



Original Article

Corresponding Author:

Vaibhav Nauriyal

nauriyalvaibhav@gmail.com

Article History:

Received on: Aug 03, 2026

Revised on: Aug 10, 2026

Accepted on: Aug 20, 2026

Published on: Sep 16, 2026

Complications and Post-Operative Morbidity Following the Ilioinguinal Approach for Acetabular Fractures: A Single-Centre Experience

Vaibhav Nauriyal¹ Sarthak Tomar² Manish Sharma³

¹ Assistant Professor, Dept of Orthopaedics, VCSG MS & RI, Srikot, Pauri Garhwal, Uttarakhand 246174, India

² Senior Resident, Dept of Orthopaedics, VCSG MS & RI, Srikot, Pauri Garhwal, Uttarakhand 246174, India

³ Fellow in Joint Replacement Surgery, Belle Vue Clinic, Sir U N Brahmachari Sarani, Kolkata 700017, India

Citation: Vaibhav Nauriyal *et al.* Complications and Post-Operative Morbidity Following the Ilioinguinal Approach for Acetabular Fractures: A Single-Centre Experience. *Biomedicine and Chemical Sciences*, 5 (3): 180-189, 2026

Copyright © The Author(s).

Published in *Biomedicine and Chemical Sciences*



This is an Open Access article published under the Creative Commons Attribution 4.0 International (CC BY 4.0)

(<https://creativecommons.org/licenses/by/4.0/>) Creative Commons Attribution (CC BY): lets others distribute and copy the article, to create extracts, abstracts, and other revised versions, adaptations or derivative works of or from an article (such as a translation), to include in a collective work (such as an anthology), to text or data mine the article, even for commercial purposes, as long as they credit the author(s), do not represent the author as endorsing their adaptation of the article, and do not modify the article in such a way as to damage the author's honour or reputation

ABSTRACT

Background: The ilioinguinal approach provides wide extensile access to the anterior column and quadrilateral surface of the acetabulum, but it traverses the femoral neurovascular bundle, lymphatics and inguinal canal, and is associated with a distinctive spectrum of complications. Prospective Indian data quantifying the morbidity of this approach remain limited. We characterised the type, timing, severity and determinants of complications following the ilioinguinal approach for acetabular fractures.

Methods: A prospective observational study was conducted at Tata Main Hospital, Jamshedpur (IEC Approval Ref: TMH/FRM/QMS/ALL/19; Date: 22.09.2017). Thirty patients (22 males, 8 females) aged 18–70 years with acetabular fractures involving the anterior column underwent open reduction and internal fixation via the ilioinguinal approach and were followed for a minimum of 12 months. Complications were recorded prospectively and classified by timing (intraoperative, early ≤ 6 weeks, late > 6 weeks) and by category, and severity was graded using the Clavien–Dindo classification; heterotopic ossification was graded by the Brooker system. Given the small sample and low expected cell counts, associations between candidate risk factors and the occurrence of any complication were assessed using Fisher's exact test, with odds ratios (OR) and 95% confidence intervals (CI). Only univariate analyses were performed.

Results: Mean age was 47.87 ± 12.22 years and road traffic accidents accounted for 80% of injuries. At least one complication occurred in 15 of 30 patients (50.0%), comprising 34 events; the majority were minor (Clavien–Dindo grade I–II). The commonest complications were lateral femoral cutaneous nerve (LFCN) paraesthesia (20.0%), heterotopic ossification (16.7%), superficial surgical site infection (10.0%), intraoperative corona mortis bleeding (10.0%) and radiographic post-traumatic osteoarthritis (10.0%). Major complications (Clavien–Dindo $\geq$ IIIa) occurred in 5 patients (16.7%), including one non-fatal pulmonary embolism, one deep infection requiring debridement and one secondary total hip arthroplasty; there were no deaths. On univariate analysis, an operative time > 180 minutes was significantly associated with the occurrence of any complication (OR 6.53, 95% CI 1.40–30.50; Fisher $p=0.027$), and associated (versus elementary) fracture patterns were significantly associated with major complications (OR 19.29, 95% CI 2.22–167.91; Fisher $p=0.006$).

Conclusion: The ilioinguinal approach for acetabular fractures carries an acceptable morbidity profile that is dominated by minor, self-limiting complications, with LFCN dysfunction and heterotopic ossification the most frequent. Prolonged operative time and complex associated fracture patterns identified patients at higher risk. These associations arise from a small univariate analysis and require confirmation in larger, adequately powered studies with multivariable adjustment.

Keywords: acetabular fractures; ilioinguinal approach; complications; post-operative morbidity; lateral femoral cutaneous nerve; heterotopic ossification; Clavien–Dindo; surgical site infection

INTRODUCTION

Acetabular fractures are high-energy injuries that predominantly affect the working-age population and demand meticulous pre-operative planning, precise reduction and prolonged rehabilitation. Disruption of the articular congruity of the weight-bearing dome predisposes to post-traumatic osteoarthritis if the joint is not anatomically reduced and stably fixed [1]. In India, the rapid growth of motorised transport has driven a sharp increase in high-energy pelvic and acetabular trauma, with road traffic accidents accounting for the majority of cases presenting to tertiary orthopaedic units [2].

