

Two-step sequential management for hip arthroplasty after hip joint gunshot injury; a case report

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March 15, 2023

Abstract

We present a 35-year-old male who sustained a right hip GSI. Delayed THA with a two-step sequential approach is feasible management in this situation in order to manage soft tissue and decrease infection rate. At one-year follow-up visit the pain was relieved and function improved significantly and had no complaints.

Introduction

Musculoskeletal injuries associated with firearm related injuries to the hip and pelvis are formed a collection of injuries such as bone and soft tissue . While there has been a rise on gunshot injuries that present problems to orthopedic surgeons , great vigilance must be taken. Associated contamination, nerve damage, and visceral organ damage must be in mind as well as high cost of treatment.

In literature the frequency of hip joint injuries related to gunshot injuries is reported about 2-17 % . However, there are few studies elaborates on hip joint gunshot injuries . According to literature, the preferred treatment option for hip joint gunshot injuries is limited to arthroplasty . Concomitant femoral head and acetabular fracture are rare and are the result of high energy trauma . In present study we report a young patient sustained s hip joint gunshot injury (GSI) with femoral head fracture and comminuted acetabular fracture which was treated in two stages.

Case history

Preoperative management

The patient is a 35-year-old male with no past medical history who presented to our institution after sustaining a single GSW to the right hip during a home invasion two weeks ago. He was undergone laparotomy emergently and after stabilizing him, the patient sustained to our center. Physical examination revealed an open ballistic wound to the posterior hip and right sciatic nerve deficit. Radiographs (Fig. 1) and computerized tomography (CT) scans (Fig. 2 and Fig. 3) of the pelvis and hip were obtained, which demonstrated a comminuted fracture of the femoral head, along with comminuted fracture of both acetabular columns. Three-dimensional CT reconstruction images were acquired to further characterize the femoral head and acetabular fracture fragments. Associated injuries such as bowels and bladder were managed via general surgery and urology services as well.

Operation

After discussing the risks and complications of operative treatment, informed consent was obtained, and the patient was taken to the operating room.

A kocher-langenbeck approach was used for exposure. We decided to explore and neurolyse the sciatic nerve and use just a 3.5 mm reconstruction posterior column buttress plate in order to do the total hip arthroplasty

(THA) after bone union along with irrigation and debridement (Fig. 4).

After a year bone union was completed, and laboratory data showed no evidence of infection. The pre-op harris hip score (HHS) was 22. In this stage THA was done through lateral approach. After dislocating the hip joint anteriorly, the hip was taken into a position of flexion, adduction, and external rotation to deliver the femoral neck osteotomy into the anterior aspect of the exposure and resecting the femoral head residues. Then the acetabulum was prepared and a 52mm Zimmer Biomet continuum cup was implanted with a 36 mm linear. The femoral canal was prepared, and after trialing, a 16/225-mm Zimmer Biomet wagner SL press-fit femoral stem was implanted with a metal Zimmer Biomet 36 mm head and -3.5 mm neck length. The hip was then reduced with satisfactory stability and soft-tissue tension were obtained. The exposure was then closed in standard fashion. Standard radiographs were obtained immediately after the operation (Fig. 5)

Postoperative care

He was made touch-down weight-bearing for 6 weeks and then allowed to advance as tolerated. The physical therapy team was consulted postoperatively for mobilization, and global hip precautions were provided as this patient had a dual approach. No heterotopic ossification prophylaxis was utilized. At one-year postoperatively, the patient returned for a follow-up visit and Radiographs were obtained at this time for routine monitoring and to confirm proper positioning of hardware (Fig. 6). He had no complaints and the HHS was 74.

Discussion

Ballistic fractures have been increased in the last two decades and made splash in order to establish new therapeutic algorithms and reduce the morbidity rate . Unfortunately, there is a lack of high-level evidence guiding management. According to previous studies gunshot injuries to the hip joint accounts for two percent of all limb gunshot injuries and open reduction and internal fixation is suggested as preferred treatment in acute phase .

