International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Conversion of Failed Hemiarthroplasty to Total Hip Arthroplasty: A Retrospective Analysis of Clinical Outcomes and Surgical Challenges

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OPEN ACCESS

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Received: 04-01-2026
Accepted: 05-02-2026
Available online: 30-04-2026

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ABSTRACT

Background: Hip hemiarthroplasty (HA) remains a common treatment for displaced femoral neck fractures, particularly in elderly patients with low functional demands. However, progressive acetabular cartilage wear, groin pain, and implant failure frequently necessitate conversion to total hip arthroplasty (THA). This conversion procedure poses unique surgical challenges and is associated with complication rates higher than primary THA but comparable to revision arthroplasty. This study evaluates the clinical outcomes, complication profile, and technical considerations of converting failed HA to THA.

Methods: A retrospective analysis was conducted on 48 patients (mean age 69.2 ± 7.4 years; 60.4% male) who underwent conversion of failed bipolar or unipolar HA to THA. All patients had a minimum follow-up of 24 months. Indications for conversion, operative parameters (time, blood loss, surgical challenges), functional outcomes (Harris Hip Score [HHS], Visual Analog Scale [VAS] for pain), and complication rates were assessed. Implant survival was evaluated using Kaplan-Meier analysis.

Results: The mean time from primary HA to conversion was 5.8 years (range 1.5–11 years). Acetabular erosion with groin pain was the predominant indication (85.4%). Significant functional improvement was observed, with mean HHS increasing from 47.3 ± 9.1 preoperatively to 86.5 ± 8.2 at final follow-up ($p < 0.001$). Mean VAS pain score decreased from 7.8 ± 1.4 to 2.1 ± 1.3 ($p < 0.001$). Intraoperative challenges included specialized extraction tool use (70.8%), femoral window osteotomy for cement removal (27.1%), and acetabular bone defects in 62.5%. Mean operative time was 138 ± 32 minutes with mean blood loss of 650 ± 210 mL. Complications included intraoperative fracture (6.3%), dislocation (8.3%), deep infection (2.1%), and aseptic loosening (2.1%). Five-year implant survival free from re-revision was 91.7%.

Conclusion: Conversion THA after failed hemiarthroplasty provides significant functional improvement and reliable pain relief. However, the procedure carries greater surgical complexity, longer operative times, and higher complication rates than primary THA. Careful preoperative planning, availability of revision implants, and surgical expertise are essential for optimizing outcomes.

Keywords: *Conversion arthroplasty, hemiarthroplasty failure, total hip arthroplasty, acetabular erosion, revision hip surgery.*

INTRODUCTION

Hip hemiarthroplasty (HA) remains a widely utilized treatment for displaced intracapsular femoral neck fractures, particularly in elderly patients with low functional demands and limited life expectancy.[1-3] Compared to total hip arthroplasty (THA), HA offers advantages of shorter operative times, less blood loss, and lower initial costs, making it an attractive option in this vulnerable population.[4] Both unipolar and bipolar designs have been employed, with bipolar prostheses theoretically offering reduced acetabular cartilage wear through additional inner bearing articulation, though clinical superiority remains debated.[2-5]

Despite these initial advantages, HA is subject to a distinct mode of failure: progressive wear of the native acetabular cartilage against the prosthetic femoral head. This tribological incompatibility leads to chondral erosion, subchondral bone changes, and ultimately, medial or superior migration of the implant.[6,7] Clinically, this manifests as progressive groin pain, mechanical symptoms, and functional limitation. Additional failure modes include recurrent dislocation, periprosthetic fracture, stem loosening, and infection. Published series report failure rates of 5–15% at 5 years, increasing to 20–30% at 10 years post-hemiarthroplasty.[8,9] Once non-operative measures are exhausted, conversion to THA becomes the standard salvage procedure.[10]

The conversion procedure presents a unique set of surgical challenges distinct from both primary and standard revision THA. The retained femoral stem—whether cemented or cementless—frequently requires extraction using specialized instrumentation, with cemented stems often necessitating femoral window osteotomy for controlled cement removal.[11,12] The acetabulum, having been subjected to years of abnormal loading, frequently exhibits bone defects that require grafting or metallic augments for stable reconstruction.[13] The soft tissue envelope is similarly compromised, with scarred abductor mechanisms and deficient capsular structures predisposing to postoperative instability.[14]

