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Association between radiological quality of reduction and functional outcome in posterior wall acetabular fractures treated with ORIF

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ABSTRACT

Background: Posterior wall acetabular fractures represent the most common subtype of acetabular injuries, frequently caused by road traffic accidents and often associated with hip instability and dislocation. The quality of reduction achieved after open reduction and internal fixation (ORIF) remains a key determinant of prognosis, although other clinical and operative factors may also influence outcomes.
Methods: A prospective observational study was conducted at Dhaka Medical College Hospital from August 2020 to March 2022, including 20 patients (aged 18–60 years) with posterior wall acetabular fractures treated with ORIF. Radiological outcomes were assessed using Matta's criteria, while functional outcomes were evaluated using the Merle D'Aubigné and Postel score. Associations with demographic, injury-related, and surgical factors were analyzed.
Results: The mean patient age was 38.3 years, with most cases resulting from road traffic accidents (90%). Anatomical reduction was achieved in 80%. Radiological outcomes were excellent in 45%, good in 40%, and fair in 15%. Functional outcomes were excellent in 50%, good in 40%, and fair in 10%. Overall satisfactory outcomes were observed in 90% of patients. Significant predictors of poorer outcomes included hip dislocation ($p<0.001$), gross displacement ($p< 0.001$), surgical delay >15 days ($p=0.036$), and postoperative complications ($p=0.001$). Demographic factors and fracture extent showed no significant association.
Conclusions: Achieving anatomical reduction is critical for favorable radiological and functional outcomes in posterior wall acetabular fractures. Early surgical intervention and avoidance of complications further optimize long-term prognosis.

Keywords: Posterior wall acetabular fracture, ORIF, Radiological outcome, Functional outcome, Hip dislocation

INTRODUCTION

Acetabular fractures represent rare but devastating injuries that account for approximately 3–8% of all fractures, with the posterior wall being the most commonly affected subtype, reported in 25–35% of case.[1] These injuries are typically the result of high-energy trauma, most frequently road traffic accidents (RTAs), which contribute to nearly half of pelvic and acetabular fractures in trauma registries worldwide.[2] Posterior wall acetabular fractures are of particular clinical significance because of their association with hip joint instability, frequent concomitant dislocation, and an increased risk of avascular necrosis (AVN) when reduction of the hip is delayed.[3] Beyond their clinical complexity, these injuries impose a profound functional and socioeconomic burden. Patients often experience

prolonged rehabilitation, restricted mobility, and a diminished ability to return to productive work, while health systems absorb the substantial costs of hospitalization, surgical intervention, and long-term care.[4,5]

The management of displaced posterior wall acetabular fractures has evolved to prioritize surgical intervention, with open reduction and internal fixation (ORIF) established as the standard of care. The goals of ORIF include restoration of joint congruity, stable fixation of fracture fragments, and prevention of post-traumatic osteoarthritis, which otherwise occurs at high rates in inadequately reduced fractures.[6] Numerous observational studies have confirmed that the quality of reduction is the single most important determinant of outcome, outweighing other demographic or injury-related variables.[7,8] Even residual incongruity of only 1–2 mm significantly increases the risk of arthritis, poor functional recovery, and eventual conversion to total hip arthroplasty.[9] In specialized trauma centers, anatomical reductions are achieved in approximately 60–80% of cases, with success rates declining steeply when reductions are imperfect or poor.[10] These findings underscore that, while fracture fixation techniques continue to evolve, the ultimate success of surgery depends heavily on the precision of reduction achieved.

The most widely used and validated method for assessing reduction quality remains the Matta radiographic criteria, which classifies reductions as excellent (<1 mm), good (2–3 mm), or fair (>3 mm displacement).[11] Multiple studies have reaffirmed the predictive value of this system, demonstrating strong correlations between radiological quality of reduction and both functional outcomes and long-term joint preservation.[12,13] However, some authors have questioned the interobserver reliability of Matta's criteria and argue that other factors, including timing of surgery, fracture type, and associated injuries may also play significant roles in determining prognosis.[14,15] These debates highlight the complexity of acetabular fracture outcomes, which cannot always be fully explained by reduction quality alone.

