthritis and subluxation of the femoral head (Figure 1). Computed tomography

Received: September 10, 2023
Accepted: November 18, 2023
Published online: March 21, 2024

Correspondence: Leling Feng, MD. Department of Joint Surgery, Ningbo NO.6 Hospital, Ningbo, Zhejiang 315000, P.R. China.

E-mail: m87370016@163.com

Doi: 10.52312/jdrs.2023.1419

Citation: Li M, Di Z, Feng L. Ipsilateral above-knee amputation in patient with recurrent dislocation after total hip arthroplasty: A case report. Jt Dis Relat Surg 2024;35(2):433-438. doi: 10.52312/jdrs.2024.1419.

©2024 All right reserved by the Turkish Joint Diseases Foundation

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes (http://creativecommons.org/licenses/by-nc/4.0/).

FIGURE 1. X-ray showing traumatic arthritis with dislocation of the femoral head.

(CT) scans showed that there were some bone defects in the posterior and superior walls of the acetabulum, but there was sufficient bone to accommodate the implant (Figure 2).

Under general anesthesia and in the lateral decubitus position, a posterolateral approach to the hip was performed. The hip joint showed typical traumatic arthritis. The femoral head was dislocated from the acetabulum superiorly. Heterotopic ossification was present on the gluteus medius, some bone defects were found in the superior wall of the acetabulum, and osteophytes had formed in the anterior wall of the acetabulum. A 52-mm-diameter uncemented shell (Reflection; Smith & Nephew, Inc., Memphis, TN, USA), two supplementary screws, and a 28-mm-diameter polyethylene liner (High Crosslinked Polyethylene, Smith & Nephew Inc., Memphis, TN, USA) were used. An acetabular positioning guide was utilized intraoperatively to align the component. The acetabular component was estimated to be positioned in 15° to 20° of anteversion. The liner had a 20° elevated rim on approximately 90° of the cup face. The elevated rim was positioned posteriorly and superiorly to prevent posterior dislocation of the femoral head. An uncemented stem (Synergy; Smith & Nephew, Inc., Memphis, TN, USA) and a ceramic head with a diameter of 28 mm and length of 4 mm were used on the femoral side. Allogeneic cancellous bone was implanted in the acetabular defect. The posterior capsular structures were partially closed. The hip stability during extension and external rotation movements was satisfactory. His intraoperative radiographs showed satisfactory results (Figure 3). No postoperative immobilization or bracing was administered. The patient was discharged home five days postoperatively and began walking with the aid of a walker.

The patient visited the hospital 40 days later and presented with severe pain and swelling after turning over in bed, and a deformity of the left hip was noted. The plain radiographs revealed posterior-superior dislocation of the femoral head (Figure 4a). Closed reduction was performed under general anesthesia, and it was observed that the hip dislocated during in flexion and internal rotation. An abduction brace was used one day later, and it maintained the hip in 20 degrees of abduction and prevented flexion by more than 70 degrees. In

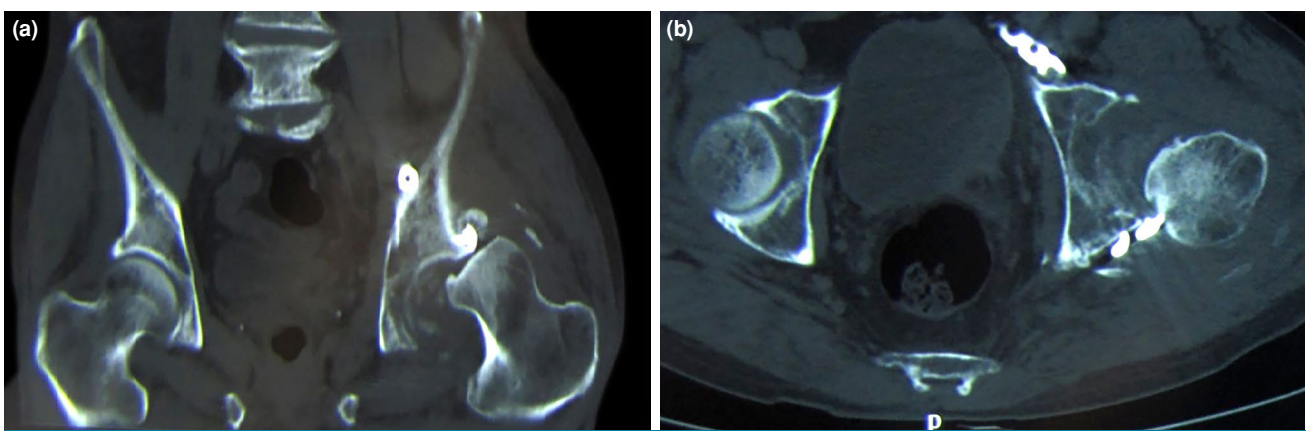

FIGURE 2. (a) Coronal CT scan showing superior dislocation of femoral head and some bone defects in the superior wall of the acetabulum. **(b)** Horizontal CT scan showing posterior dislocation of femoral head and sufficient bone in the anterior and posterior walls to accommodate the acetabular cup.
CT: Computed tomography.