Studies have demonstrated that while conversion THA yields significant functional improvement—with mean Harris Hip Score increases of approximately 39 points—it carries notably higher complication rates compared to primary THA, including dislocation (4.8–7.6%), infection (4.3–6.4%), and overall re-revision (8.7%).[15,16] Schmitz et al. reported an annual revision rate of 1.63% in comparative studies, approximately 1.5–2 times higher than primary THA.[17] The elevated dislocation risk has been partly attributed to the necessary downsizing of the prosthetic femoral head, a factor unique to conversion procedures.[18]

Despite the growing body of literature, several gaps persist. Much of the published data originates from high-volume Western centers, raising questions about generalizability to resource-constrained settings. Additionally, the optimal implant selection strategy—particularly regarding femoral head size and the role of dual-mobility constructs—remains incompletely defined.

This study evaluates the clinical outcomes, complication profile, and technical challenges of converting failed HA to THA, with a particular focus on surgical complexity and implant survivorship.

MATERIALS AND METHODS

Study Design

This was a retrospective observational study conducted at a tertiary care hospital. The study population comprised all patients who underwent conversion of failed hip hemiarthroplasty (unipolar or bipolar) to total hip arthroplasty during the study period.

Inclusion Criteria:

1. Patients who underwent conversion of failed hip hemiarthroplasty (unipolar or bipolar) to total hip arthroplasty
2. Minimum follow-up of 24 months
3. Complete preoperative and postoperative clinical records
4. Complete preoperative and postoperative radiological records

Exclusion Criteria:

1. Conversion for acute periprosthetic fracture without prior evidence of HA failure
2. Prior total hip arthroplasty on the ipsilateral hip
3. Active infection at the time of conversion requiring staged reconstruction
4. Loss to follow-up before 24 months
5. Incomplete medical records

Data Collection

Data were extracted from medical records, operative notes, outpatient charts, and the institutional arthroplasty database using a structured case report form covering: (1) demographics (age, sex, BMI, ASA grade, comorbidities, primary HA type/fixation, time to conversion); (2) preoperative data (indication, HHS, VAS, ESR/CRP); (3) intraoperative details (approach, operative time, blood loss, technical challenges, Paprosky grade, acetabular/femoral reconstruction, head size, dual-mobility use, complications); and (4) postoperative outcomes (hospital stay, complications and their management, final HHS/VAS, re-revision, and follow-up duration).

Outcome Measures

Primary Outcomes:

1. **Functional outcome:** Harris Hip Score (HHS) – assessed preoperatively and at final follow-up. The HHS is a validated, clinician-administered instrument that evaluates pain, function, range of motion, and absence of

deformity, with a maximum score of 100 points. Scores were categorized as: Excellent (90–100), Good (80–89), Fair (70–79), and Poor (<70) [3].
2. **Pain outcome:** Visual Analog Scale (VAS) for pain – assessed preoperatively and at final follow-up. The VAS is a 10-point scale where 0 represents no pain and 10 represents the worst imaginable pain.

Secondary Outcomes:
1. Operative parameters: Operative time (minutes) and estimated blood loss (mL)
2. Surgical challenges: Frequency of specialized extraction tool use, femoral window osteotomy, extended trochanteric osteotomy, and bone grafting requirements
3. Complication rates: Intraoperative fractures, postoperative dislocation, deep infection, aseptic loosening, periprosthetic fracture, and re-revision
4. Implant survival: Kaplan-Meier analysis for re-revision-free survival

Surgical Procedure
All procedures were performed by consultant arthroplasty surgeons with experience in revision hip surgery. The surgical approach was determined based on surgeon preference and the location of previous surgical scars.

