

Effect of Treatment Type and Surgeon Subspecialty on Outcomes of Periprosthetic Femur Fractures

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INTRODUCTION:

Research into periprosthetic proximal femur fracture (PPFF) treatment and outcomes is limited by sample size and methodology. Our purpose was to assess differences in surgeon training, treatments, and fracture type on risk of reoperation.

METHODS:

A collaborative research consortium of eleven centers retrospectively reviewed PPFFs from 2014-2019 to determine variations in surgeon, fracture type and treatment on surgical outcomes. Surgeons were classified according to fellowship training, fractures using the Vancouver classification and treatment as open reduction internal fixation (ORIF) or revision THA (rTHA) with or without ORIF. Regression analysis was performed with reoperation as the primary outcome.

RESULTS:

Of 601 PPFFs, 396 (66%) had at least six-months follow-up: 23 (6%) Vancouver A, 343 (87%) Vancouver B, and 30 (8%) Vancouver C. Of the 343 Vancouver B fractures, 263 (77%) were treated by an arthroplasty specialist, 44 (13%) by an orthopaedic trauma specialist, and 36 (11%) by a surgeon without arthroplasty or trauma training. Seventy-two (21%) were treated with ORIF while 271 (79%) were treated with rTHA with or without ORIF. 73 patients required reoperation (21%). Treatment by an orthopaedic trauma specialist versus arthroplasty surgeon (odds ratio (OR): 2.87) and fracture type (Vancouver B3 vs B1: OR: 5.70) were independent risk factors for reoperation.

DISCUSSION AND CONCLUSION:

The scarcity of PPFFs limits high-quality research regarding ideal treatment and expected outcomes. Our multicenter, retrospective data suggest that surgeon subspecialty and fracture type affect reoperation rates. A prospective multicenter study is needed to confirm these results.

Table 1. Patient demographics based on need for reoperation.

	No Reoperation n=279	Reoperation n=72	p-value
Age	74.0 (67.0,83.0)	74.0 (64.0,83.0)	0.559
Gender			1.000
Female	185 (66.3%)	50 (69.4%)	
Male	95 (33.7%)	23 (31.5%)	
BMI	27.1 (23.6,31.1)	28.3 (23.2,32.9)	0.462
Current smokers	45 (16.2%)	10 (13.7%)	0.665
Follow Up	1.63 (1.01,2.64)	1.22 (0.33,2.49)	0.023
CRD	34 (12.0%)	12 (16.4%)	0.508
PVD	31 (11.1%)	11 (15.1%)	0.530
Diabetes	51 (18.3%)	11 (15.1%)	0.561
Pre-operative ambulatory status			0.678
Full	131 (47.3%)	36 (50.0%)	
Assisted	75 (26.9%)	25 (34.7%)	
Minimal	5 (1.8%)	2 (2.8%)	
Surgeon Type			0.134
Arthroplasty	213 (76.3%)	50 (69.4%)	
Other	27 (10.0%)	9 (12.5%)	
Trauma	30 (11.1%)	14 (19.2%)	
Treatment			0.481
ORIF	54 (20.0%)	18 (24.7%)	
Revision THA	216 (80.0%)	55 (75.3%)	
Vancouver:			0.036
B1	54 (20.0%)	11 (15.1%)	
B2	205 (75.9%)	53 (72.6%)	
B3	11 (4.07%)	9 (12.3%)	
Commented Primary:			0.391
Ambulatory at 3-months postoperatively:	13 (4.81%)	6 (10.7%)	
Ambulatory at 6-months postoperatively:	215 (90.0%)	59 (84.3%)	0.270
Ambulatory at 3-months postoperatively:			0.151
Ambulatory at 6-months postoperatively:	212 (96.4%)	52 (91.2%)	

Table 2. Surgical characteristics based on need for reoperation.

	No Reoperation n=279	Reoperation n=72	p-value
Surgeon Type:			0.134
Arthroplasty	213 (76.3%)	50 (69.4%)	
Other	27 (10.0%)	9 (12.5%)	
Trauma	30 (11.1%)	14 (19.2%)	
Treatment:			0.481
ORIF	54 (20.0%)	18 (24.7%)	
Revision THA	216 (80.0%)	55 (75.3%)	
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Commented Primary:			0.391
Ambulatory at 3-months postoperatively:	13 (4.81%)	6 (10.7%)	
Ambulatory at 6-months postoperatively:	215 (90.0%)	59 (84.3%)	0.270
Ambulatory at 3-months postoperatively:			0.151
Ambulatory at 6-months postoperatively:	212 (96.4%)	52 (91.2%)	

Table 3. Surgical characteristics based on surgeon training.

	Arthroplasty n=343	Other n=18	Trauma n=22	p-value
Treatment				<0.001
ORIF	29 (11.0%)	11 (41.7%)	28 (63.6%)	
Revision THA	214 (89.0%)	21 (58.3%)	14 (36.4%)	
Vancouver:				<0.001
B1	55 (13.9%)	8 (22.2%)	22 (50.0%)	
B2	212 (86.1%)	28 (77.8%)	18 (40.0%)	
B3	16 (0.8%)	0 (0.0%)	4 (9.0%)	
Commented Primary:				0.570
Ambulatory at 3-months postoperatively:	14 (2.3%)	2 (6.9%)	3 (12.5%)	
Ambulatory at 6-months postoperatively:	219 (97.7%)	9 (25.0%)	19 (87.5%)	0.134
Ambulatory at 3-months postoperatively:	14 (3.3%)	4 (11.1%)	3 (6.7%)	0.460
Ambulatory at 6-months postoperatively:	219 (96.7%)	14 (38.9%)	19 (83.3%)	0.595
Ambulatory at 3-months postoperatively:	14 (3.3%)	4 (11.1%)	3 (6.7%)	0.611
Ambulatory at 6-months postoperatively:	219 (96.7%)	14 (38.9%)	19 (83.3%)	0.541
Ambulatory at 3-months postoperatively:	14 (3.3%)	4 (11.1%)	3 (6.7%)	0.541
Ambulatory at 6-months postoperatively:	219 (96.7%)	14 (38.9%)	19 (83.3%)	0.872

Table 4. Multivariate logistic regression for need for reoperation in Vancouver B3.

Variable	Estimate	p-value	Odds Ratio	Lower 95%	Upper 95%
Surgeon Type					
Arthroplasty	Reference				
Trauma	1.06	0.821	2.87	1.14	7.21
Vancouver					
B1	Reference				
B2	0.55	0.310	1.74	0.62	5.35
B3	1.74	0.031	5.70	1.52	22.57
Treatment					
Revision THA	Reference				
ORIF	2.08	0.881	0.92	0.31	2.87
Age (years)	-0.03	0.004	0.97	0.94	0.99
Sex (male)	-0.11	0.756	0.90	0.46	1.68
Body mass index	0.003	0.903	1.00	0.96	1.05
Smoking	-0.23	0.592	0.80	0.33	1.76
Chronic kidney disease	0.42	0.365	1.52	0.60	3.74
Periprosthetic vascular disease	0.62	0.172	1.85	0.74	4.42
Diabetes	-0.31	0.480	0.74	0.30	1.67