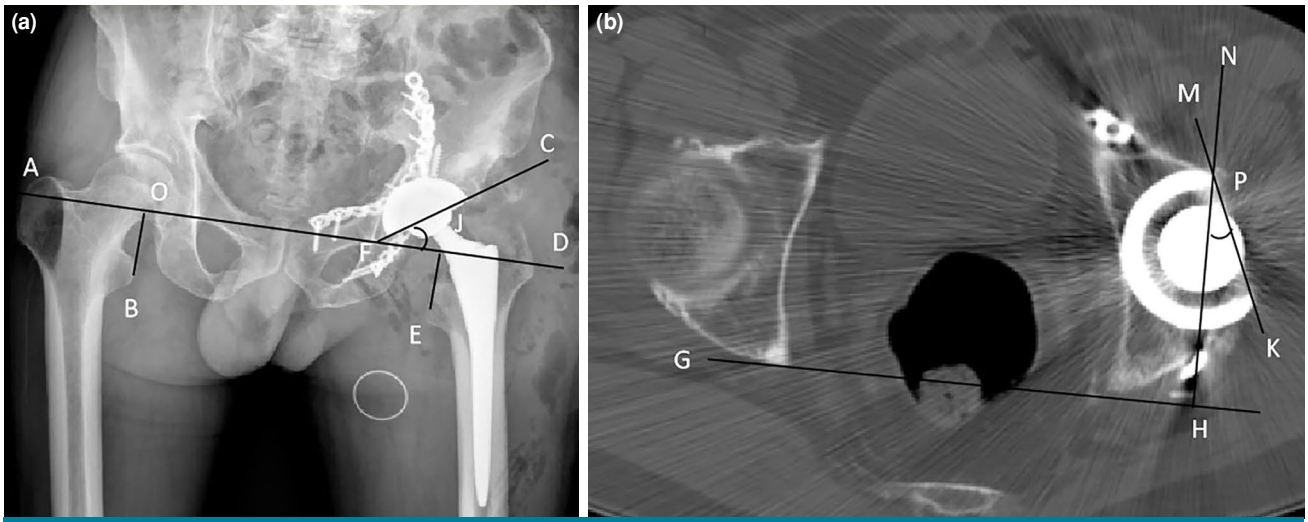

FIGURE 3. (a) Postoperative X-ray after THA showing the stem length at operated side (EJ: 45.6 mm) and at the non-operated side (BO: 46.5 mm), as well as the acetabular cup inclination at operated side (∠CFD: 34°). **(b)** Horizontal CT scan showing acetabular cup inclination at operated side (∠KPH: 20°). Measurements were undertaken according to McWilliams et al.[1]
THA: Total hip arthroplasty; CT: Computed tomography.

FIGURE 4. (a) Forty days after surgery, the first dislocation of the hip joint occurred. **(b)** After the fourth reduction, the X-rays indicated a significant increase in heterotopic ossification (red arrow). **(c)** External plaster fixation.

addition, an abduction pillow between the legs while sleeping, a high chair and an elevated toilet seat were used.

He suffered from three more similar dislocations at 30, 68, and 170 days after the first closed reduction. After the third dislocation, he reported that initially, the hip had felt stable, but more recently, it felt loose, especially when he turned over or bent the hip. He had a fear of dislocation. The electromyogram showed a weakened gluteus medius and partial left sciatic nerve injury. The X-rays indicated a significant increase in heterotopic ossification (Figure 4b). The patient was recommended to undergo revision surgery after the second dislocation, but he refused and opted for conservative treatment again. However, the patient rarely used the brace and abduction pillow at home. Plaster external fixation (20 degrees of abduction, 30 degrees of flexion) was administered to prevent a fifth dislocation (Figure 4c). He was instructed to take acetylsalicylic acid orally to prevent thrombosis, and we later learned that he did not adhere to this prescription. We planned to remove the plaster after six weeks. However, the patient was lost to follow-up.

