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ORIGINAL ARTICLE

OUTCOMES OF DELAYED TOTAL HIP ARTHROPLASTY; POST-ACETABULAR FRACTURE FIXATION

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ABSTRACT

Background: Despite advances in the treatment of acetabular fractures, traumatic osteoarthritis rate is very high & accounts for 13-40% of all hip osteoarthritis cases. Arthroplasty in the context of an acetabular fracture is a complicated procedure whether done as part of the acute therapy (ORIF acute THA) or in the delayed setting (ORIF delayed THA). The objective of this study was to determine the functional outcomes of delayed total hip arthroplasty post-acetabular fracture fixation.

Materials & Methods: This Descriptive was conducted in the department of orthopedics & spine, Hayatabad Medical Complex, Peshawar from February1st 2022 to Oct 31st 2025. Function outcomes of all patients were assessed post-operatively using Harris Hip score. Higher scores indicate better outcomes.

Results: Out of 30 patients included in our study two patients were having Harris Hip score between 90 & 100(Excellent outcome), 21 were having Harris hip score between 80 & 90(Good outcome) while three patients were having Harris hip score between 70 & 80(Fair outcome). Paired t-test was used to compare pre & post-operative outcomes of patients & the results were statistically significant.

Conclusion: Despite the technically challenging procedure, delayed cementless acetabular total hip arthroplasty (THA) is an effective procedure for patients who have had prior unsuccessful acetabular fracture treatment.

KEYWORDS: Acetabular fracture; Arthroplasty; Harris hip score; Osteoarthritis; Total Hip Replacement.

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INTRODUCTION

Background: Acetabular fracture is one of the most complex injuries in orthopedic trauma caused by high energy RTA or fall from height. However low energy mechanisms can also result in acetabular fractures such as in osteoporosis & osteopenic bones.[1-2] The incidence of acetabular fractures is 3 per 100,000 per year & in the United Kingdom approx. 2000 acetabular fractures are reported annually with the predominance in Elderly.[3-4] Unstable acetabular fractures involving the dome of acetabulum which is displaced >3mm need surgical intervention to restore anatomic articular congruity & to adequately cover femoral head under dome of acetabulum. If the fracture traversing the acetabular dome remains displaced & unreduced, post-traumatic degenerative arthritis is inevitable.[5-6]

Despite advances in the treatment of acetabular fractures, traumatic osteoarthritis rate is very high & accounts for 13-40% of all hip osteoarthritis cases.[7] Arthroplasty in the context of an acetabular fracture is a complicated procedure. whether done as part of the acute therapy (ORIF acute THA) or in the delayed setting (ORIF delayed THA). Some studies have identified that when THA is performed in combination with acetabular fixation, good outcomes & early weight-bearing are reported as compared to ORIF & delayed THA.[8-10] THA in patients having acetabular fractures are accompanied by difficulties such as acetabular abnormalities that hinders the main fixation of conventional acetabular components, distorted joint anatomical connections, noticeable soft tissue scarring.[11] The treatment of choice for operative fixation of acetabular fixation is based on integrity of the pelvic ring and

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acetabular columns to provide dependable fixing.[12]

Post-acetabular fracture OA has been treated with both cemented and uncemented acetabular components. The radiographic and functional characteristics of THA following acetabular fractures have improved as a result of recent advances in uncemented fixation.[13] Liang et al.[14] from London, UK in their study found that out of 255 patients having acetabular fractures acute THA was used for 138 (54.1%) and delayed THA for 117 (45.9%). The functional outcomes of the two study groups were identical. Mortality and complications rates were similar. The revision rate for delayed THA was greater than that of the acute group (17.1 vs. 4.3%; p=0.002).

Nicol et al.[15] from Ontario, Canada in their study revealed that out of 26 patients, 12 had done acute THA & 14 had done delayed THA. In acute THA group only one patient had prosthetic joint infection while 3 patients in delayed THA group had at least one complication, including Prosthetic joint infection, infection or failed cup fixation requiring reoperation once.

Unawareness about the outcomes of delayed total hip arthroplasty post-acetabular fractures fixation was our research problem. Our research will help the surgeons in future to guide about treatment regime for the management of acetabular fractures. It will also provide information about the outcomes of Total hip arthroplasty (THA) post acetabular fracture fixation. The objective of this study was to determine the functional outcomes of delayed total hip arthroplasty post-acetabular fracture fixation.

