Early Periprosthetic Femur Fractures are Associated with Higher Incidence of Periprosthetic Joint Infection and Reoperation Compared to Late Fractures Following Total Hip Arthroplasty

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Background

- Prior studies demonstrate that early aseptic THA reoperations increase the risk of periprosthetic joint infection (PJI), but are limited by the varying levels of severity of indications for reoperation [1-3].
- Reoperation for periprosthetic femur fractures (PFFs) that occur in the early recovery following total hip arthroplasty (THA) may increase the risk for subsequent reoperation and infection due to compromise to the soft tissue envelope [3].
- Osseointegration typically occurs by 3 months following THA [4-6]

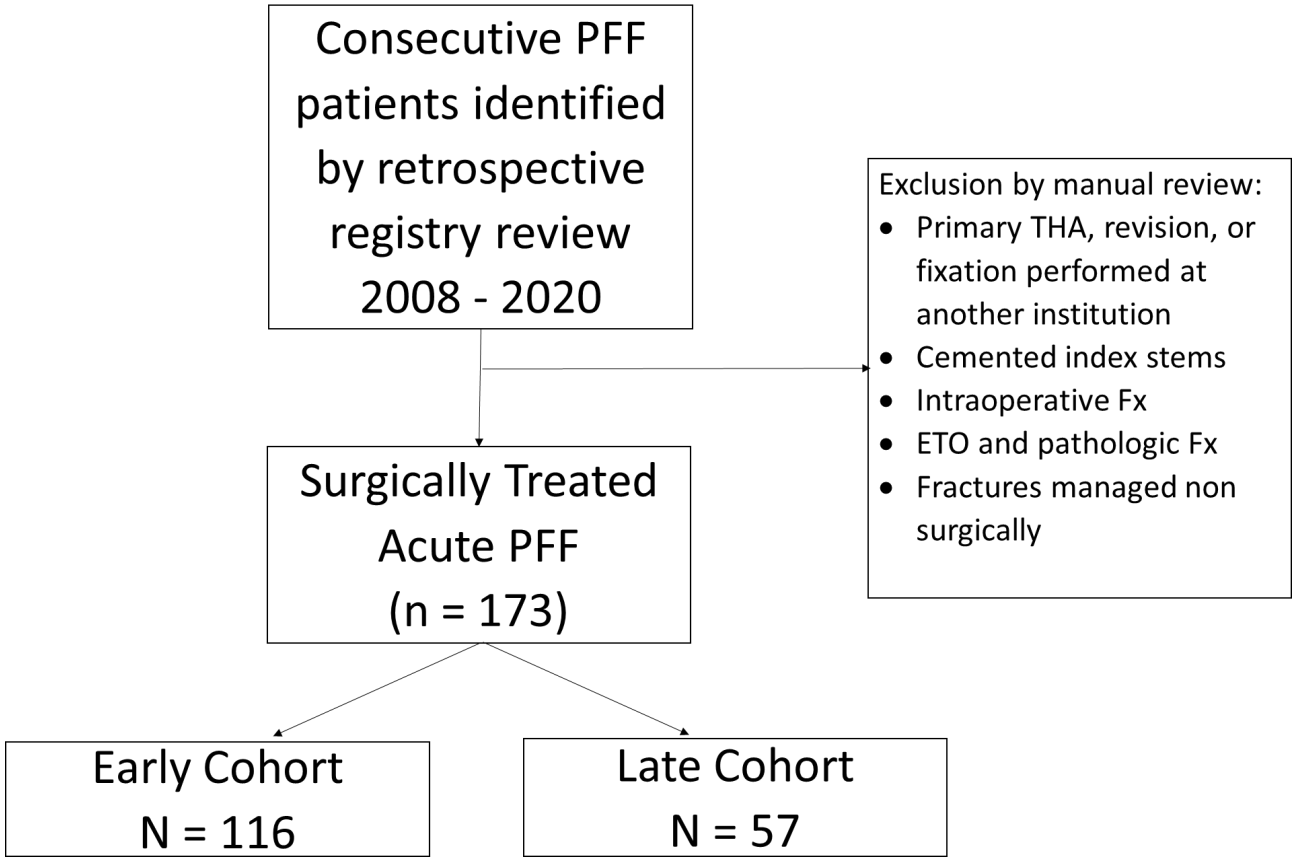
Objective

1) To compare the rate of reoperation
2) To compare the rate of PJI
3) To compare patient reported outcome measures (PROMs)