Functional recovery following acetabular fracture fixation is commonly evaluated using the Merle D'Aubigné and Postel score, which remains a validated tool for hip function assessment across both short- and long-term follow-up.[16,17] Using this scale, between 50–70% of patients achieve good-to-excellent outcomes following ORIF, although the presence of hip dislocation, gross fracture displacement, and surgical delay beyond 15 days have consistently been associated with unsatisfactory results.[12] Importantly, long-term studies with follow-ups extending 10–20 years demonstrate a progressive decline in hip function, often attributable to secondary arthritis, underscoring the importance of early and precise anatomical reduction.[18,19] These findings reinforce that surgical outcomes should not only be measured in the immediate postoperative phase but also with attention to the durability of function over decades.

Despite a robust body of evidence linking reduction quality to outcomes, significant gaps remain. Much of the literature originates from high-income countries with specialized trauma centers, whereas data from low- and middle-income countries—where RTAs are disproportionately more common and surgical delays are frequent—remain sparse.[20] Moreover, while several studies support radiological quality of reduction as the main predictor of outcomes, others suggest that operative delay, associated abdominal or thoracic injuries, and the extent of posterior wall involvement can also profoundly influence results. The lack of consensus reflects a need for further focused research.

In this context, the present study aims to evaluate the association between radiological quality of reduction and functional outcome in posterior wall acetabular fractures treated with ORIF. By analysing both radiological and functional endpoints in a cohort managed at a tertiary centre, this study seeks to clarify the extent to which reduction quality alone predicts outcome and to identify additional clinical or surgical factors that may influence prognosis. Such evidence is crucial not only for guiding surgical technique and intraoperative goals but also for patient counselling, prognostication, and long-term rehabilitation planning.

METHODS

This prospective observational study was designed to evaluate the association between radiological quality of reduction and functional outcomes following open reduction and internal fixation (ORIF) for posterior wall acetabular fractures. The study was conducted in the Department of Orthopaedic Surgery at Dhaka Medical College Hospital, Dhaka, Bangladesh, over a 20-month period from August 2020 to March 2022. A total of 20 patients who met the eligibility criteria and provided informed consent were included. Convenience sampling was used. Inclusion criteria were patients aged 18–60 years of both sexes with radiologically confirmed posterior wall acetabular fractures treated with ORIF within three weeks of injury. Patients younger than 18 or older than 60 years, those with active or latent infections, open fractures, debilitating comorbidities, pathological fractures, or those who declined consent were excluded. All patients underwent comprehensive evaluation, including demographic details, mechanism of injury, associated injuries, and clinical examination. Mechanisms of injury were categorized into high-energy trauma (e.g., road traffic accidents) and low-energy trauma (e.g., falls). Radiological evaluation included standard pelvic anteroposterior X-rays and computed tomography (CT) scans. Fractures were classified according to the Letournel and Judet classification system. Surgical planning was based on the fracture pattern, and the Kocher-Langenbeck approach was employed in most cases. The primary

surgical goal was anatomical reduction of the articular surface with stable fixation of the posterior wall. The quality of reduction was evaluated using the Matta radiographic criteria, which classify reductions as excellent (<1 mm displacement), good (2–3 mm), or fair (>3 mm).[11] Postoperative radiographs were obtained immediately after surgery and during follow-up, and the evaluations were independently reviewed by two experienced radiologists to minimize observer bias. Functional outcomes were assessed using the Merle D'Aubigné and Postel scoring system.[21,22] This system evaluates three domains—pain, mobility, and walking ability—each scored on a scale of 1 to 6. The total score ranges from 3 to 18 and is categorized as excellent (15–18), good (12–14), fair (9–11), or poor (<9). Higher scores indicate better hip function.

Ethical approval was obtained from the Institutional Review Board of Dhaka Medical College. Written informed consent was obtained from all participants after explaining study objectives, procedures, risks, and benefits in the local language. Patient confidentiality was maintained throughout the study.

Data were collected prospectively using a structured case record form, which included demographic variables, clinical characteristics, operative details, and outcome measures. Statistical analysis was performed using SPSS version 21. Descriptive statistics were used for baseline variables and expressed as means with standard deviations or frequencies with percentages, as appropriate. Associations between clinical and operative variables with radiological and functional outcomes were assessed using chi-square tests or Fisher's exact tests. A p value <0.05 was considered statistically significant. Results were presented in tables and figures for clarity.