MATERIALS AND METHODS

This Descriptive was conducted in the department of orthopedics & spine, Hayatabad Medical Complex Peshawar from February1st 2022 to Oct 31st 2025. Approval for the study was taken from hospital ethical committee & informed consent for the study was taken from patients or attendants. Sample size was calculated using Open Epi sample size calculator & the required sample size was 32. Non-probability consecutive sampling was used for the study. All adult patients having age > 18 years, having displaced acetabular fractures involving the dome of acetabulum or causing hip instability due to fracture dislocation either anterior or posterior & which require acetabular fixation in addition to total hip arthroplasty were included in the study.

All patients having active infections (local or systemic), severe vascular dysfunction, active deep venous thrombosis or pulmonary embolism & patients unfit for anesthesia were excluded from the study. Acetabulum fractures were diagnosed using Xray pelvis with both hips, AP, Lateral & Judet views (i.e., obturator oblique & iliac oblique views). CT scan was also done for patients having displaced acetabular dome fractures or those having fracture dislocation of acetabular wall (i.e., anterior or posterior).

After taking ethical approval from hospital ethical committee patients fulfilling the inclusion criteria were included in our study. Patient's age (i.e., >18 years), gender (men/women) were our demographic variables while the presence of acetabular fractures was our research variable. THA performed within 3 weeks is termed acute & later is included as delayed total hip arthroplasty.

For every patient, the Hardinge or hip direct lateral approach was employed. Unless it hampered acetabular reaming, retained hardware was not frequently removed. An evaluation of the fracture union was conducted. In cases where acetabular defects were contained, impaction bone grafting was utilised. If sufficient stability of the acetabular component was attained, small segmental flaws (less than 20%) were not rebuilt. Larger segmental lesions were repaired with femoral head auto or allograft. Uncemented acetabular components were utilized in all patients while in 7 patients non-cemented stems were utilized & 3 patients had cemented stems. Function outcomes of all patients were assessed post-operatively using Harris Hip score. Higher scores indicate better outcomes. Scoring 90-100 (Excellent outcome), 80-89 (Good outcome), 70-79 (Fair outcome) & <70 is included as poor outcome. Harris hip score was calculated preoperatively, at 6 weeks, 3 months & 6 months of follow-up.

Under the supervision of an associate professor and an orthopaedics professor with at least 15 years of post-fellowship experience and a qualified staff nurse, all collecting procedures were carried out. IBM-SPSS-V.25 was utilised for data analysis. For numerical data, such as age, gender, and length of sickness, mean± S.D. was assessed. Counts and percentages were used to evaluate categorical factors such as gender, age groups, and length of illness. All patients included in the study were divided into Group A: preoperative & Group B: postoperative group. Paired sample T-test was used to compare mean Harris Hip score between 2 groups.

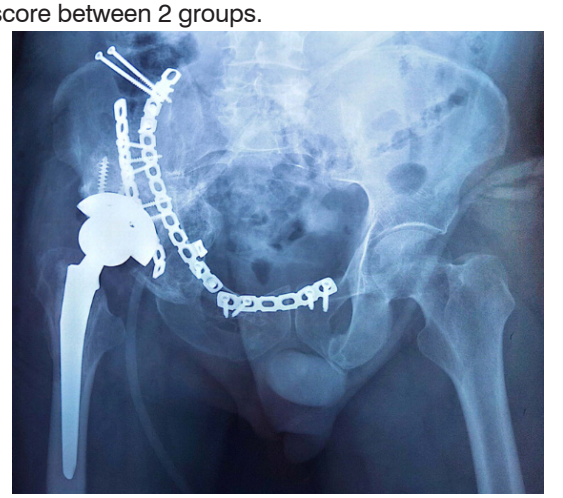

Fig: Delayed Total hip arthroplasty in a 56 years old male patient, post acetabular fracture fixation

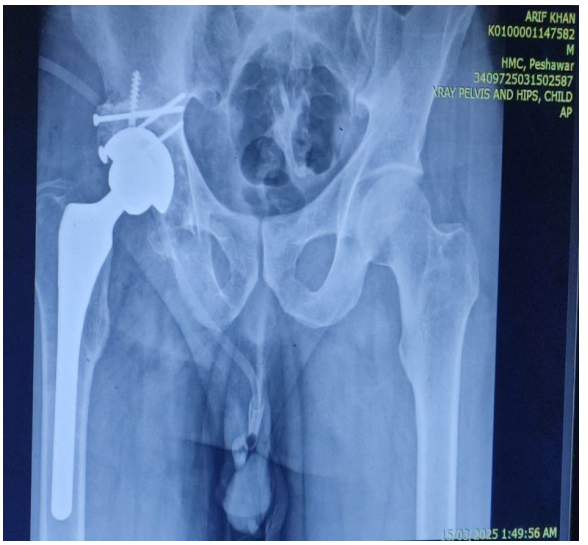

Fig: Delayed Total hip arthroplasty in a 55 years old male patient, post acetabulum fracture fixation

RESULTS

Out of 30 patients included in our study 28 were males & 2 were female having done acetabular fixation initially followed by Total hip replacement (THR). 21(70%) patients were aged > 45years while 9(30%) patients were aged <45 years. 6 patients were having hypertension & one was diabetic. Six patients were having Harris Hip score between 90 & 100(Excellent outcome), 21 were having Harris hip score between 80 & 90(Good outcome) while three patient was having Harris hip score between 70 & 80(Fair outcome). 6 patients were having limp due to LLD< 2cm, which was correctable with shoe raising.

