Prophylactic Cabling of the Femur in Revision Total Hip Arthroplasty Lowers the Risk of Vancouver B2 and B3 Fractures

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INTRODUCTION:

Periprosthetic femoral fractures (PPFx) represent one of the most common causes of revision total hip arthroplasty (rTHA). Among PPFx, Vancouver B2, B3, and C are more challenging to manage, often requiring a re-operation and stem revision. Cables have shown to reduce stem subsidence, fracture propagation, and stress during axial loading. However, there is a paucity of literature in the role of prophylactic cabling during rTHA. Therefore, the purpose of this study is to determine the acute PPFx rate and types of PPFx in rTHA for patients with prophylactic cables compared to those without.

METHODS:

This retrospective study identified all patients undergoing rTHA at a single institution. Current procedural terminology (CPT) codes and radiographic images were reviewed to group patients into the prophylactic cables or no cables cohorts. Primary outcome was the rate of acute PPFx (<30 days postoperatively). Secondary outcomes were the Vancouver classification subtype of PPFx, re-operations for PPFx, and all-cause re-revisions.

RESULTS:

2977 patients were identified, 192 with prophylactic cables and 2785 without cables. There was no difference in acute PPFx rates between cables and no cables (1.56% vs. 2.08%, P=0.796). However, prophylactic cabling substantially lessened the more complex B2 and B3 fractures and re-operation rates. In the prophylactic cable group, 100% of fractures were B1 compared to 30-B1 (51.7%), 16-B2 (27.5%), 9-B3 (15.5%), and 3-C (5.2%) fractures in the no cables group. Re-operation rates for acute PPFx were significantly lower in the prophylactic cables cohort (33.3%) than in the no cables cohort (50.0%), P=0.022. All-cause re-revisions were also significantly lower in those with prophylactic cables (7.3% vs. 12.8%, P=0.038).

DISCUSSION AND CONCLUSION:

Prophylactic cabling for taper fluted, diaphyseal fitting stems protects against more complex Vancouver B2 and B3 fractures. During rTHA, surgeons should consider prophylactically cabling the femur to lessen the risk of re-operation and complex fractures.

Table 1. Patient Demographics

	Total Cohort	Cables	No Cables	P-value
Number of Patients (N)	2977	192	2785	-
Age	67.3 ± 11.9	71.4 ± 11.5	67.0 ± 11.9	**<0.001**
Sex				0.313
Female	1539 (51.7%%)	92 (47.9%)	1447 (52.0%)	
Male	1438 (48.3%)	100 (52.1%)	1338 (48.0%)	
BMI (kg/m²)	29.1 ± 5.85	29.5 ± 6.35	29.0 ± 5.81	0.327
ASA	2.58 ± 0.71	2.71 ± 0.76	2.56 ± 0.71	**<0.001**
Age-Adjusted CCI	4.00 ± 2.03	4.58 ± 1.93	3.95 ± 2.03	**<0.001**

Values given as mean ± SD, N (%); **Bold** values indicate statistical significance (P<0.05); *BMI*, body mass index; *ASA*, American Society of Anaesthesiologists physical status classification; *Age-Adjusted CCI*, Charlson Comorbidity Index

Table 2. Cables vs. No Cables Outcomes

	Total Cohort	Cables	No Cables	P-value
Number of Patients (N)	2977	192	2785	-
Acute PPFx	61 (2.05%)	3 (1.56%)	58 (2.08%)	0.796
Re-Operations of PPFx	30/61 (49.18%)	1/3 (33.33%)	29/58 (50.005)	**0.022**
All-Cause Re-revisions	373 (12.5%)	14 (7.29%)	359 (12.89%)	**0.038**
90-Day Readmissions	333 (11.2%)	16 (8.33%)	317 (11.4%)	0.239
Days to Readmission	21.2 ± 13.3	31.4 ± 22.5	18.4 ± 7.49	**0.031**

Values given as mean ± SD, N (%); **Bold** values indicate statistical significance (P<0.05); *Acute PPFx*, Periprosthetic Fracture

Table 3. Vancouver Classification of Periprosthetic Hip Fractures

	Cables	No Cables	P-value
Total Number of Patients (N)	192	2785	-
Number of Acute PPFx	3 (1.56%)	58 (2.08%)	0.796
B1 Fractures	3 (100.00%)	30 (51.73%)	-
B2 Fractures	0 (0.00%)	16 (27.59%)	-
B3 Fractures	0 (0.00%)	9 (15.52%)	-
C Fractures	0 (0.00%)	3 (5.17%)	-

Values given as mean ± SD, N (%); **Bold** values indicate statistical significance (p<0.05)