RESULTS

Table 1 summarizes the demographic and injury characteristics of the study population. The mean age of patients was 38.25±10.19 years (range 18–60), with the majority (65%) belonging to the 31–40-year age group. Most participants were male (90%) and predominantly employed as service workers (55%). Road traffic accidents accounted for the primary mechanism of injury (90%), while falls from height were less frequent (10%). The left side was more commonly affected (70%) than the right (30%). Associated injuries were absent in most cases (70%), though abdominal (20%) and chest injuries (10%) were observed. Hip dislocation was present in 15% of patients. The mean delay from trauma to surgery was 12.8±3.57 days, with nearly half (45%) undergoing surgery between 11–15 days after injury.

Table 2 outlines the fracture pattern characteristics of the study cohort. The majority of patients (85%) presented with low displacement of fracture fragments, while only 15% demonstrated gross displacement. Acetabular fracture involvement exceeded 50% in 85% of cases, with a mean involvement of 58.25±11.39% (range 30–70). In contrast, posterior wall fracture involvement was ≤50% in 85% of patients, with a mean extent of 41.75±11.39% (range 30–70). Table 3 presents the surgical characteristics and postoperative complications of the study population. Anatomical reduction, defined as 0–1 mm residual displacement by Matta criteria, was achieved in 80% of cases, while 15% had imperfect reduction and 5% had poor reduction. Most patients (80%) experienced no postoperative complications. Among those who did, heterotopic ossification was observed in 10%, avascular necrosis in 5%, and sciatic nerve palsy in 5%. Figure 1 illustrates the distribution of radiological outcomes based on Matta criteria. Nearly half of the patients (45%) achieved excellent radiological results with <1 mm displacement, while 40% demonstrated good outcomes (2–3 mm displacement). A smaller proportion (15%) had fair outcomes with >3 mm displacement. These findings indicate that the majority of patients attained satisfactory radiological reduction following ORIF.

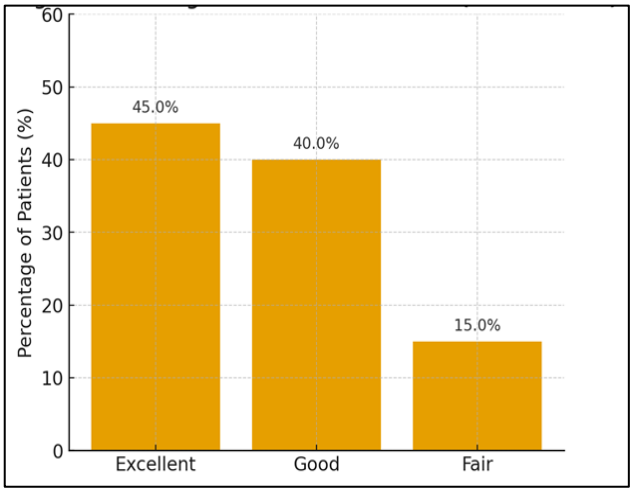

Figure 1: Radiological outcome distribution (Matta criteria).

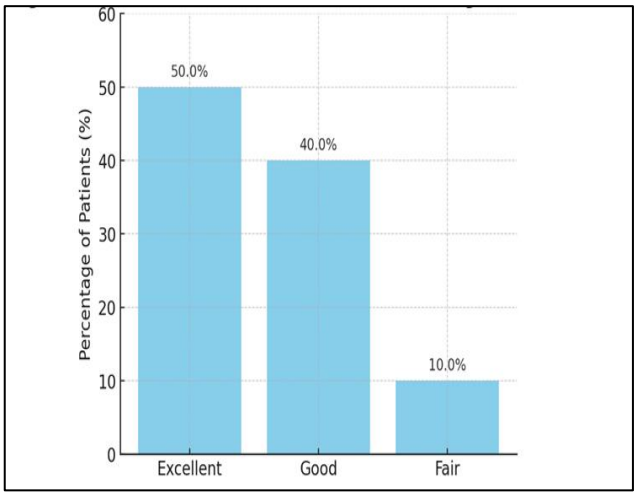

Figure 2: Functional outcome distribution (Merle D'aubigné and Postel score)

Table 4 demonstrates the association of radiological outcomes with clinical and operative factors. Hip dislocation was significantly related to poorer outcomes (p=0.019); while none of the patients with excellent outcomes had dislocations, 66.7% of those with fair outcomes presented with hip dislocation. Similarly, displacement of fracture fragments showed a significant association (p=0.019); all patients with excellent outcomes had low displacement, whereas 66.7% of those with fair outcomes had gross displacement. Surgical delay also influenced results, with 66.7% of patients undergoing surgery after more than 15 days experiencing fair outcomes, compared to 44.4% of excellent outcomes seen in patients treated within 10 days (p=0.073). The quality of reduction was a critical determinant (p=0.049); all patients with excellent outcomes achieved anatomical reduction, while 66.7% of those with fair outcomes had imperfect reductions. Postoperative complications were significantly linked to outcomes (p=0.016); avascular necrosis and sciatic nerve palsy were each observed in one-third of patients with fair outcomes, while none of these complications occurred in patients with excellent results. Other variables, including mode of injury, affected side, and the extent of acetabular or posterior wall involvement, did not show significant associations.