Remarkable, hip arthroplasty is preserved for failed fixations. The ration of this algorithm may refer to the high complication rate after hip joint gunshot injuries since poor functional results reported in cases of acetabulum fracture and contamination with bowel contents . However, the severity of injury and contamination varies from case to case . Although vascular injuries condemned as risk factor for infection after low velocity intra-articular gunshot injury, in a recent study there were no risk factor for infection in such injuries.

The major consideration in hip joint GSI is decision making about delayed vs. immediate hip arthroplasty with regard to high contamination possibility since Weinstein et al. showed all bullet tracks are grossly contaminated with foreign materials.

Naziri et al. evaluated the outcome and complications of THA in nine patients with secondary arthritis due to prior GSI. Although THA in these patients was technically demanding, the outcome was surprising and comparable to primary THA due to degenerative joint disease. Georgiadis et al. reported a 22-year-old male with hip GSI and femoral neck fracture treated with internal fixation and valgus osteotomy. Pazraci et al. showed that THA after debridement is a feasible treatment in young patients with a history of hip GSI; although the poor post-operative harris hip score (65.5%) after THA in hip joint gunshot injuries. They included 10 patients and operated them four to eight months after injury. Intestinal injury was associated with high infection rate. Ozden et al. demonstrated that THA is an effective option to improve patients with secondary hip arthritis due to previous hip GSI. Martin et al. reported a 70-year-old female with hip GSI resulted in femoral head and acetabulum fracture. She was treated with open reduction and internal fixation of acetabulum, as well as bipolar hemiarthroplasty. Bell et al. reported a 39-year-old with hip GSI and comminuted fracture of femoral head and neck who undergone staged arthroplasty after initial placement of an antibiotic spacer.

Here, in our study, we describe a two sequential management for THA in a young male after hip GSI.

Since, there was a severe comminution in acetabulum and femoral head and the post-trauma arthritis was amenable, we just reconstruct the posterior column and avoid more soft tissue manipulation. After achieving bone union THA was done to improve his function.

In conclusion, hip GSI deserves multidisciplinary approach and managing the soft tissue as well as decreasing infection rate in secondary THA. Delayed THA with a two-step sequential approach is a feasible management in this situation.

Acknowledgment: none

References:



Figure 1 Antero-posterior (AP) pre-op radiography shows comminuted fracture of right acetabulum and femoral head.