Four months after the fourth reduction, we learned that the patient underwent an above-knee amputation at another hospital for arterial occlusion. According to his medical records, 84 days after the fourth reduction, he suffered from rest pain, numbness, and weakness in his left lower limb. However, he did not go to the hospital. Fourteen days later, the abovementioned symptoms were obviously aggravated. The affected lower leg and foot were cold and cyanotic. He showed a loss of distal sensation over the entire foot and active movement of the foot and ankle. The pulsations of the dorsalis pedis and posterior tibial artery were absent. The arteriography results showed multiple plaques, and strip-like calcifications had formed bilaterally on the walls of the lower limb arteries. The left femoral, popliteal, posterior tibial, and peroneal arteries were occluded. Emergent artery exploration and catheter thrombectomy were performed by vascular surgeons. During exploration, the superficial femoral artery and popliteal artery were filled with a large old thrombus. Hyperplasia, sclerosis, and stenosis were also noted in the intima of the artery. Persistent cyanosis of the affected limb with refractory pain, a high fever, enlarged ischemic skin patchiness, and an elevated C-reactive protein level (230.36 mg/L) indicated sepsis and failure of the revascularization procedure. An above-knee amputation was performed four days later. The patient was discharged from the hospital after demonstrating stable vital signs and good wound healing outcomes.

Seven months after the amputation, the patient complained of pain and numbness of the right lower limb for five hours. The patient was admitted to the hospital without hesitation. He was diagnosed with right femoral and popliteal artery thrombosis. The femoral artery thrombus was removed, and the osteofascial compartment was decompressed in the emergency department. The sensation in the right lower limb returned to normal after surgery. Currently, the patient can walk and take care of himself with the help of prosthetic limbs.

DISCUSSION

In contrast to traumatic knee dislocations, amputation due to hip dislocation is extremely rare. The current report presents a case of an above-knee amputation being performed for recurrent dislocations that occurred after THA.[1]

Hip dislocation is a relatively common complication, occurring in approximately 0.3 to 28% of all cases treated by primary and revision procedures.[2] Most dislocations occur within the first six weeks after surgery, and most cases in the hip can be resolved using closed reduction. After the reduction, an abduction orthosis is often used to maintain the hip in 20 degrees of abduction and prevent flexion by more than 60 degrees. Immobilization for six weeks to three months is recommended.[3] No additional dislocation occurs in most of these patients. Surgery is usually indicated for patients who experience two or more dislocations. The prevalence of recurrent dislocation requiring surgical treatment has been reported to range from 13 to 42%.[4] Surgical options include soft-tissue or trochanteric advancement, the exchange of modular components, and the replacement of a component with a larger head diameter.[5]

The patient in our case study had acetabular fracture and central dislocation of the femoral head, and it is possible that the previous surgery contributed to the recurrent dislocations. Residual deformities or defects in the acetabular wall can make it very difficult to place an acetabular prosthesis in the "safe zone". In addition to the inaccurate positioning of prosthetic components, an insufficient offset (left side being 9 mm shorter than the right side), gluteus medius weakness and extensive loosening of scar tissue for better exposure led to a

soft tissue imbalance, which may increase the risk of dislocation in our patient. The impingement of heterotopic ossification on the pelvis is one of the possible causes of dislocation. Another cause may be a lack of postoperative restrictions after primary hip replacement. Patient education is important for treating dislocation after hip replacement. The first dislocation for the patient in our study occurred 40 days after the replacement procedure. For early dislocation, treatment by closed reduction followed by a period of relative immobilization with an abduction brace and pillow is often sufficient.[6] However, the patient failed to comply with the postoperative treatment. This patient's poor compliance may be one of the main causes of his recurrent dislocations.

Acute lower-extremity arterial occlusion accounts for a wide variety of complications culminating in limb loss or death. Although national epidemiological data have shown the incidence of acute limb ischemia to be 14/100,000, the current incidence of acute lower-extremity arterial occlusion in the general population still remains unclear.[7] Limb salvage may be achieved in most of patients with peripheral emboli, but in some studies, amputation rates have been reported to be nearly 30%.[8] The two main causes of the acute occlusion of peripheral arteries are thrombosis, which occurs in 85% of patients, and embolism, which occurs in 15% of patients.[9] In addition to atrial fibrillation, coronary heart disease, diabetes mellitus, a history of a major amputation or vascular surgery and smoking during the last five years were found to be risk factors in patients with arterial occlusion.[10]

Profound acute limb ischemia, which can include dysfunction of the gastrocnemius and foot muscles of the affected limb, is a strong indication for emergent surgical interventions.[11] It is usually believed that the duration of time from the onset to treatment is a major factor that influences limb survival.[12] Prolonged ischemia of the limb can cause secondary thrombosis, which is likely to exacerbate lower limb ischemia cases. Therefore, early diagnosis and treatment are critical to preserve affected limbs. A smoking history of more than 20 years, a history of multiple fractures and operations, poor compliance to treatment strategies after recurrent dislocations, poor adherence to taking anticoagulants, and delayed treatment after lower limb ischemia may have caused arterial occlusion in our patient.