Table 1: Demographic and injury characteristics of patients with posterior wall acetabular fractures (n=20).

Variable	Category	Frequency (N)	Percentage (%)
Age (years)	≤30	2	10.0
	31–40	13	65.0
	41–50	3	15.0
	>50	2	10.0
	Mean±SD (range)	38.25±10.19 (18–60)	
Sex	Male	18	90.0
	Female	2	10.0
Occupation	Service worker	11	55.0
	Business owner	5	25.0
	Housewife	2	10.0
	Student	2	10.0
Mode of injury	Road traffic accident	18	90.0
	Fall from height	2	10.0
Affected side	Left	14	70.0
	Right	6	30.0
Associated injuries	None	14	70.0
	Abdominal injury	4	20.0
	Chest injury	2	10.0
Hip dislocation	Absent	17	85.0
	Present	3	15.0
Trauma to surgery delay (days)	≤10	7	35.0
	11–15	9	45.0
	>15	4	20.0
	Mean±SD (range)	12.8±3.57 (8–20)	

Table 2: Fracture pattern characteristics (n=20).

Variable	Category	Frequency (N)	Percentage (%)
Displacement of fragment	Low displacement	17	85.0
	Gross displacement	3	15.0
Acetabular fracture involvement (%)	≤50	3	15.0
	>50	17	85.0
	Mean±SD (range)	58.25±11.39 (30–70)	
Posterior wall fracture involvement (%)	≤50	17	85.0
	>50	3	15.0
	Mean±SD (range)	41.75±11.39 (30–70)	

Figure 2 depicts the distribution of functional outcomes according to the Merle D'Aubigné and Postel scoring system. Half of the patients (50%) achieved excellent outcomes, characterized by minimal or no pain, preserved mobility, and normal walking ability. Good outcomes were observed in 40% of patients, while only 10% had fair outcomes, reflecting limitations in mobility and increased functional impairment. No patients in this cohort fell into

the poor outcome category. Overall, the majority (90%) demonstrated satisfactory postoperative functional recovery.

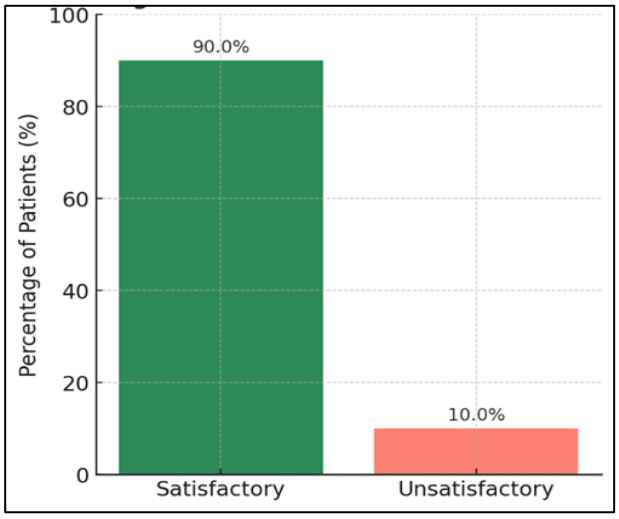

Figure 3: Overall outcome distribution.

Table 5 outlines the association of functional outcomes, assessed by the Merle D'Aubigné and Postel score, with clinical and operative factors. Several variables showed significant associations. All patients with fair outcomes had associated abdominal injuries (100%), compared to only 10% of those with excellent outcomes (p=0.016). Hip dislocation was a strong predictor of poor function (p=0.001), with both patients in the fair group presenting with dislocation, while none of the excellent group were affected. Similarly, displacement of fracture fragments was significantly associated with outcomes (p=0.001); all fair outcomes occurred in patients with gross displacement, while excellent outcomes were only observed in those with low displacement. Surgical timing also influenced recovery (p=0.036); all patients with surgery delayed beyond 15 days had fair outcomes, whereas 40% of those treated within 10 days achieved excellent function. Quality of reduction was critical (p=0.005); anatomical reductions resulted exclusively in excellent outcomes, while all patients with imperfect reductions fell into the fair group. Postoperative complications were also significantly linked to function (p=0.001); avascular necrosis and sciatic nerve palsy each occurred in 50% of the fair outcome group, while none of the excellent outcomes were affected. Other factors, such as mode of injury, side of involvement, and extent of acetabular or posterior wall fracture, did not demonstrate significant associations.

