

Infection-Related Findings in Revision Total Hip Arthroplasty Using Bone Bank Allografts: Clinical Implications for Complex Reconstruction

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INTRODUCTION & AIM

Revision total hip arthroplasty is frequently performed for implant loosening and severe periprosthetic bone loss, conditions that may overlap with occult or overt infection. Bone bank allografts are widely used for acetabular and femoral reconstruction, but infection-related findings in this complex population remain insufficiently characterized. This study aimed to describe infection-related outcomes in revision arthroplasty with bone allografts and to explore whether surgical complexity, reflected by graft type, was associated with relevant clinical variables.

METHODS

Observational, cross-sectional study with retrospective review of medical records from a specialised referral centre, including all revision THA procedures with bone bank allograft reconstruction performed between 2013 and 2019. Thirty-six variables were collected covering demographics, surgical history of both hips, comorbidities, medication, perioperative complications, hospitalisation, surgical technique and graft characteristics. Two trained researchers extracted the data independently, with interrater reliability confirmed by Cohen's kappa and the intraclass correlation coefficient. Patients were grouped by allograft type and compared using independent-samples t-tests, with significance set at 0.05 and 95% confidence intervals.

STUDY POPULATION

Demographics & procedure	n (%)	Comorbidity & hospital course	n (%)
Age, mean (SD)	63.2 (10.9) yrs	Hypertension	36 (53.7)
Sex, male	36 (53.7)	Diabetes mellitus, no	60 (89.6)
Osteoarthritis	50 (74.6)	Comorbidities, mean	1.16
Loosening as cause	60 (89.6)	Home medications, mean	1.61
Only primary THA before	32 (47.8)	Non-smoker	55 (84.6)
Previous procedures, mean	1.73	No alcohol use	50 (76.9)
Primary THA to revision	178.4 mo	No contralateral THA	45 (67.2)
Impacted morselized graft	42 (66.7)	Hospital stay, mean	11.94 days
Structured graft	33.3%	ICU stay, mean	2.03 days

Table 1: Characteristics of the study population (n = 67). Two deaths were recorded, one from in-hospital and one from early postoperative complications.