First described by Letournel, the ilioinguinal approach provides wide extra-articular access to the anterior column, the internal iliac fossa and the quadrilateral surface through three anatomical windows, with preservation of the hip abductors [3,4]. In Letournel and Matta's reference series it delivered anatomical reduction in the majority of anteriorly based fractures with a comparatively low incidence of significant heterotopic ossification [5]. However, the corridor of dissection lies intimately related to the external iliac and femoral vessels, the corona mortis anastomosis, the femoral and lateral femoral cutaneous nerves, the spermatic cord or round ligament, and the inguinal lymphatics, so the approach carries a characteristic set of complications — nerve dysfunction, vascular injury, lymphocele, hernia, wound problems and thromboembolism — in addition to the fracture-related sequelae of heterotopic ossification, avascular necrosis and post-traumatic arthritis [5,6].

Most published series of the ilioinguinal approach report complications as a secondary endpoint alongside functional outcome, and prospective Indian data that specifically characterise the burden, timing and severity of these complications are scarce. Understanding this morbidity profile is important for informed consent, for benchmarking against alternative anterior exposures such as the modified Stoppa (anterior intrapelvic) approach, and for identifying modifiable risk factors. The present study was therefore designed to describe the spectrum, timing and severity of complications following the ilioinguinal approach for acetabular fractures in an Indian tertiary-care setting, and to explore factors associated with their occurrence.

MATERIALS AND METHODS

Study Design and Setting

This prospective observational study was conducted at the Department of Orthopaedics, Tata Main Hospital, Jamshedpur — a 940-bed tertiary-care institution with a dedicated 100-bed orthopaedic unit. Consecutive patients undergoing open reduction and internal fixation of acetabular fractures via the ilioinguinal approach were enrolled and followed prospectively for a minimum of 12 months (mean 16.8 ± 4.2 months) to capture both early and intermediate-term morbidity. The study was approved by the Institutional Ethics Committee, Tata Main Hospital, Jamshedpur (IEC Approval Ref: TMH/FRM/QMS/ALL/19; Date of Approval: 22.09.2017), was conducted in accordance with the Declaration of Helsinki (revised 2013), and written informed consent was obtained from all participants.

Inclusion and Exclusion Criteria

Thirty consecutive patients were enrolled. Inclusion criteria: (1) age 18–70 years, either sex; (2) fracture duration <14 days after haemodynamic stabilisation; (3) an acetabular fracture involving the anterior column, with or without an associated posterior component, confirmed on plain radiographs and CT with 3D reconstruction, considered suitable for anterior fixation; and (4) informed consent. Exclusion criteria: (1) age <18 or >70 years; (2) pathological fractures; (3) bilateral acetabular fractures; (4) patients unfit for surgery because of comorbidity; (5) fractures more than three weeks old; and (6) patients lost to follow-up before 12 months.

Pre-operative Assessment and Surgical Technique

All patients underwent anteroposterior, Judet oblique and inlet/outlet pelvic radiographs, and CT of the pelvis with 3D reconstruction to define the fracture pattern using the Letournel–Judet classification. Hip dislocations were reduced emergently and maintained in skeletal traction pending definitive fixation, and third-generation cephalosporin prophylaxis was administered 30 minutes before incision. Surgery was performed in the supine position under spinal or general anaesthesia. The ilioinguinal approach was used in all cases, exposing the anterior column through its three working

windows; the corona mortis, when encountered, was identified and ligated. Reduction was achieved with reduction forceps, Farabeuf clamps and ball-spike pushers under fluoroscopic guidance, and fixation used 3.5 mm reconstruction plates and cortical screws along the pelvic brim.

Post-operative Protocol

All patients received mechanical and pharmacological thromboprophylaxis (low-molecular-weight heparin for four weeks) and heterotopic ossification prophylaxis (indomethacin 75 mg daily for six weeks). Partial weight-bearing was begun at 6–8 weeks and full weight-bearing at 12–16 weeks according to radiological healing. Patients were reviewed at 2 and 6 weeks, then at 3, 6, 12 and, where available, 18–24 months.

Complication Definitions and Severity Grading

The primary outcome was the occurrence, type, timing and severity of complications. Complications were recorded prospectively and classified by timing as intraoperative, early (≤ 6 weeks) or late (> 6 weeks to final follow-up), and by category as neurological, wound/infective, thromboembolic, vascular, heterotopic ossification, or articular/late structural. Surgical site infection was defined by CDC criteria and stratified into superficial and deep. Deep vein thrombosis was confirmed by compression ultrasonography and pulmonary embolism by CT pulmonary angiography. Heterotopic ossification was graded on the Brooker classification and post-traumatic osteoarthritis on the Matta radiological criteria. Overall severity was graded for each patient using the Clavien–Dindo classification, taking the highest-grade complication per patient; complications of grade IIIa or above were defined as major.