Table 3: Surgical characteristics and postoperative complications (n=20).

Variable	Category	Frequency (N)	Percentage (%)
Quality of reduction (Matta criteria)	Anatomical (0–1 mm)	16	80.0
	Imperfect (2–3 mm)	3	15.0
	Poor (>3 mm)	1	5.0
Postoperative complications	None	16	80.0
	Heterotopic ossification	2	10.0
	Avascular necrosis	1	5.0
	Sciatic nerve palsy	1	5.0

Note: Anatomical reduction defined as 0–1 mm displacement, imperfect as 2–3 mm, and poor as >3 mm according to Matta's radiographic criteria. Postoperative complications were recorded during follow-up.

Table 4: Association of radiological outcomes (Matta criteria) with clinical and operative factors (n=20).

Clinical / operative factors	Excellent (n=9)	Good (n=8)	Fair (n=3)	P value
Mode of injury				
Road traffic accident	7 (77.8%)	8 (100.0%)	3 (100.0%)	0.257
Fall from height	2 (22.2%)	0 (0.0%)	0 (0.0%)	
Affected side				
Left	6 (66.7%)	5 (62.5%)	3 (100.0%)	0.461
Right	3 (33.3%)	3 (37.5%)	0 (0.0%)	
Associated abdominal injury	1 (11.1%)	1 (12.5%)	2 (66.7%)	0.061
Hip dislocation				
Present	0 (0.0%)	1 (12.5%)	2 (66.7%)	0.019
Absent	9 (100.0%)	7 (87.5%)	1 (33.3%)	
Displacement of fracture fragment				
Gross	0 (0.0%)	1 (12.5%)	2 (66.7%)	0.019
Low	9 (100.0%)	7 (87.5%)	1 (33.3%)	
% acetabular fracture (>50%)	8 (88.9%)	7 (87.5%)	2 (66.7%)	0.626
% posterior fracture (>50%)	1 (11.1%)	1 (12.5%)	1 (33.3%)	0.626

Continued.

Clinical / operative factors	Excellent (n=9)	Good (n=8)	Fair (n=3)	P value
Trauma to surgery delay				
≤10 days	4 (44.4%)	2 (25.0%)	1 (33.3%)	0.073
11–15 days	3 (33.3%)	6 (75.0%)	0 (0.0%)	
>15 days	2 (22.2%)	0 (0.0%)	2 (66.7%)	
Quality of reduction				
Anatomical	9 (100.0%)	6 (75.0%)	1 (33.3%)	0.049
Imperfect	0 (0.0%)	1 (12.5%)	2 (66.7%)	
Poor	0 (0.0%)	1 (12.5%)	0 (0.0%)	
Postoperative complications				
None	9 (100.0%)	6 (75.0%)	1 (33.3%)	0.016
Avascular necrosis	0 (0.0%)	0 (0.0%)	1 (33.3%)	
Heterotopic ossification	0 (0.0%)	2 (25.0%)	0 (0.0%)	
Sciatic palsy	0 (0.0%)	0 (0.0%)	1 (33.3%)	

Note: Radiological outcomes classified by Matta radiographic criteria: Excellent (<1 mm), Good (2–3 mm), Fair (>3 mm). * Significant associations ($p < 0.05$).

Table 5: Association of functional outcomes (Merle D'aubigné and Postel score) with clinical and operative factors (n=20).