Following PFFs that occur in the early postoperative period (<90 days following primary THA) versus those that occur remotely (>90 days following primary THA).

Methods

Figure 1. Cohort Selection.



Methods

Table 1. Demographics and Surgical Characteristics

Variable	Early (n=116)	Late (n=57)	P-value
Male, n (%)	39 (33.6)	30 (52.6)	**0.025**
BMI (mean (SD))	29.55 (8.16)	28.42 (6.13)	0.358
ASA Score (%)			0.288
1	1 (1.1)	1 (2.7)	
2	54 (60.0)	18 (48.6)	
3	35 (38.9)	17 (45.9)	
4	0 (0.0)	1 (2.7)	
Age at reop (median (IQR))	68.00 [62.00, 73.50]	71.00 [60.00, 82.00]	0.866
Index Approach (%)			**0.035**
Anterior	15 (14.4)	1 (1.8)	
Posterolateral	101 (85.6)	56 (98.2)	
Vancouver Classification (%)			0.105
B1	7 (6.0)	8 (14.0)	
B2	104 (89.7)	43 (75.4)	
B3	1 (0.9)	0 (0.0)	
C	1 (0.9)	1 (1.8)	
G	3 (2.6)	5 (8.8)	
Clinical Follow Up (m), mean (SD)	29.60 (27.57)	33.63 (34.50)	0.462
Radiographic Follow Up (m)	23.18 (25.57)	28.36 (29.88)	0.221
Latest Follow Up (m)	26.82 (26.77)	30.98 (31.41)	0.349

Results

Table 2. Reoperations following Surgical Treatment of PFF

Variable	Early (n=116)	Late (n=57)	P-value
Reoperation, n (%)	27 (23)	6 (10.5)	0.081
Indication for Reoperation, n (%)			0.141
ALTR	1 (3.8)	0 (0.0)	
Aseptic loosening	0 (0.0)	1 (16.7)	
Infection	13 (50.0)	0 (0.0)	
Instability	5 (19.2)	3 (50.0)	
Leg length discrepancy	1 (3.8)	0 (0.0)	
Nonunion	2 (7.7)	1 (16.7)	
Painful hardware	2 (7.7)	0 (0.0)	
Re-fracture	2 (7.7)	1 (16.7)	
Infection, n (%)	13 (11.2)	0 (0.0)	**0.02**

Results

- There were more revisions for PJI following surgical treatment of early PFFs (11.2% vs. 0%, p=0.02).
- The late PFF cohort had greater 1-year (91.2% vs. 78.6%) and 2-year (87.7% vs. 75.7%) reoperation-free survival