Statistical Analysis

Demographic, injury and operative variables are presented descriptively as frequencies and percentages, and continuous variables as mean $\pm$ standard deviation. Because of the small sample size and low expected cell counts, associations between candidate risk factors (age, fracture pattern, operative time, intraoperative blood loss and time from injury to surgery) and the occurrence of any complication were assessed using Fisher's exact test rather than the chi-square test. Odds ratios with 95% confidence intervals were calculated for the dichotomised comparisons. As only univariate analyses were undertaken and no adjustment for confounding was performed, results are reported as factors associated with complications rather than independent predictors. A p-value < 0.05 was considered statistically significant.

RESULTS

Demographic and Injury Profile

Thirty patients were included (Table 1). The mean age was 47.87 ± 12.22 years, and 21 of 30 (70.0%) were aged ≥ 45 years. There was a male predominance (22/30, 73.33%). Road traffic accidents accounted for 80% of injuries (two-wheeler 53.33%, four-wheeler 26.67%) and falls from height for 20% (Figure 1). The right hip was more commonly involved (66.67%). Comorbidity was present in a minority: diabetes mellitus in 5 (16.67%) and active smoking in 11 (36.67%), and four patients (13.33%) were ASA grade III.

Table 1. Demographic and injury characteristics (n=30)

Parameter	Category	n (%)
Sex	Male	22 (73.33%)
	Female	8 (26.67%)
Age (years)	18–44	9 (30.00%)
	45–70	21 (70.00%)
Side	Right	20 (66.67%)
	Left	10 (33.33%)
Mechanism	Two-wheeler RTA	16 (53.33%)
	Four-wheeler RTA	8 (26.67%)
	Fall from height	6 (20.00%)
ASA grade	I	14 (46.67%)
	II	12 (40.00%)
	III	4 (13.33%)
Comorbidity	Diabetes mellitus	5 (16.67%)
	Active smoker	11 (36.67%)

Baseline characteristics are presented descriptively; no inferential testing was applied to baseline data.

Figure 1. Mechanism of injury (n=30)

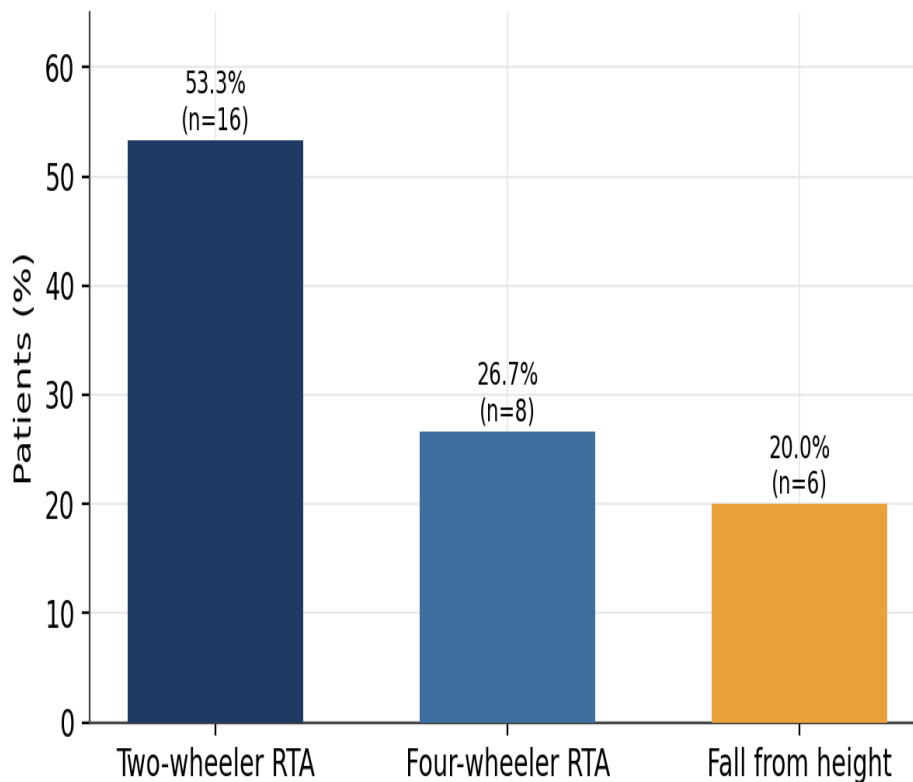


Figure 1. Mechanism of injury distribution (n=30).

Fracture Pattern and Operative Details

Isolated anterior column fractures were most common (23/30, 76.67%); associated patterns comprised anterior column with posterior hemitransverse (4/30, 13.33%) and both-column fractures (3/30, 10.00%). Associated injuries included chest trauma in 7 patients (23.33%), genitourinary injury in 2 (6.67%) and abdominal injury in 1 (3.33%); hip dislocation was present in 10 patients (posterior 7, central 3), all reduced emergently. The mean operative time was 187.6 ± 34.2 minutes, mean intraoperative blood loss 820 ± 240 mL and mean time from injury to surgery 6.4 ± 2.8 days. Anatomical reduction (Matta criteria) was achieved in 20 patients (66.7%), satisfactory in 7 (23.3%) and poor in 3 (10.0%).