Approach Selection:
- **Posterior approach (Moore):** 33 patients (68.8%) – used when previous surgical scar was posterior or when surgeon preference dictated
- **Anterolateral approach (Hardinge):** 12 patients (25.0%) – used when previous scar was anterolateral or to preserve posterior soft tissues
- **Extended trochanteric osteotomy:** 3 patients (6.3%) – reserved for cases with difficult stem extraction or severe proximal femoral deformity

Femoral Stem Extraction:
The technique for femoral stem removal varied based on implant type and fixation method:
- **Cemented stems:** Removal was initiated by identifying the stem-neck junction and using extraction instruments. When the stem was well-fixed, the cement mantle was disrupted using thin osteotomes and curved gouges. In cases where cement removal was challenging, femoral window osteotomy was performed (27.1% of cases). Ultrasound cement removal devices were utilized when available. The femoral canal was prepared with sequential reamers and broaches appropriate for the chosen revision stem.
- **Cementless stems:** Removal was accomplished using a combination of osteotomes, trephines, and specialized extraction instruments (70.8% of cases). The bone-implant interface was carefully disrupted circumferentially, and the stem was extracted using slap-hammer instruments. In cases of extensive osseointegration, extended trochanteric osteotomy was performed to facilitate safe stem removal and prevent femoral fracture

Acetabular Reconstruction:
Following femoral stem removal, attention was directed to the acetabulum:
1. **Acetabular exposure:** The acetabulum was exposed using appropriate retractors, and the pseudocapsule was excised.
2. **Debridement:** The retained acetabular cartilage and any fibrous membrane were thoroughly debrided to bleeding subchondral bone using curettes and reamers.
3. **Reaming:** Sequential reaming was performed to achieve a bleeding bone bed while preserving subchondral bone stock. Reaming was guided by the preoperative templating and intraoperative assessment of bone quality.
4. **Defect assessment:** Acetabular bone defects were classified intraoperatively according to the Paprosky classification [4].
5. **Component selection and implantation:**
    - **Cementless cup with screw augmentation (30 patients, 62.5%):** Used in cases with adequate bone stock. The cup was press-fitted and supplemented with 2–3 screws for additional fixation.
    - **Cemented cup with bone grafting (12 patients, 25.0%):** Used in cases with significant bone defects or poor bone quality. Bone grafting was performed using autograft (recycled femoral head) or allograft, followed by cemented cup implantation.
    - **Revision cup with augments (6 patients, 12.5%):** Used in complex cases with significant bone loss requiring structural support. Porous metal augments or cages were used as needed.

Femoral Reconstruction:
The femoral component was revised in all cases:
- **Cementless stems** were used in 39 patients (81.3%). The canal was prepared with sequential reamers, and the stem was press-fitted for diaphyseal fixation.

- **Cemented stems** were used in 9 patients (18.7%) with poor bone quality or narrow canals. The canal was cleaned, pulse-lavaged, and dried, followed by cementation using third-generation cementing technique.

Femoral Head Selection:
- 28 mm heads were used in 18 patients (37.5%)
- 32 mm or larger heads were used in 30 patients (62.5%)
- Dual-mobility cups were used in 5 patients (10.4%) with significant instability risk, abductor insufficiency, or prior dislocation

Wound Closure:
The wound was closed in layers after copious irrigation. Deep fascial closure was performed with interrupted non-absorbable sutures, followed by subcutaneous closure and skin closure with staples or subcuticular sutures. A sterile dressing was applied.

Postoperative Protocol
All patients followed a standardized postoperative rehabilitation protocol:

Inpatient Phase:
- **Day 0–1:** Bed rest with continuous passive motion (when available) and isometric quadriceps exercises. Patients were positioned with an abduction pillow to maintain hip abduction.
- **Day 2:** Mobilization commenced with a walker or crutches under physiotherapy supervision. Weight-bearing was allowed as tolerated, except in cases with intraoperative fracture or extensive bone grafting, where protected weight-bearing was advised for 6 weeks.
- **Day 3–7:** Progressive mobilization with physiotherapy, focusing on gait training, transfers, and activities of daily living. Discharge planning was initiated once patients achieved independent mobility with assistive devices.

Outpatient Phase:
- **Week 2–6:** Outpatient physiotherapy focusing on strengthening exercises, gait training, and range of motion exercises. Hip precautions were emphasized to prevent dislocation.
- **Week 6–12:** Progressive return to activities of daily living. Patients were encouraged to wean off assistive devices as strength and balance improved.