Clinical / operative factors	Excellent (n=10)	Good (n=8)	Fair (n=2)	P value
Mode of injury				
Road traffic accident	8 (80.0%)	8 (100.0%)	2 (100.0%)	0.329
Fall from height	2 (20.0%)	0 (0.0%)	0 (0.0%)	
Affected side				
Left	7 (70.0%)	5 (62.5%)	2 (100.0%)	0.585
Right	3 (30.0%)	3 (37.5%)	0 (0.0%)	
Associated abdominal injury	1 (10.0%)	1 (12.5%)	2 (100.0%)	0.016
Hip dislocation				
Present	0 (0.0%)	1 (12.5%)	2 (100.0%)	0.001
Absent	10 (100.0%)	7 (87.5%)	0 (0.0%)	
Displacement of fracture fragment				
Gross	0 (0.0%)	1 (12.5%)	2 (100.0%)	0.001
Low	10 (100.0%)	7 (87.5%)	0 (0.0%)	
% acetabular fracture (>50%)	9 (90.0%)	7 (87.5%)	1 (50.0%)	0.340
% posterior fracture (>50%)	1 (10.0%)	1 (12.5%)	1 (50.0%)	0.340
Trauma to surgery delay				
≤10 days	4 (40.0%)	3 (37.5%)	0 (0.0%)	0.036
11–15 days	4 (40.0%)	5 (62.5%)	0 (0.0%)	
>15 days	2 (20.0%)	0 (0.0%)	2 (100.0%)	
Quality of reduction				
Anatomical	10 (100.0%)	6 (75.0%)	0 (0.0%)	0.005
Imperfect	0 (0.0%)	1 (12.5%)	2 (100.0%)	
Poor	0 (0.0%)	1 (12.5%)	0 (0.0%)	
Postoperative complications				
None	10 (100.0%)	6 (75.0%)	0 (0.0%)	0.001
Avascular necrosis	0 (0.0%)	0 (0.0%)	1 (50.0%)	
Heterotopic ossification	0 (0.0%)	2 (25.0%)	0 (0.0%)	
Sciatic palsy	0 (0.0%)	0 (0.0%)	1 (50.0%)	

Note: Functional outcomes were classified according to Merle D'Aubigné and Postel score. * Significant associations ($p<0.05$).

Table 6 presents the association of overall outcomes with injury-related factors. A significant association was observed with abdominal injury (p=0.012); both patients with unsatisfactory outcomes had abdominal injuries, compared to only 11.1% in the satisfactory group. Hip dislocation showed a highly significant relationship ($p<0.001$), as all patients with unsatisfactory outcomes had dislocated hips, whereas 94.4% of those without dislocation achieved satisfactory results.

Similarly, displacement of fracture fragments was strongly predictive of outcome ($p < 0.001$); gross displacement was present in all unsatisfactory cases, while 94.4% of patients with low displacement had satisfactory results. Mode of injury, affected side, and the extent of acetabular or posterior wall fracture did not demonstrate statistically significant associations, although unsatisfactory outcomes appeared more frequent in patients with left-sided injuries and fractures involving >50% of the acetabulum or posterior wall.

Table 6: Association of overall outcomes with injury-related factors (n=20).

Injury-related characteristics	Satisfactory (n=18)	Unsatisfactory (n=2)	P value
Mode of injury			
Road traffic accident	16 (88.9%)	2 (100.0%)	0.619
Fall from height	2 (11.1%)	0 (0.0%)	
Affected side			
Left	12 (66.7%)	2 (100.0%)	0.329
Right	6 (33.3%)	0 (0.0%)	
Associated injury			
Abdomen injury	2 (11.1%)	2 (100.0%)	0.012
Chest injury	2 (11.1%)	0 (0.0%)	
None	14 (77.8%)	0 (0.0%)	
Dislocation of hip joint			
Absent	17 (94.4%)	0 (0.0%)	<0.001
Present	1 (5.6%)	2 (100.0%)	
Displacement of fracture			
Low	17 (94.4%)	0 (0.0%)	<0.001
Gross	1 (5.6%)	2 (100.0%)	
Acetabular fracture (%)			
≤50	2 (11.1%)	1 (50.0%)	0.144
>50	16 (88.9%)	1 (50.0%)	
Posterior wall fracture (%)			
≤50	16 (88.9%)	1 (50.0%)	0.144
>50	2 (11.1%)	1 (50.0%)	

Note: Overall outcome categorized as satisfactory or unsatisfactory based on combined radiological and functional assessment.
*Significant associations ($p<0.05$).