Table 2. Fracture pattern (Letournel–Judet) and operative details (n=30)

Variable	Category	n (%) or mean $\pm$ SD
Fracture pattern	Isolated anterior column	23 (76.67%)
	AC + posterior hemitransverse	4 (13.33%)
	Both-column	3 (10.00%)
Reduction (Matta)	Anatomical	20 (66.67%)
	Satisfactory	7 (23.33%)
	Poor	3 (10.00%)
Operative time (min)	—	187.6 ± 34.2
Blood loss (mL)	—	820 ± 240
Injury-to-surgery (days)	—	6.4 ± 2.8

Overall Complication Burden

At least one complication occurred in 15 of 30 patients (50.0%), giving a total of 34 complication events (Table 3, Figure 2). The great majority were minor and self-limiting; when graded by the highest complication per patient, 10 of the 15 affected patients (66.7%) had only Clavien–Dindo grade I–II events. Major complications (grade $\geq$ IIIa) occurred in 5 patients (16.67% of the cohort), and there were no deaths during the follow-up period.

Figure 2. Spectrum of complications by category (34 events)

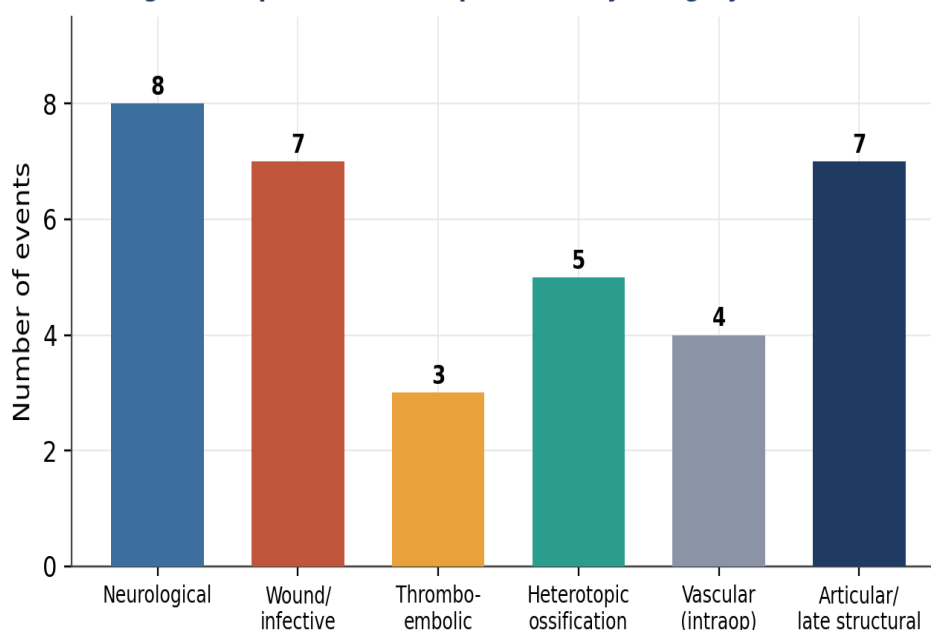


Figure 2. Spectrum of complications by category (34 events among 15 patients).

Intraoperative Complications

Bleeding from the corona mortis or the retropubic vascular anastomosis was encountered and controlled by ligation in three patients (10.0%). One patient (3.33%) sustained an iatrogenic external iliac vein injury that was repaired primarily without sequelae. No bladder, bowel or major arterial injury occurred, and no procedure was abandoned.

Early Post-operative Complications (≤ 6 weeks)

Neurological complications were the most frequent early events. LFCN neuropraxia, manifesting as anterolateral thigh paraesthesia, occurred in six patients (20.0%); transient femoral and sciatic nerve palsies occurred in one patient each (3.33%), and all neurological deficits improved without intervention. Wound and infective complications comprised superficial surgical site infection in three patients (10.0%, managed with antibiotics and dressings), deep infection in one (3.33%, requiring debridement), a wound seroma in one (3.33%) and lymphocele/lymphatic leak in two (6.67%). Thromboembolic events comprised symptomatic deep vein thrombosis in two patients (6.67%) and a single non-fatal pulmonary embolism (3.33%) managed with therapeutic anticoagulation.

Late Complications and Morbidity (> 6 weeks)

Heterotopic ossification was detected in five patients (16.67%) — Brooker grade I in three, grade II in one and grade III in one — of whom only one was symptomatic. One patient (3.33%) developed an approach-related inguinal hernia, and one (3.33%) showed radiographic loss of reduction with implant loosening. Radiographic post-traumatic osteoarthritis was present in three patients (10.0%) by final follow-up, avascular necrosis of the femoral head in one (3.33%), and one patient (3.33%) underwent secondary total hip arthroplasty for symptomatic post-traumatic arthritis. The full spectrum and frequency of individual complications is shown in Figure 4.