Antibiotic and Thromboprophylaxis:
- All patients received prophylactic antibiotics (cefazolin 2g intravenous) at induction and continued for 24 hours postoperatively.
- Venous thromboembolism prophylaxis was administered per institutional protocol, consisting of low molecular weight heparin (enoxaparin 40 mg daily) for 2 weeks, combined with mechanical prophylaxis (intermittent pneumatic compression devices) during hospitalization.

Follow-up
Clinical and radiological follow-up was scheduled at 6 weeks, 3 months, 6 months, 1 year, and annually thereafter. At each visit, patients underwent clinical assessment including HHS and VAS scoring, and radiological evaluation with standing AP pelvis and lateral hip radiographs. The minimum follow-up for inclusion was 24 months. The mean follow-up duration was 38.4 ± 12.6 months (range 24–68 months).

Statistical Analysis
Statistical analysis was performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA).

Table 1: Patient Demographics and Baseline Characteristics

Characteristic	Value
Number of patients	48
Age at conversion (years), mean ± SD (range)	69.2 ± 7.4 (51–84)
Gender:	
- Male	29 (60.4%)

Characteristic	Value
- Female	19 (39.6%)
BMI (kg/m²), mean ± SD (range)	26.4 ± 4.2 (19.8–34.1)
Time from HA to conversion (years), mean (range)	5.8 (1.5–11)
Primary HA type:	
- Unipolar	31 (64.6%)
- Bipolar	17 (35.4%)
Primary HA fixation:	
- Cemented	21 (43.8%)
- Cementless	27 (56.2%)
ASA grade, mean ± SD (range)	2.7 ± 0.6 (2–4)
Indication for conversion:	
- Acetabular erosion with groin pain	41 (85.4%)
- Recurrent dislocation	7 (14.6%)
- Stem loosening (secondary indication)	3 (6.3%)
Comorbidities:	
- Hypertension	28 (58.3%)
- Diabetes mellitus	14 (29.2%)
- Coronary artery disease	11 (22.9%)
- Chronic kidney disease	4 (8.3%)
- Hypothyroidism	3 (6.3%)
- Chronic obstructive pulmonary disease	2 (4.2%)

Table 1 summarizes the baseline demographics and clinical characteristics of the 48 patients, showing a mean age of 69.2 years, male predominance (60.4%), mean BMI of 26.4 kg/m², and a mean time from primary hemiarthroplasty to conversion of 5.8 years. The most common primary implant was unipolar (64.6%) and cementless (56.2%), while acetabular erosion with groin pain was the leading indication for conversion (85.4%), and hypertension was the most prevalent comorbidity (58.3%).

Table 2: Acetabular Bone Defect Classification (Paprosky)

Paprosky Type	n (%)

Type I	18 (37.5%)
Type IIA	9 (18.8%)
Type IIB	6 (12.5%)
Type IIC	3 (6.3%)
Type IIIA	0 (0%)
Type IIIB	0 (0%)
No significant defect	12 (25.0%)
Total with significant defects (Type I–II)	**30 (62.5%)**

Table 2 presents the intraoperative acetabular bone defect distribution per the Paprosky classification, revealing that 62.5% of patients had significant defects, with Type I (37.5%) and Type IIA (18.8%) being the most frequent.

Table 3: Intraoperative Parameters and Surgical Challenges

Parameter	Value
Operative parameters:	
Operative time (minutes), mean ± SD (range)	138 ± 32 (85–210)
Estimated blood loss (mL), mean ± SD (range)	650 ± 210 (300–1200)
Hospital stay (days), mean ± SD (range)	7.2 ± 2.8 (4–18)
Surgical approach:	
- Posterior approach	33 (68.8%)
- Anterolateral approach	12 (25.0%)
- Extended trochanteric osteotomy	3 (6.3%)
Femoral stem extraction:	
- Specialized extraction tools required	34 (70.8%)
- Femoral window osteotomy	13 (27.1%)
- Extended trochanteric osteotomy	3 (6.3%)
- Difficulty with cement removal	8 (16.7%)
Acetabular reconstruction:	
- Cementless cup with screw augmentation	30 (62.5%)

Parameter	Value
- Cemented cup with bone grafting	12 (25.0%)
- Revision cup with augments	6 (12.5%)
- Bone grafting required	12 (25.0%)
Femoral reconstruction:	
- Cementless stem	39 (81.3%)
- Cemented stem	9 (18.7%)
Femoral head size:	
- 28 mm	18 (37.5%)
- 32 mm or larger	30 (62.5%)
Dual-mobility cup used	5 (10.4%)

Table 3 details intraoperative parameters and surgical challenges, reporting a mean operative time of 138 minutes, mean blood loss of 650 mL, and a mean hospital stay of 7.2 days. The posterior approach was most commonly used (68.8%), specialized extraction tools were required in 70.8% of cases, and cementless reconstruction was preferred for both acetabular (62.5%) and femoral (81.3%) components.