IMAGING

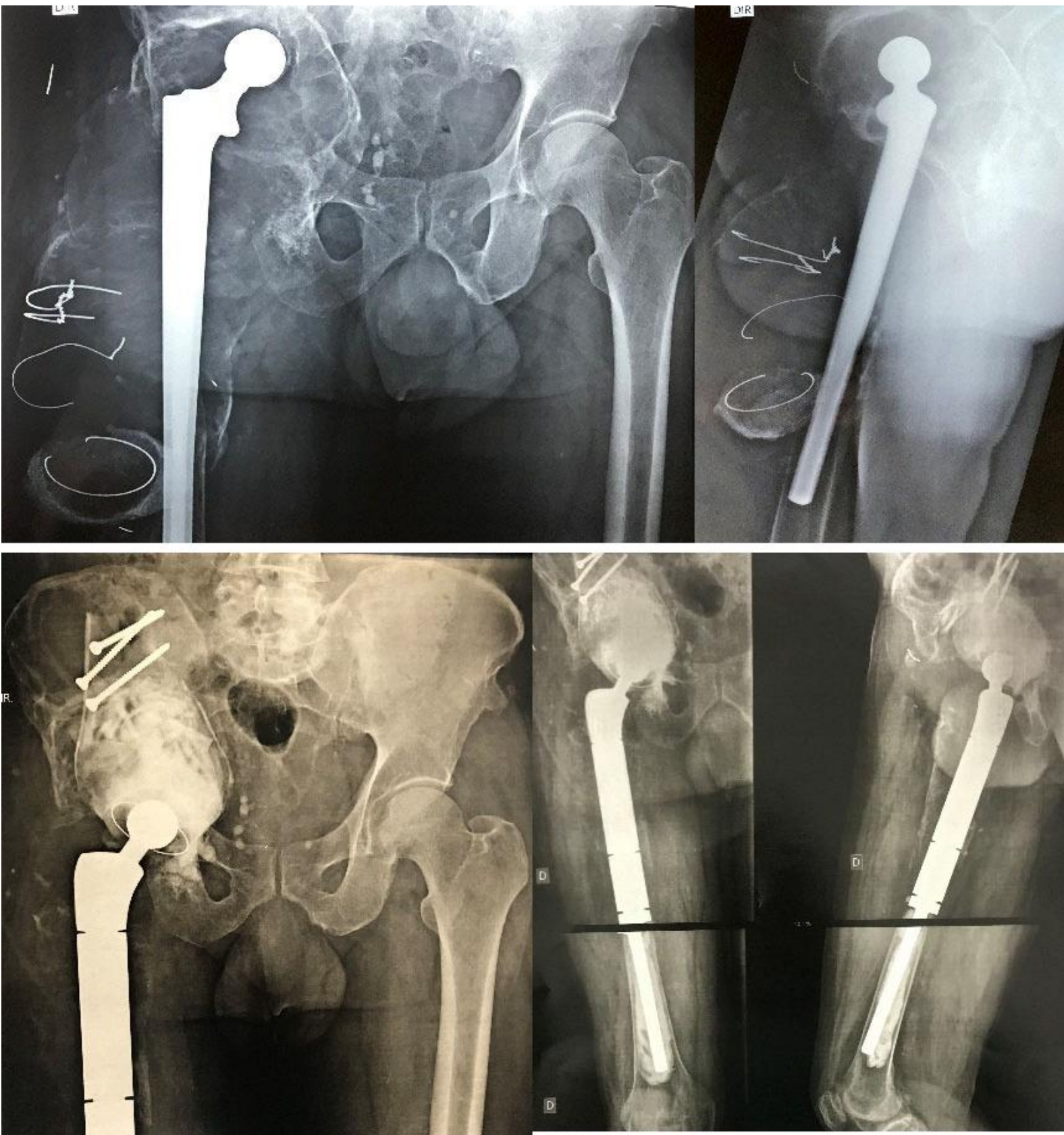


Figure 1: Large acetabular and femoral bone defect (A,B) and post-operative reconstruction with a structured graft from the distal femur (C,D).



Figure 2: Minor acetabular defect with loosening of the acetabular component (A,B) and reconstruction using impacted bone graft (C,D).

RESULTS

12.9%

positive
intraoperative
cultures

11.9%

acute surgical site
infection
(≤90 days)

92.4%

free from late
operative infection

Infection-related and perioperative outcomes

Finding	n (%)
Positive intraoperative cultures	8 (12.9)
Acute surgical site infection, ≤90 days	8 (11.9)
Free from late operative infection	61 (92.4)
No in-hospital complications	41 (61.2)
Free from early complications, ≤90 days	57 (86.4)
No blood transfusion required	49 (73.1)

Table 2: Denominators vary between variables because of missing records.

Graft type and surgical complexity

Variable	Structured mean (SD)	Impacted mean (SD)	Difference (SD) [95% CI]	p	d
Previous surgeries (n)	2.14 (0.91)	1.60 (0.78)	0.55 (0.21) [0.11 to 0.98]	0.02	0.65
Time since last surgery (mo)	126.63 (87.99)	129.24 (68.71)	-3.61 (20.77) [-45.16 to 37.95]	0.86	-0.05
Primary THA to revision (mo)	214.53 (119.16)	161.12 (71.76)	53.40 (24.76) [3.85 to 102.96]	0.04	0.59

Table 3: Comparison between graft types. d = Cohen's d effect size.

Structured grafts were used in patients with a significantly higher number of previous surgeries and a longer interval since the primary arthroplasty, both with moderate effect sizes. No difference was found in time since the most recent surgical procedure.

CONCLUSIONS

In complex revision total hip arthroplasty requiring bone bank allografts, infection-related events are clinically relevant: positive intraoperative cultures and early surgical site infection were observed in a meaningful proportion of cases. Structured allografts were associated with greater surgical complexity, suggesting that patients with multiple prior procedures and extensive bone loss represent a higher-risk subgroup requiring rigorous microbiological investigation, multidisciplinary planning and infection-focused surveillance.

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