In conclusion, the lack of adherence to critical treatment may have led to the severe outcome of amputation. Therefore, patient education and compliance are essential for both the treatment of hip dislocations and arterial occlusion. Providing key educational messages at the beginning of treatment can enhance treatment adherence, particularly with regard to anticoagulants use. In addition, patients with hip joint dislocation after trauma surgery are the high-risk group of THA postoperative dislocation. A more detailed preoperative plan should be developed. During surgery, the soft tissues around the hip joint should be protected and repaired as much as possible, and the postoperative rehabilitation may also need to be more conservative.

Acknowledgements: The authors thank all contributors for the substantial information that was compiled in previously published papers in the same or similar fields as cited in this manuscript, as these provided important help in preparing this manuscript.

Patient Consent for Publication: A written informed consent was obtained from the patient.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions: Were responsible for performing the total hip arthroplasty operation. They also played a pivotal role in drafting the initial manuscript: M.L., Z.D.; Contributed significantly to data collection and assisted in manuscript preparation: L.F., Z.D.; Critically revised the manuscript for important intellectual content: M.L., L.F. All authors have read and approved the final version of the manuscript.

Conflict of Interest: The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding: The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Atik OŞ. Writing for Joint Diseases and Related Surgery (JDRS): There is something new and interesting in this article! Jt Dis Relat Surg 2023;34:533. doi: 10.52312/jdrs.2023.57916.
2. Parvizi J, Picinic E, Sharkey PF. Revision total hip arthroplasty for instability: Surgical techniques and principles. J Bone Joint Surg [Am] 2008;90:1134-42.
3. Canale ST, Beaty JH. Arthroplasty of the hip. Campbell's Operative Orthopaedics, 11th edition. Philadelphia, Elsevier: 2008:158-310.
4. Sanchez-Sotelo J, Berry DJ. Epidemiology of instability after total hip replacement. Orthop Clin North Am 2001;32:543-52. doi: 10.1016/s0030-5898(05)70225-x.
5. Parvizi J, Wade FA, Rapuri V, Springer BD, Berry DJ, Hozack WJ. Revision hip arthroplasty for late instability secondary to polyethylene wear. Clin Orthop Relat Res 2006;447:66-9. doi: 10.1097/01.blo.0000218751.14989.a6.
6. Sikes CV, Lai LP, Schreiber M, Mont MA, Jinnah RH, Seyler TM. Instability after total hip arthroplasty: Treatment with large femoral heads vs constrained liners. J Arthroplasty 2008;23(7 Suppl):59-63. doi: 10.1016/j.arth.2008.06.032.

7. Jørgensen CC, Kjaersgaard-Andersen P, Solgaard S, Kehlet H; Lundbeck Foundation Centre for Fast-track Hip and Knee Replacement Collaborative Group. Hip dislocations after 2,734 elective unilateral fast-track total hip arthroplasties: Incidence, circumstances and predisposing factors. Arch Orthop Trauma Surg 2014;134:1615-22. doi: 10.1007/s00402-014-2051-3.
8. Kuukasjärvi P, Salenius JP. Perioperative outcome of acute lower limb ischaemia on the basis of the national vascular registry. The Finnvasc Study Group. Eur J Vasc Surg 1994;8:578-83. doi: 10.1016/s0950-821x(05)80594-8.
9. Ouriel K, Veith FJ, Sasahara AA. A comparison of recombinant urokinase with vascular surgery as initial treatment for acute arterial occlusion of the legs. Thrombolysis or Peripheral Arterial Surgery (TOPAS) Investigators. N Engl J Med 1998;338:1105-11. doi: 10.1056/NEJM199804163381603.
10. Aboyans V, Criqui MH, Denenberg JO, Knoke JD, Ridker PM, Fronek A. Risk factors for progression of peripheral arterial disease in large and small vessels. Circulation 2006;113:2623-9. doi: 10.1161/CIRCULATIONAHA.105.608679.
11. Cowan KN, Lawlor DK. Sudden onset of paraplegia from acute aortic occlusion: A review of 2 cases and their unique presentation. Am J Emerg Med 2006;24:479-81. doi: 10.1016/j.ajem.2006.01.008.
12. Babaoğlu K, Deveci M, Yavuz S, Altun G, Anık Y. Aortic saddle embolism caused by right ventricle thrombus in a 2-year-old girl with Ebstein anomaly and Glenn shunt. Anadolu Kardiyol Derg 2014;14:E5-6. doi: 10.5152/akd.2014.5211.