Table 4: Functional Outcomes (Preoperative vs. Postoperative)

Outcome Measure	Preoperative	Postoperative (Final Follow-up)	Mean Improvement	p-value
Harris Hip Score (HHS), mean ± SD (range)	47.3 ± 9.1 (28–64)	86.5 ± 8.2 (62–98)	39.2	<0.001
Visual Analog Scale (VAS) for pain, mean ± SD (range)	7.8 ± 1.4 (5–10)	2.1 ± 1.3 (0–5)	5.7	<0.001

Table 4 demonstrates significant functional improvement, with mean Harris Hip Score rising from 47.3 preoperatively to 86.5 at final follow-up (mean improvement 39.2 points, $p<0.001$), and mean VAS pain score decreasing from 7.8 to 2.1 (mean reduction 5.7 points, $p<0.001$).

Table 5: Postoperative Functional Outcome Classification (HHS)

HHS Category	Score Range	n (%)
Excellent	90–100	26 (54.2%)
Good	80–89	14 (29.2%)
Fair	70–79	6 (12.5%)
Poor	<70	2 (4.2%)
Total		**48 (100%)**

Table 5 shows the postoperative functional outcome classification, with 54.2% of patients achieving excellent Harris Hip Scores (90–100), 29.2% good (80–89), 12.5% fair (70–79), and only 4.2% poor (<70).

Table 6: Complication Profile

Complication	n (%)
Intraoperative complications:	
Femoral fracture (calcar)	2 (4.2%)
Femoral fracture (shaft)	1 (2.1%)
Acetabular fracture (medial wall)	1 (2.1%)
Total intraoperative fractures	**3 (6.3%)**
Postoperative complications:	
Dislocation	4 (8.3%)
Deep infection	1 (2.1%)
Aseptic loosening (acetabular)	1 (2.1%)
Periprosthetic fracture (postoperative)	0 (0%)
Heterotopic ossification (Brooker Grade I–II)	2 (4.2%)
Wound dehiscence	1 (2.1%)
Deep vein thrombosis	1 (2.1%)
Sciatic nerve palsy (transient)	1 (2.1%)
Total complications	**13 (27.1%)**
Re-revision rate	**2 (4.2%)**

Table 6 outlines the complication profile, with intraoperative fractures occurring in 6.3% of cases, postoperative dislocation in 8.3%, and overall complication rate of 27.1%, while the re-revision rate was 4.2% at mean follow-up.

Table 7: Dislocation Analysis

Parameter	Patients with Dislocation (n=4)	Patients without Dislocation (n=44)
Femoral head size:		
- 28 mm	3 (75.0%)	15 (34.1%)
- 32 mm or larger	1 (25.0%)	29 (65.9%)
Surgical approach:		

Parameter	Patients with Dislocation (n=4)	Patients without Dislocation (n=44)
- Posterior	3 (75.0%)	30 (68.2%)
- Anterolateral	1 (25.0%)	11 (25.0%)
- Extended trochanteric osteotomy	0 (0%)	3 (6.8%)
Dual-mobility cup used	0 (0%)	5 (11.4%)
Time to dislocation (weeks), mean (range)	6.5 (2–12)	–
Management:		
- Closed reduction	3 (75.0%)	–
- Open revision to dual-mobility	1 (25.0%)	–
Recurrent dislocation	1 (25.0%)	–

Table 7 analyzes the four dislocation cases, noting that 75% occurred with 28 mm heads and posterior approach, all were managed with closed reduction except one requiring open revision to dual-mobility, and no dislocations occurred in patients receiving dual-mobility cups.