DISCUSSION

In this prospective study of 20 patients with posterior wall acetabular fractures treated with ORIF, we observed that the mean age was 38.25 years, with the majority belonging to the 31–40-year group, and that most patients were male service workers sustaining injuries predominantly from road traffic accidents (RTAs). This demographic pattern is consistent with previous reports, where high-energy trauma in young, working-age men remains the leading cause of posterior wall acetabular fracture.[6,23] The predominance of left-sided involvement in our series also aligns with the variability seen across studies, while the 15% incidence of hip dislocation falls within the lower range of that described in global cohorts.[23]

With respect to fracture characteristics, most patients presented with low fragment displacement (85%), but a large proportion (85%) also had acetabular involvement of more than 50%. Despite this, posterior wall involvement was ≤50% in the majority (85%). These findings emphasize that even when the posterior wall fragment is relatively small, acetabular surface involvement can be extensive, an aspect well-recognized as a determinant of surgical planning.[24] Importantly, our surgical outcomes demonstrated that anatomical reduction was achieved in 80% of patients, while complications were relatively infrequent, with heterotopic ossification in 10% and AVN or sciatic nerve palsy each in 5%. These complication rates are consistent with published ranges, where heterotopic ossification is reported in 10–25% and AVN in 5–12% of cases.[25,26]

Radiological outcomes assessed using Matta's criteria showed that 45% of patients achieved excellent results, 40% good, and 15% fair. These figures mirror outcomes reported in specialized centers, where excellent-to-good radiological results range between 70% and 85%.[24-27] More importantly, several associations were statistically significant in our cohort. Hip dislocation was strongly associated with poor radiological outcomes, with two-thirds of patients with fair results having dislocations, a finding that echoes prior observations that unreduced or delayed dislocations predispose to residual incongruity and AVN.[26] Similarly, gross fragment displacement was significantly linked to fair outcomes, supporting the principle that reduction accuracy is the most important determinant of prognosis.[28] The quality of reduction itself

was also critical, as all patients with excellent radiological results had anatomical reductions, while two-thirds of those with fair outcomes had imperfect reductions, consistent with Matta's original assertion that even millimetric incongruity impacts long-term outcomes. Finally, the presence of complications such as AVN and sciatic palsy was predictive of poor radiological results, in agreement with reports by Das et al.[26] By contrast, mode of injury, fracture extent, and side affected were not significant predictors, reflecting similar trends in other series.[24]

Functional outcomes assessed using the Merle D'Aubigné and Postel score showed that 50% of patients achieved excellent results, 40% good, and 10% fair. These findings fall within the range reported by large cohorts, where good-to-excellent results are seen in 60–80% of patients.[29,30] Key determinants of poor function in our study were abdominal injuries, hip dislocation, gross displacement, surgical delay beyond 15 days, imperfect reductions, and complications such as AVN and sciatic palsy. These associations are well supported in the literature, with several studies confirming the detrimental effect of hip dislocation, gross displacement, and delayed fixation on long-term function.[29] Our results also reinforce the observation that complications, particularly AVN and nerve palsy, severely compromise functional recovery.[26]

When combining radiological and functional outcomes, 90% of patients in our study achieved satisfactory overall results, while 10% had unsatisfactory outcomes. Unsatisfactory outcomes were significantly associated with abdominal injuries, hip dislocation, and gross displacement, again underscoring the interplay of injury severity and operative factors in determining prognosis. This parallels findings from systematic reviews where overall satisfactory outcomes are achieved in 80–90% of cases, with dislocation and displacement being the strongest predictors of poor results.[15-31]

Overall, our findings affirm that while demographic and injury characteristics largely reflect global patterns, the determinants of outcome remain consistent: anatomical reduction, avoidance of surgical delay, and prevention of complications are paramount. Dislocation and displacement stand out as critical prognostic factors across radiological, functional, and overall outcomes, a message repeatedly emphasized in the literature.[24-30] Our study thus contributes further evidence from a South Asian context, aligning closely with international experience while highlighting the need for timely, precise surgical management of posterior wall acetabular fractures.

Limitations

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

This prospective observational study highlights the decisive role of radiological quality of reduction in determining functional and overall outcomes in posterior wall acetabular fractures treated with ORIF. Anatomical reduction was strongly associated with excellent radiological and functional results, while hip dislocation, gross displacement, surgical delay beyond 15 days, and postoperative complications such as AVN and sciatic palsy were significant predictors of unsatisfactory outcomes. Conversely, demographic variables, side of fracture, and extent of acetabular or posterior wall involvement were not significantly associated with prognosis. These findings reinforce the importance of early diagnosis, meticulous surgical technique, and timely intervention in optimizing long-term hip function and patient recovery.

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