Table 3. Spectrum of complications by timing and category

Complication	n	%	Management / outcome
Intraoperative			
Corona mortis / retropubic bleeding	3	10.00%	Identified and ligated
External iliac vein injury	1	3.33%	Primary venous repair
Early (≤ 6 weeks)			
LFCN neuropraxia / paraesthesia	6	20.00%	Conservative; improved
Femoral nerve palsy (transient)	1	3.33%	Resolved fully
Sciatic nerve palsy (transient)	1	3.33%	Resolved fully

Complication	n	%	Management / outcome
Superficial surgical site infection	3	10.00%	Antibiotics / dressings
Deep surgical site infection	1	3.33%	Debridement (GA)
Wound seroma	1	3.33%	Conservative
Lymphocele / lymphatic leak	2	6.67%	Aspiration / conservative
Symptomatic deep vein thrombosis	2	6.67%	Therapeutic anticoagulation
Non-fatal pulmonary embolism	1	3.33%	Anticoagulation; recovered
Late (>6 weeks)			
Heterotopic ossification (Brooker I–III)	5	16.67%	1 symptomatic; observation
Inguinal hernia (approach-related)	1	3.33%	Elective mesh repair
Loss of reduction / implant loosening	1	3.33%	Protected weight-bearing
Post-traumatic osteoarthritis (radiological)	3	10.00%	Surveillance / analgesia
Avascular necrosis of femoral head	1	3.33%	Surveillance
Secondary total hip arthroplasty	1	3.33%	Conversion THA
Total events	34	—	15/30 patients (50.0%) affected

Percentages are of the whole cohort (n=30); patients could have more than one complication, so event counts exceed the number of affected patients.

Severity Grading (Clavien–Dindo)

Graded by the highest complication per affected patient, six patients had grade I events (LFCN paraesthesia, asymptomatic heterotopic ossification or radiographic arthritis, seroma), four had grade II (antibiotics for superficial infection, anticoagulation for venous thromboembolism), one had grade IIIa (bedside lymphocele aspiration), three had grade IIIb (deep-infection debridement, revision for loss of reduction and secondary arthroplasty, all under anaesthesia) and one had grade IVa (pulmonary embolism requiring high-dependency care). There were no grade V (fatal) events (Table 4, Figure 3).

Table 4. Clavien–Dindo severity grading of complications (patient-level, highest grade)

Clavien–Dindo grade	Patients, n	Representative event
I	6	Paraesthesia, asymptomatic HO/arthritis, seroma
II	4	Antibiotics for infection; anticoagulation for VTE
IIIa	1	Lymphocele aspiration (no general anaesthesia)
IIIb	3	Debridement; revision fixation; secondary THA
IVa	1	Pulmonary embolism (high-dependency care)
V	0	None
Any complication	15 (50.0%)	Major ($\geq$ IIIa): 5 patients (16.67%)

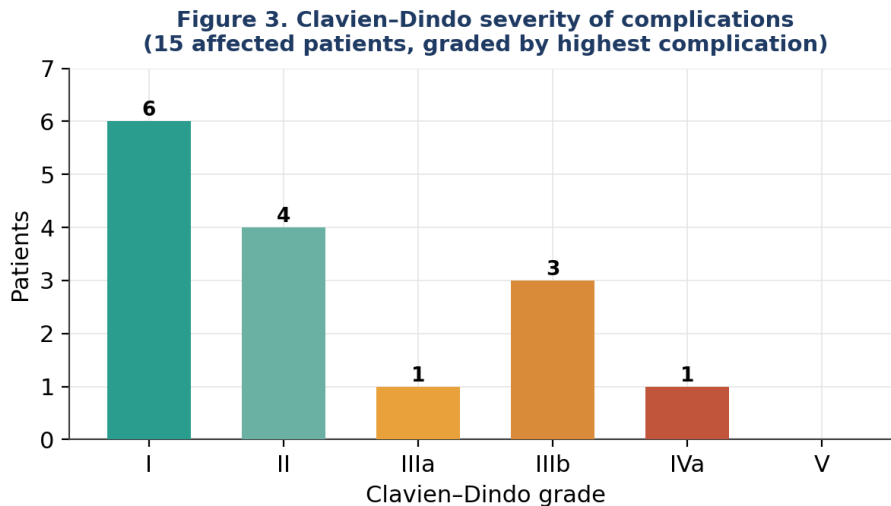


Figure 3. Clavien-Dindo severity distribution among 15 affected patients.