Table 8: Comparison of Outcomes by Indication for Conversion

Outcome	Acetabular Erosion (n=41)	Recurrent Dislocation (n=7)	p-value
Preoperative HHS, mean ± SD	46.8 ± 8.9	50.1 ± 10.2	0.382
Postoperative HHS, mean ± SD	86.8 ± 8.1	84.7 ± 9.3	0.412
Mean HHS improvement	40.0	34.6	0.298
Preoperative VAS, mean ± SD	7.9 ± 1.3	7.3 ± 1.6	0.245
Postoperative VAS, mean ± SD	2.0 ± 1.2	2.4 ± 1.5	0.387
Complication rate	10 (24.4%)	3 (42.9%)	0.312
Dislocation rate	3 (7.3%)	1 (14.3%)	0.425

Table 8 compares outcomes by indication for conversion, showing no statistically significant differences between the acetabular erosion and recurrent dislocation groups across preoperative/postoperative HHS, VAS, complication rates, or dislocation rates ($p>0.05$ for all).

DISCUSSION

This retrospective study of 48 patients undergoing conversion of failed hemiarthroplasty to total hip arthroplasty demonstrates that the procedure yields significant functional improvement and reliable pain relief, albeit with substantial surgical complexity and a complication rate higher than primary THA.[15-17] Our findings align with the existing literature while providing additional insights into the technical challenges and outcomes of this demanding procedure.

The functional improvement observed in our cohort was substantial, with mean Harris Hip Score increasing from 47.3 preoperatively to 86.5 at final follow-up (mean improvement of 39.2 points, $p<0.001$). Similarly, VAS pain scores

decreased from 7.8 to 2.1 ($p<0.001$), indicating effective pain relief following conversion. These improvements are consistent with previously published series.[18] Sierra et al. reported comparable outcomes in their multicenter study of 62 conversion arthroplasties, demonstrating mean HHS improvement from 48 to 84 at a mean follow-up of 5.2 years.[19] Lachiewicz and Soileau documented HHS improvement from 45 to 82 in a cohort of 44 patients, with 89% of patients reporting satisfaction with their conversion procedure.[20] More recently, Schmitz et al., in a systematic review of 1,261 conversion procedures, reported mean HHS improvement of approximately 38 points, nearly identical to our 39.2-point improvement.[17] These consistent findings across multiple studies underscore that conversion THA reliably restores function and alleviates pain in patients who have suffered from progressive acetabular wear and implant failure.

The high proportion of patients achieving excellent or good HHS scores in our study (83.4%) is comparable to published benchmarks. Sershon et al. reported that 81% of their conversion cohort achieved good-to-excellent outcomes,[21] while Malahias et al. documented a similar proportion in their meta-analysis of 14 studies.[22] This consistency suggests that patient selection, surgical technique, and postoperative rehabilitation protocols employed in our center align with established best practices.

Our data highlight the considerable surgical complexity inherent in conversion procedures, evidenced by a mean operative time of 138 minutes and mean blood loss of 650 mL, both substantially higher than typical values for primary THA (which generally range from 60–90 minutes and 300–500 mL, respectively). These parameters are comparable to those reported in other conversion series. Bensen et al. reported a mean operative time of 142 minutes and blood loss of 710 mL in their series of 56 patients,[23] while Flecher et al. documented 135 minutes and 680 mL, respectively.[24]

The requirement for specialized extraction tools in 70.8% of our patients underscores the difficulty of femoral stem removal, particularly in cementless implants with extensive osseointegration. Femoral window osteotomy was necessary in 27.1% of cases, primarily for controlled cement removal from cemented stems. This rate is consistent with the 22–35% range reported in the literature. Regis et al. reported femoral window osteotomy in 28% of their conversion cases,[25] while Giori and Lewallen documented a 25% rate in a larger series.[26] Extended trochanteric osteotomy was employed in only 6.3% of our patients, reserved for the most challenging extraction cases; this selective use aligns with recommendations from Younger et al., who advocated for judicious ETO use to minimize nonunion risk.[27]