Paired t-test was used to compare mean Harris Hip score between pre-operative & post-operative groups. At 6 weeks of follow-up the results were statically significant i.e., Post-operative Harris hip score was improved.

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DISCUSSION

Surgical treatment is modality of choice for unstable acetabulum fractures. The most frequent complication post acetabular fixation is osteoarthritis, which require total hip arthroplasty (THA) subsequently within 10 years with a range of 8 to 35%. Compared to THA for primary arthritis, treating these painful joints with THA is difficult and has a worse survival rate.[16,17,18] Panteli et al.[4] in their study found the rate of conversion to THA following acetabular fixation was 25.8% (n=16). Weaver et al.[19] study found that, when

Fig 1: The comparison of mean Harris hip score between pre-op & post-op delayed acetabular fixation at 6-week follow-up

	N	Mean	S.D	95% interval of difference		t-value	d.f	p-value
Group A	30	48.20	10.521	**Lower**	**Upper**	-13.24	53	0.000
Group B	30	79.8000	7.75887	-36.39	-26.81			

Fig 2: The comparison of mean Harris hip score between pre-op & post-op delayed acetabular fixation at 3 months follow-up

	N	Mean	S.D	95% interval of difference		t-value	d.f	p-value
Group A	30	48.20	10.521	**Lower**	**Upper**	13.323	57	0.000
Group B	30	82.8000	9.23038	29.399	39.801			

Fig 3: The comparison of mean Harris hip score between pre-op & post-op delayed acetabular fixation at 6 months follow-up

	N	Mean	S.D	95% interval of difference		t-value	d.f	p-value
Group A	30	48.20	10.521	**Lower**	**Upper**	18.06	29	0.000
Group B	30	84	10	31.75	39.85			

compared to THA done for osteoarthritic alterations, the ORIF group had a tendency towards greater re-operation rates for secondary THA, but it also noted a higher complication risk for infection/dislocation.

In our study it was found that mean Harris hip score following post Total hip arthroplasty at 6 weeks follow-up was 79.8000, at 3 months follow-up was 82.8000 & at 6 months of follow-up was 84. Our results showed improvements in outcomes of delayed Total hip arthroplasty post acetabular fracture fixation. Similar to our study Kumar et al.[20] in their study found that in all eighteen patients, the THA implant was stable. The study's 12-Item Short Form Health Survey (SF-12) score ranged from 40.0 to 49.4 with a mean of 44.29 ± 2.95, and the Harris Hip score ranged from 82 to 95 with a mean of 89.72 ± 4.24. According to Harris Hips scoring criteria, 11 (61.1%) of the 18 instances had excellent results, while the remaining 7 (38.9%) had good results.

Similar to our study El-Bakoury et al.[21] found that in delayed total hip arthroplasty following failed acetabular fracture fixation at their last follow-up, the median (interquartile range (IQR)) Oxford Hip Score (OHS) went from 9.5 (7 to 11.5), 95% CI (8 to 10.6), to 40 (39 to 44), 95% CI (40 to 43)) postoperatively ($p < 0.001$). They also found that despite the procedure's high technological requirements. The results of delayed THA are unaffected by the original fracture therapy.

Contrary to our study, Shaker et al.[22] in their study found significantly higher post-operative complications & lower functional outcomes in delayed THA as compared to primary THA. Nicol et al.[10] in their study also found better Oxford hip score post operatively & fewer complications as compared to delayed total hip arthroplasty. Liang et al.[23] in their study found that two study groups i.e., acute THA & delayed THA, did not differ in their functional outcomes. The incidence of complications and deaths were similar. The revision rate was greater in the delayed THA group than in the acute group (17.1 vs. 4.3%; $p = 0.002$).

CONCLUSION

Despite the technically challenging procedure, delayed cementless acetabular total hip arthroplasty (THA) is an effective procedure for patients who have had prior unsuccessful acetabular fracture treatment.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	MI, MS
Acquisition, Analysis or Interpretation of Data:	MI, MS, AK, WK, AA
Manuscript Writing & Approval:	MI, MS, AK, WK, SUR

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.