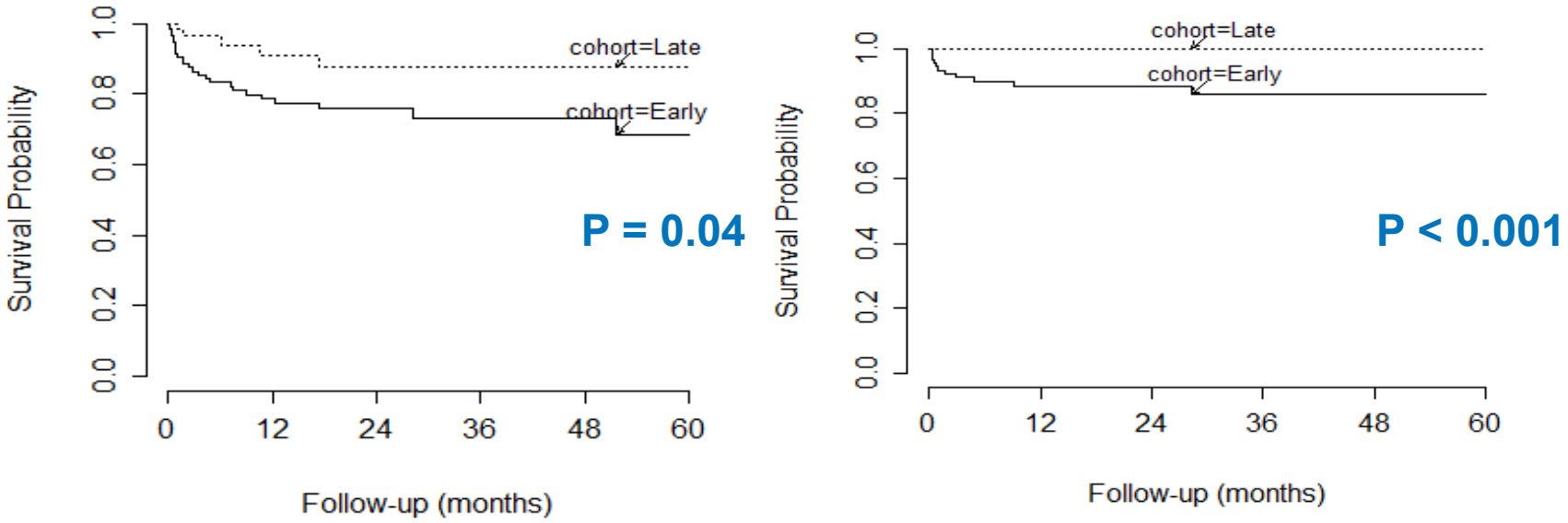


Figure 2. Survival free of reoperation (left) and survival free of PJI (right).

Results

- The late cohort had significantly greater mean preoperative HOOS JR scores compared to the early cohort (36 ± 21 vs. 62 ± 21, completion rate: 17% vs. 18%, p = 0.002).

- The early cohort had significantly higher 6-week delta-HOOS JR (40.9 ± 26 vs. 6.1 ± 25, completion rate: 12% vs. 13%, p = 0.004) and 1-year delta-HOOS JR (51 ± 24 vs. 18.5 ± 25, completion rate: 12% vs. 14%, p = 0.004) compared to the late cohort.

- There was no significant difference in 2-year postoperative HOOS JR between cohorts.

Discussion

- Early PFF following an index THA is associated with increased risk of reoperation and PJI.
- PFF healing tissue is exposed to additional trauma and oxygen tension is compromised, which may increase the vulnerability of the wound to bacterial infection.
- Additional perioperative antiseptic precautions may be warranted for early fractures: negative pressure dressings postoperatively, additional irrigation during the procedure, sending operative tissue cultures, and perioperative or extended prophylactic antibiotics.
- Fall prevention training and measures remain paramount, especially in typically older THA patients.

Limitations

- Retrospective study design
- Surgery delay from PFF diagnosis to treatment not assessed
- Surgically treated Vancouver B2 fractures are associated with higher rates of postoperative PJI compared to other fracture classes. There is a higher proportion of B2 in early cohort.
- Several treating surgeons (surgical technique and postoperative rehab protocol was not standardized)

Conclusions

- There is a higher incidence of reoperation and PJI following PFFs that occur within 90 days following primary THA, compared to PFFs that occur remotely.

- Surgeons should consider all perioperative antiseptic measures possible to mitigate the risk of infection following PFF.

- THA rehab protocols should incorporate fall prevention training to prevent PFF from occurring, especially during the early postoperative period

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