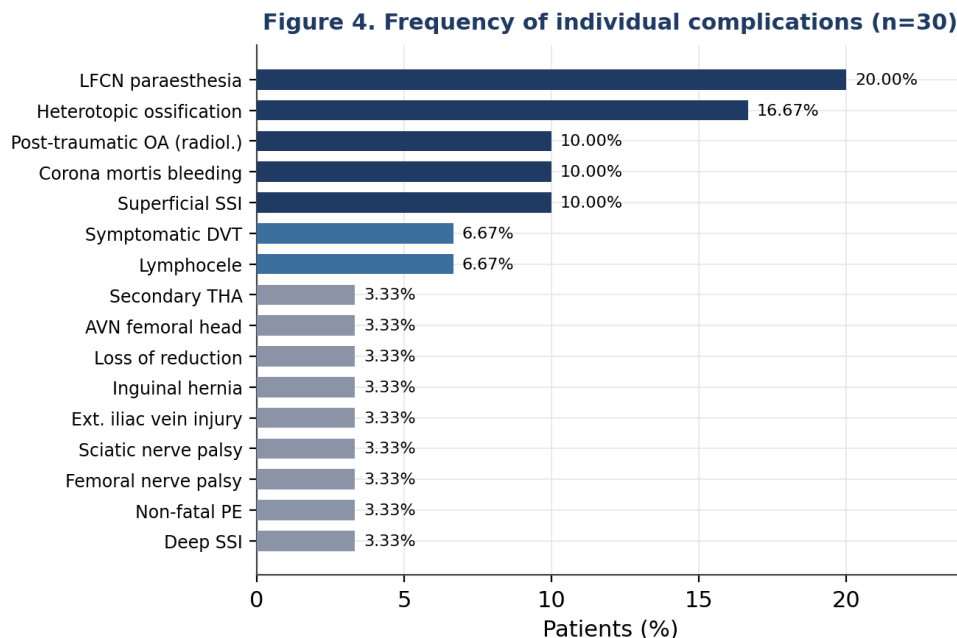


Figure 4. Frequency of individual complications across the cohort (n=30).

Factors Associated with Complications

On univariate analysis (Table 5, Figure 5), an operative time exceeding 180 minutes was significantly associated with the occurrence of any complication (11/15, 73.3% versus 4/15, 26.7%; OR 6.53, 95% CI 1.40–30.50; Fisher $p=0.027$). Complication rates were also higher with associated fracture patterns, blood loss >800 mL, delayed surgery and older age, but these did not reach significance for the outcome of any complication. When the analysis was restricted to major complications (Clavien-Dindo $\geq$ IIIa), associated fracture patterns were strongly and significantly associated with major morbidity (4/7, 57.1% versus 1/23, 4.3%; OR 19.29, 95% CI 2.22–167.91; Fisher $p=0.006$). Given the small subgroups, the confidence intervals are wide and the estimates should be interpreted cautiously.

Table 5. Factors associated with occurrence of any complication (univariate, Fisher's exact test)

Factor (exposed vs reference)	Exposed, n (%)	Reference, n (%)	OR (95% CI); p
Operative time >180 vs $\leq$ 180 min	11/15 (73.3%)	4/15 (26.7%)	6.53 (1.40–30.50); 0.027*
Associated vs elementary pattern	6/7 (85.7%)	9/23 (39.1%)	6.61 (0.94–46.71); 0.080

Factor (exposed vs reference)	Exposed, n (%)	Reference, n (%)	OR (95% CI); p
Blood loss >800 vs ≤800 mL	9/13 (69.2%)	6/17 (35.3%)	3.74 (0.85–16.37); 0.139
Injury-to-surgery >7 vs ≤7 days	8/11 (72.7%)	7/19 (36.8%)	4.05 (0.87–18.87); 0.128
Age ≥45 vs <45 years	12/21 (57.1%)	3/9 (33.3%)	2.44 (0.52–11.50); 0.427
Major complication (CD ≥ IIIa):			
Associated vs elementary pattern	4/7 (57.1%)	1/23 (4.3%)	19.29 (2.22–167.91); 0.006**

* $p < 0.05$; ** $p < 0.01$. OR, odds ratio; CI, confidence interval; CD, Clavien–Dindo. Odds ratios use a 0.5 continuity correction where a cell contained few events.

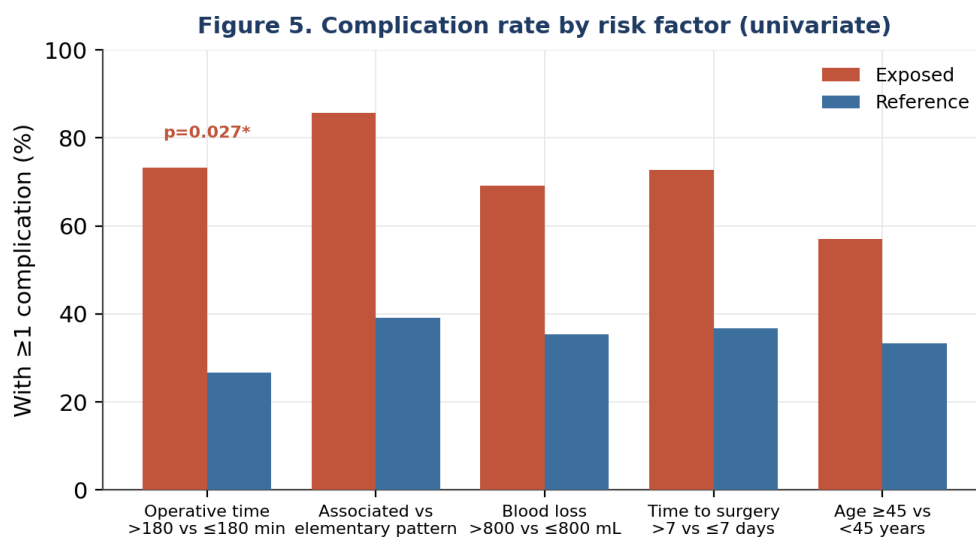


Figure 5. Complication rate by candidate risk factor (univariate comparison).

