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Primary complex total hip replacement in 13 months old neglected Pelvi-acetabular fracture

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Abstract

Old pelvi-acetabular fracture are very difficult to operate in terms of achievement of anatomical reduction. Although two staged procedures are still treatment of choice(first stage acetabular osteosynthesis then THR if complication occurs) but neglected cases(more than 3 weeks old untreated fractures)can also treated by total hip replacement. Our case is A 35 years old patient sustained railway traffic accident. He had crush injury left lower limb severe abdominal and chest trauma, bilateral sacroiliac join disruption, iliac wing fracture left side and pelvi-acetabular fracture right side.at that time patient was treated at other hospital where above knee amputation of left lower limb done, abdominal and chest injury managed but pelvi-acetabular fracture was treated conservatively. After 1 year patient presented to us with pain and restriction of movement of right hip and inability to sit also. we performed primary complex total hip replacement using multi-hole acetabular cup and un-cemented femoral stem with metal on ultra high molecular polyethylene bearing and bone graft. results are satisfactory with fair range of motion at hip and modified harris hip score. So primary complex total hip replacement is viable option for old pelvi-acetabular fracture cases where anatomical and biological reduction of fracture is not possible.

Keywords: Neglected pelvi-acetabular fractures, primary complex total hip replacement, complex pelvi-acetabular fracture

1. Introduction

Acetabular fractures are very notorious and associated with complication like osteoarthritis of hip and avascular necrosis of femoral head. complications depend upon time of surgery and reduction of fractures ^[1]. acetabular fracture treament changed over time and a good clinical outcome if managed appropriately ^[2]. Old pelvi-acetabular fracture are very difficult to operate in terms of achievement of anatomical reduction. Although two staged procedures are still treatment of choice (first stage acetabular osteosynthesis then THR if complication occurs) but neglected cases (more than 3 weeks old untreated fractures) can also treated by total hip replacement. Furthermore fibrosis and secondary fracture healing makes surgical exposure and reduction more troublesome. Primary complex total hip replacement shows good outcome, relatively early mobilization, and less soft tissue damage as compared to 2 stage procedure.

1.1. Case presentation

A 35 years old patient sustained railway traffic accident. He had crush injury left lower limb severe abdominal and chest trauma, bilateral sacroiliac join disruption, iliac wing fracture left side and pelvi-acetabular fracture right side.at that time patient was treated at other hospital where above knee amputation of left lower limb done, abdominal and chest injury managed but pelvi-acetabular fracture was treated conservatively. After 1 year patient presented to us with pain and restriction of movement of right hip and inability to sit also.

Radiograph and CT-scan shows central Acetabular fracture dislocation of right hip with pubic rami fracture with iliac wing fracture and sacroiliac joint disruption.



Fig 1: X-ray pelvis with both hip AP view shows central fracture dislocation of right hip with iliac wing fracture and rami fracture with above knee amputated left lower limb



Fig 2: X-ray showing, Oblique views of pelvis



Fig 3: Pre-operative image of patient shoes amputated left lower limb and no abduction or



Fig 4: Fusion of sacro-illiac joint with bone graft and primary complex total hip replacement right



Fig 5: Showing range of abduction(0 to 30 degree) of hip on post operative day 3

1.1.2 Surgical technique

Patient was positioned in prone, sacroilliac reduction tried but it was not possible due to old trauma. In-situ fusion of sacroiliac joint done with autologous cancellous graft impaction right side. After it patient was positioned in right lateral and incision made according to lateral hardinge approach. Head was removed after femoral neck in situ cut. Exposure of Acetabular margins done. Defect was seen in medial acetabular wall. according to AAOS classification this was pelvis discontinuity (type4). the following were steps of acetabular reconstruction.

Step 1: femoral neck cut at appropriate site and head was removed. After inspection of Acetabular cavity, medial wall was fractured.

Step 2: Head autograft kept in acetabular cavity and reaming done over it. Slight lateralization of hip centre done to fit acetabular shell and fix it with bone through screws.