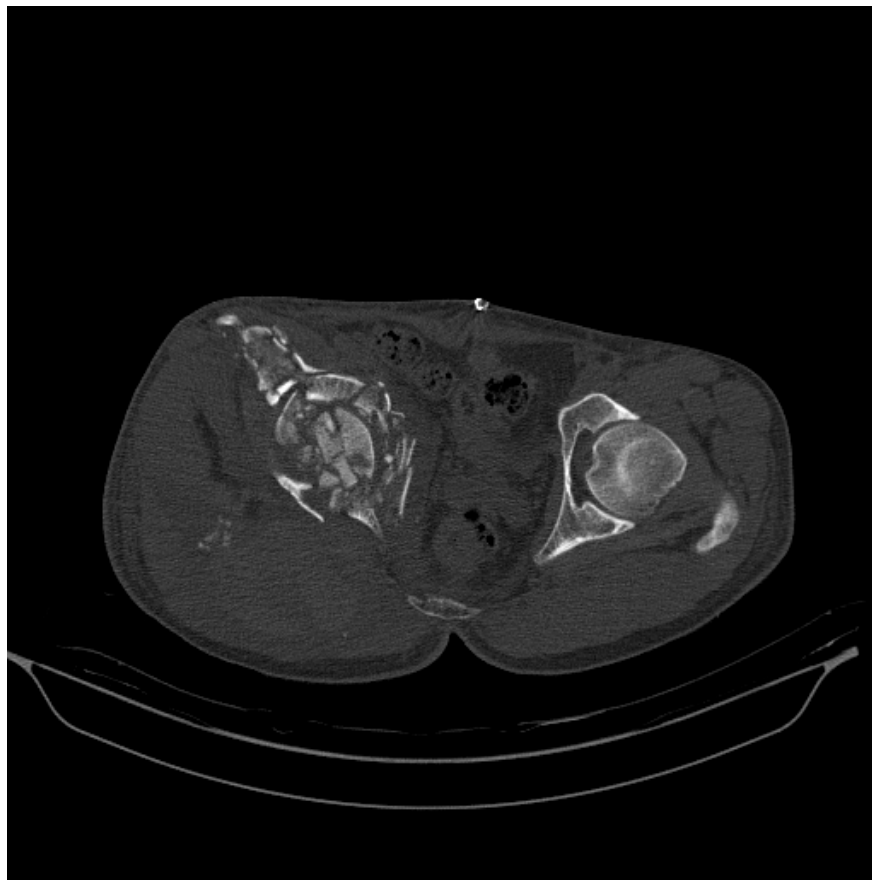


Figure 2 Axial CT-scan demonstrates severe comminution of right acetabulum and femoral head.



Figure 3 3D CT-scan shows the severe comminution of right acetabulum



Figure 4: immediate post-operative x-ray of first step shows posterior column reconstruction.



Figure 5 immediate post-operative x-ray of second step.

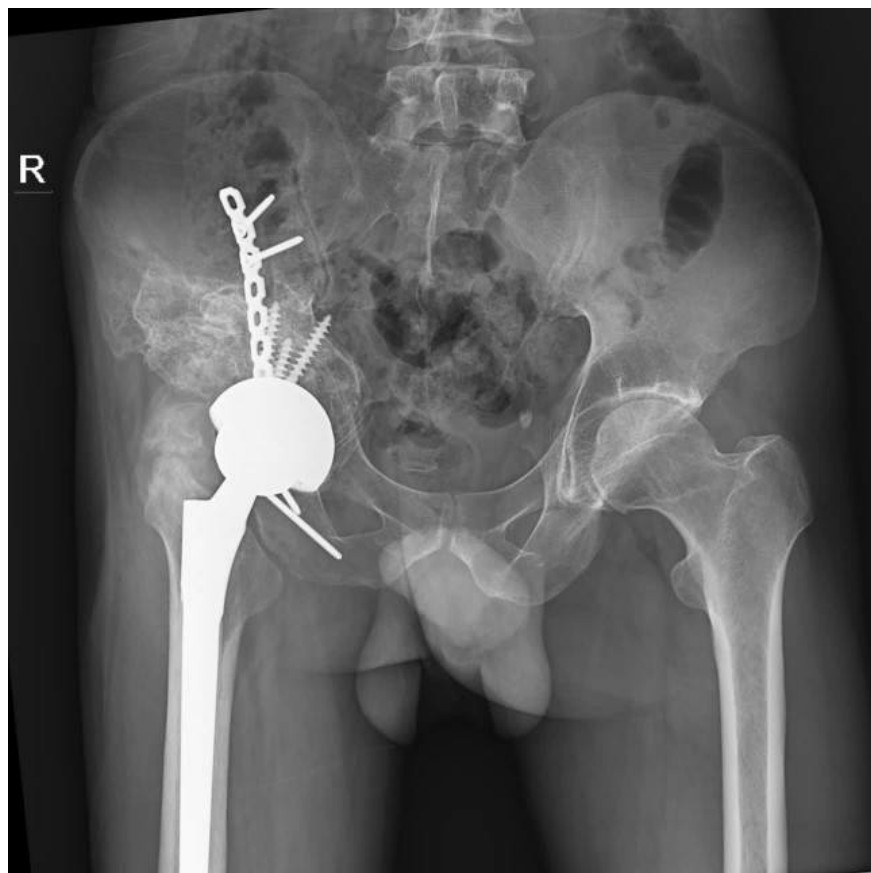


Figure one- year post-operative pelvic x-ray.

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