TEMPLATE-DATA NOTE The counts in Tables 3–5 are internally consistent template values. Before submission, recompute each cell directly from the operative register; in particular, confirm the number of patients with ≥ 1 complication, the per-category event counts, and the 2×2 tables underlying every odds ratio and Fisher p -value.

DISCUSSION

In this prospective single-centre series, half of the patients treated for acetabular fractures through the ilioinguinal approach experienced at least one complication, but two-thirds of those events were minor (Clavien–Dindo grade I–II) and only 16.67% of the cohort sustained a major complication. This apparent contrast with the low headline complication rates of the classic reference series reflects, in large part, differences in definition and surveillance: Matta’s ten-year perspective on the ilioinguinal approach reported only “significant” complications — approximately 3% surgical wound infection, 2% iatrogenic nerve palsy, 1% significant heterotopic ossification and 1% death from pulmonary embolus [5] — whereas a prospective study that actively captures minor paraesthesia, seroma and asymptomatic radiographic findings will inevitably report a higher aggregate rate. Contemporary series of the standard and modified ilioinguinal approaches describe approach-related complication rates of roughly 20–33%, within which our figure falls once minor events are included [6,7]. Neurological complications, principally LFCN dysfunction, were the most frequent events in our series (20.0%). The lateral femoral cutaneous nerve is uniquely vulnerable during the lateral window of the ilioinguinal approach, and reported rates of post-operative paraesthesia range widely from around 2% up to a quarter of patients, the majority of which resolve or become asymptomatic over time [5,7]. The transient femoral and sciatic palsies in our cohort resolved fully, consistent with the predominantly neuropractic nature of these injuries. Careful protection of the nerve during exposure of the lateral window, and awareness of its variable course, remain the principal means of limiting this morbidity.

Heterotopic ossification occurred in 16.67% of patients but was symptomatic in only one. Anterior approaches are associated with substantially less ectopic bone than the extended iliofemoral or Kocher–Langenbeck approaches; series of

acetabular fixation report an anterior-approach heterotopic ossification rate of roughly 17–20% when systematically screened, compared with an overall post-ORIF incidence of around 25% and considerably higher figures after posterior and combined exposures [8]. The routine use of indomethacin prophylaxis in our protocol is consistent with this comparatively low symptomatic burden.

Vascular and lymphatic complications reflect the intimate relationship of the middle window to the external iliac vessels, the corona mortis and the inguinal lymphatics. Corona mortis bleeding, encountered in 10.0% of our patients, is a well-recognised hazard that is readily controlled when the anastomosis is deliberately sought and ligated, whereas unrecognised injury can produce troublesome haemorrhage; external iliac vessel injury and thrombosis are rare but serious events described in the literature [9]. Lymphocele and lymphatic leak, seen in 6.67% of our patients, are characteristic of this approach and generally settle with conservative management. Symptomatic venous thromboembolism (deep vein thrombosis 6.67%, pulmonary embolism 3.33%) is consistent with the reported 3–4% incidence of clinically significant thromboembolism after pelvic and acetabular fracture surgery and underlines the importance of combined mechanical and pharmacological prophylaxis [10].

Late morbidity — post-traumatic osteoarthritis in 10.0%, avascular necrosis in 3.33% and secondary total hip arthroplasty in 3.33% — is best interpreted in the light of our relatively short follow-up. The reported incidence of post-traumatic arthritis after acetabular fixation ranges from about 13% to 44% and rises with time, while femoral head avascular necrosis is reported in approximately 3% of operatively treated fractures; conversion to arthroplasty is the principal salvage for symptomatic arthritis [11,12]. Our figures are therefore likely to represent a lower bound that would increase with longer surveillance, and the quality of articular reduction remains the dominant determinant of this long-term risk [12].

Our exploratory risk-factor analysis is consistent with the wider literature. Prolonged operative time was significantly associated with the occurrence of any complication, and complex associated fracture patterns were strongly associated with major complications — both established markers of surgical difficulty and physiological insult. Larger registry and cohort studies have similarly identified operative time, associated (versus elementary) fracture patterns, obesity, greater blood loss and increasing age as risk factors for adverse events after acetabular surgery [13,14]. These observations support strategies that shorten operative time and reduce soft-tissue insult — meticulous pre-operative planning, appropriate case selection and, where suitable, less extensile anterior exposures.