Step 3: The acetabular shell (pinnacle multihole cup, depuy Johnson and Johnson TM) was press fitted. shell wasw hydroxyl-appetite coated and total 9 screws passed through it, to hold graft and native acetabular wall.

Step 4: Acetabular shell was slightly uncovered on posterosuperior aspect for which covered by structural autograft and fixed with one 3.5 mm cortical screws.

Step 5: Uncemented femoral stem was used. liner and head fitted, hip reduced. limb length was measured and found equal after surgery. Suturing done in layers. Active assisted Range of movement exercises started, with non-weight bearing for 6 weeks. Toe-touch weight bearing started after 6 weeks. By the end of three months, the patient was allowed complete weight bearing with tripod cane support on contralateral side. Clinical and radiological assessments were performed at 3 monthly intervals for 12 months.

1.1.3 Results

Follow up done on 6th week post-operatively than every 3 monthly interval for 1 year. patient started walking 6 weeks after surgery with help of walker and partial weight bearing on right hip and left lower limb prosthesis and Range of motion at right hip was 0-30 degree, adduction was 0-10 degree, flexion was 0-60 degree with knee flexed and 0-20 degree internal and external rotation was possible actively. After 3 months patient was able to walk with tripod cane support and partial weight bearing. full weight bearing on right hip allowed after 6 month of surgery.

In further follow up patient showed gradual improvement in active range of motion at hip and modified hip score was in fair range. low modified Harris score may be due to contralateral lower limb involvement.

 Table 1: Range of motion (Degree) at right hip and Modified Harris hip score in follow up period.

Duration	Flexion	Extension	External rotation	Internal rotation	Abduction	Adduction	Modified Harris hip score
6 weeks	0-60	0-5	0-20	0-20	0-30	0-10	69.3
3 months	0-60	0-5	0-30	0-24	0-30	0-15	71.5
6 months	0-70	0-5	0-35	0-24	0-34	0-15	73.7
12months	0-84	0-5	0-35	0-26	0-35	0-15	73.7

1.1.4 Discussion

After 1 year of follow up patient had stable hip prosthesis. started walking with prosthetic limb left side and 1 tripod cane. Modified harris hip score at end of 1 year was fair. Treatment option for pelvis discontinuity and illium and Sacro-illiac jont defects is usually two stage surgery in first satge fix various fracture with biological reduction and in second stage if osteonecrosis or osteoarthritis occurs go for total hip replacement in second stage. Reconstruction relies on to gain anatomical fixation of the component to the host bone. This requires intimate host bone implant stability or primary complex total hip replacement in one stage with or without cage. cementless actabular component showed good results in total hip relacement after acetabular fractures ^[3]

In our case anatomical and biological fixation was very difficult or not possible.so in this case we use autologous bone graft and multi hole cup to fill defect and fix acetabular shell which was hydroxy-appetite coated also. Cemented cups and reinforcement cages have a higher incidence of loosening and failure when delayed THR is performed in post-acetabular fractures ^[4]. Reconstruction of supportive columns and the posterior wall with auto and/or allografts favors the use of cementless components, which have been associated with better outcomes ^[5]

Reconstruction options include reinforcement rings and cages ^[6], multihole acetabular shell and. Cementless implants are preferred on the acetabular side when the posterior column can be stabilized and at least 50% host bone-implant contact can be achieved ^[7]

The center of rotation of the hip was not restored in our case. Because of acetabular defect, we could not put the hip in the proper position but acetabular cup was stable intraoperatively.

Primary total hip replacement in acetabular fractures is a matter of debate and is limited to cases with femoral head damage and difficult acetabular reconstructions. The cup may not be stable, and failure may occur. In our case primary total hip replacement is our choice due to neglected fracture.

Conclusion- with good technique primary total hip replacement can be done which provides good range of motion and early mobilization than two staged procedure. Bone graft and uncemented Acetabular shell is good and economic option for this type of neglected fracture.

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