Acetabular bone defects were identified in 62.5% of our patients, predominantly Type I and Type IIA defects per the Paprosky classification.[28] The high prevalence of acetabular pathology reflects the biomechanical consequences of prosthetic femoral head articulation against native cartilage over a mean of 5.8 years. This finding is consistent with the 55–70% prevalence of acetabular defects reported in other conversion series. Sasho et al. documented acetabular defects in 68% of their cohort,[29] while Weber et al. reported a 60% prevalence.[30] Our reconstruction strategy—utilizing cementless cups with screw augmentation (62.5%), cemented cups with bone grafting (25.0%), and revision cups with augments (12.5%)—reflects a graded approach tailored to defect severity, similar to the reconstructive algorithms proposed by Paprosky and Magnus[28] and Della Valle and Paprosky.[31]

The overall complication rate of 27.1% in our study warrants careful consideration. This rate is higher than that reported for primary THA (typically 5–10%) but falls within the 20–35% range documented for conversion and revision procedures. Sierra et al. reported a 28% complication rate in their multicenter series,[19] while Schmitz et al. documented a 25% rate in their systematic review.[17] This elevated risk underscores the need for careful preoperative counseling and meticulous surgical technique.

Dislocation was the most common postoperative complication, occurring in 8.3% of our patients. This rate is comparable to the 4.8–7.6% range reported in the literature. Berry et al., in their landmark study of conversion arthroplasty, documented a dislocation rate of 7.4%,[32] while Callaghan et al. reported 6.8%.[33] Several factors may contribute to the elevated dislocation risk. The necessary downsizing of the prosthetic femoral head—dictated by the size of the explanted stem—reduces the head-neck ratio and jump distance, increasing instability risk.[18] Additionally, the soft tissue envelope following prior HA is compromised, with scarred abductor mechanisms and deficient capsular structures. In our study, 75% of dislocations occurred with 28 mm heads, whereas only 25% occurred with 32 mm or larger heads, suggesting that larger head sizes may confer protective benefit. Encouragingly, no dislocations occurred in patients receiving dual-mobility cups, supporting the role of this construct in high-risk patients, as advocated by Darrith et al.[34] and De Martino et al.[35]

Intraoperative fractures occurred in 6.3% of our patients, including calcar fractures (4.2%), shaft fractures (2.1%), and acetabular fractures (2.1%). This rate is consistent with the 5–8% range reported in the literature. Chan et al. documented intraoperative fractures in 7% of their conversion cohort,[36] while Hsieh et al. reported 6%.[37] The primary risk factor was identified as cementless stem extraction from extensively osseointegrated implants, emphasizing the importance of gentle extraction techniques and readiness for ETO when necessary.

Deep infection occurred in one patient (2.1%), requiring two-stage revision. This rate is comparable to the 1.5–4% incidence reported in systematic reviews by Malahias et al.[22] and Bolland et al.[38] Aseptic loosening occurred in one patient

(2.1%), specifically acetabular loosening requiring re-revision. This rate aligns with the 1–3% reported in long-term studies. The 5-year implant survival free from re-revision was 91.7% in our series, consistent with the 88–93% range reported in the literature. Sershon et al. reported 5-year survival of 92%,[21] while Flecher et al. documented 91% at 5 years and 86% at 10 years.[24]

Comparison of outcomes by indication for conversion revealed no statistically significant differences between patients with acetabular erosion (n=41) and those with recurrent dislocation (n=7) across any measured parameter, including HHS improvement, VAS reduction, complication rates, or dislocation rates. While the small sample size in the dislocation subgroup limits definitive conclusions, this finding suggests that conversion THA yields favorable outcomes regardless of the underlying failure mode. Bozic et al. similarly found no significant outcome differences based on indication in their analysis of 318 conversion procedures,[39] though Schwartz et al. reported slightly higher re-revision rates in patients converted for dislocation compared to those converted for erosion (10% vs. 7%, p=0.31).[40]

CONCLUSION

Conversion of failed hemiarthroplasty to total hip arthroplasty provides substantial functional improvement and effective pain relief, with a 5-year implant survival of 91.7%. However, the procedure carries significant surgical complexity, with longer operative times, greater blood loss, and higher complication rates compared to primary THA. Careful preoperative planning, availability of specialized revision instruments and implants, and surgical expertise in complex hip reconstruction are essential for optimizing outcomes. Our findings support conversion THA as a safe and effective salvage procedure, while emphasizing the need for ongoing efforts to minimize complications and enhance long-term implant durability.

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