Limitations. This study is limited by its small cohort (n=30), single-centre design and follow-up that, although extended to a minimum of 12 months for morbidity surveillance, remains too short to capture the full late burden of post-traumatic arthritis, avascular necrosis and secondary arthroplasty. Only univariate analyses were performed; no multivariable adjustment for confounding was undertaken, so the reported associations should not be regarded as independent predictors. The small subgroups yield wide confidence intervals, and the aggregate complication rate is sensitive to the intensity of surveillance and to how minor events are defined. Larger, multi-centre prospective studies with a minimum of two years' follow-up, standardised complication definitions and multivariable analysis — ideally comparing the ilioinguinal and anterior intrapelvic (modified Stoppa) approaches — are warranted.

CONCLUSION

Fixation of acetabular fractures through the ilioinguinal approach carries an acceptable morbidity profile that is dominated by minor, self-limiting complications, with lateral femoral cutaneous nerve dysfunction and heterotopic ossification the most frequent events and major complications confined to a small minority of patients. Prolonged operative time was associated with the occurrence of any complication, and complex associated fracture patterns with major complications, identifying groups in whom meticulous technique, efficient surgery and careful counselling are especially important. These associations derive from a small univariate analysis and require confirmation in larger, adequately powered studies with multivariable adjustment and longer follow-up before they can be regarded as independent prognostic factors. Within these limits, the ilioinguinal approach remains a reliable and reproducible exposure for anterior acetabular fixation in the Indian population.

Declarations

Ethics approval: Approved by the Institutional Ethics Committee, Tata Main Hospital, Jamshedpur (IEC Approval Ref: TMH/FRM/QMS/ALL/19; Date of Approval: 22.09.2017). Procedures were conducted in accordance with the Declaration of Helsinki (revised 2013). Written informed consent was obtained from all participants.

Competing interests: All authors declare no competing interests.

Funding: No funding was received for this study.

Author contributions: VN: study conception, operative management, data collection and manuscript preparation. ST: data collection, complication surveillance and manuscript review. MS: literature review, statistical analysis and critical revision. All authors read and approved the final manuscript.

REFERENCES

1. Tile M. Fractures of the pelvis and acetabulum. 3rd ed. Philadelphia: Lippincott Williams & Wilkins; 2003.
2. Laird A, Keating JF. Acetabular fractures: a 16-year prospective epidemiological study. *J Bone Joint Surg Br*. 2005;87(7):969–73.
3. Letournel E, Judet R. Fractures of the acetabulum. 2nd ed. Berlin: Springer-Verlag; 1993.
4. Letournel E. The treatment of acetabular fractures through the ilioinguinal approach. *Clin Orthop Relat Res*. 1993;(292):62–76.
5. Matta JM. Operative treatment of acetabular fractures through the ilioinguinal approach: a 10-year perspective. *Clin Orthop Relat Res*. 1994;(305):10–9.
6. Meena S, Sharma PK, Mittal S, Sharma J, Chowdhury B. Modified Stoppa approach versus ilioinguinal approach for anterior acetabular fractures: a systematic review and meta-analysis. *Bull Emerg Trauma*. 2017;5(1):6–12.
7. Ma K, Luan F, Wang X, Ao Y, Liang Y, Fang Y, et al. Randomized, controlled trial of the modified Stoppa versus the ilioinguinal approach for acetabular fractures. *Orthopedics*. 2013;36(10):e1307–15.
8. Baschera D, Rad H, Collopy D, Zellweger R. Incidence and clinical relevance of heterotopic ossification after internal fixation of acetabular fractures: retrospective cohort and case control study. *J Orthop Surg Res*. 2015;10:60.
9. Klos K, Marintschev I, Böttcher J, Hofmann GO, Mückley T. External iliac artery thrombosis associated with the ilio-inguinal approach in the management of acetabular fractures: a case report. *J Med Case Rep*. 2008;2:4.
10. Hsiao PM, Liao SC, Chen IJ, et al. Incidence of deep vein thrombosis and symptomatic pulmonary embolism in Taiwanese patients with pelvic and/or acetabular fractures: a retrospective study. *Sci Rep*. 2023;13:16352.
11. Yuan H, Zhu N, Sun L, et al. Total hip arthroplasty for posttraumatic osteoarthritis secondary to acetabular fracture: an evidence based on 1,284 patients from 1970 to 2018. *Front Surg*. 2022;9:953976.
12. Tannast M, Najibi S, Matta JM. Two to twenty-year survivorship of the hip in 810 patients with operatively treated acetabular fractures. *J Bone Joint Surg Am*. 2012;94(17):1559–67.
13. Verbeek DO, van der List JP, Tissue CM, Helfet DL. Predictors for long-term hip survivorship following acetabular fracture surgery: importance of gap compared with step displacement. *J Bone Joint Surg Am*. 2018;100(11):922–9.
14. Sems SA, Johnson M, Cole PA, Byrd CT, Templeman DC. Elevated body mass index increases early complications of surgical treatment of pelvic ring injuries. *J Orthop Trauma*. 2010;24(5):309–14.
15. Dindo D, Demartines N, Clavien PA. Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. *Ann Surg*. 2004;240(2):205–13.