Who Is Treating Periprosthetic Femur Fractures? An Analysis of the Periprosthetic Research Consortium

Nicholas B Pohl[1], Arjun Saxena, Jeffrey Benjamin Stambough[2], J. Ryan Martin[3], Simon Mears, Paul Lichstein
[1]Rothman Orthopaedic Institute, [2]University of Arkansas For Medical Sciences, [3]Vanderbilt University Medical Center

INTRODUCTION: Periprosthetic femur fractures (PPFF) following total hip arthroplasty (THA) have increased in the past decade as the demand for primary surgery continues to grow. Although there is now more evidence to describe the treatment of Vancouver B fractures, there is still limited knowledge regarding factors that cause surgeons to perform either an ORIF or rTHA. The purpose of this study was to determine what type of surgeons treat Vancouver B PPFFs at 11 major academic institutions and if there are trends in treatment decision-making regarding the use of ORIF or rTHA based on surgical training or patient factors.

METHODS: This multicenter retrospective study evaluated patients surgically treated for Vancouver B PPFF after THA between 2014 and 2019. Patients from 11 academic centers located in the United States were included in this study. Surgical outcomes and patient demographics were evaluated based on surgeon training, surgical treatment type, and institution.

RESULTS: Presence of Vancouver B2 (OR: 0.02, P <0.001) or B3 (OR: 0.04, P <0.001) fractures were independent risk factors for treatment with rTHA. Treatment by a trauma (OR: 12.49, P<0.001) or other-specified surgeon (OR: 13.63, P<0.001) were independent risk factors for ORIF repair of Vancouver B fractures. There were no differences in outcomes based on surgeon subspecialty training.

DISCUSSION AND CONCLUSION: This study showed the trends in surgeons who surgically manage Vancouver B fractures at 11 major academic institutions and highlighted that regardless of surgical training or surgical treatment type, post-operative outcomes following management of PPFF were similar.

Figure 1.

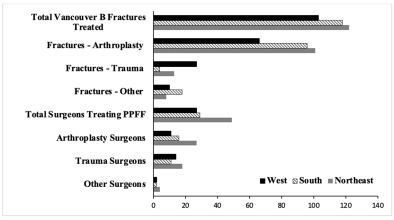

Table 1. Center specific information regarding demographics, Vancouver B periprosthetic fracture classification, and treatment by arthroplasty, trauma, or other orthopaedic surgeons.

	Center 1 (N=41)	Center 2 (N=40)	Center 3 (N=11)	Center 4 (N=41)	Center 5 (N=18)	Center 6 (N=32)	Center 7 (N=5)	Center 8 (N=16)	Center 9 (N=63)	Center 10 (N=22)	Center 11 (N=54)
Arthroplasty	38 (92.7%)	33 (82.5%)	9 (81.8%)	30 (73.2%)	10 (55.6%)	30 (93.8%)	2 (40.0%)	16 (100%)	39 (61.9%)	17 (77.3%)	39 (72.2%)
Other	3 (7.30%)	5 (12.5%)	2 (18.2%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (20.0%)	0 (0.00%)	7 (11.1%)	3 (13.6%)	15 (27.8%)
Orthopaedic Trauma	0 (0.00%)	2 (5.00%)	0 (0.00%)	11 (26.8%)	8 (44.4%)	2 (6.2%)	2 (40.0 %)	0 (0.00%)	17 (27.0%)	2 (9.10%)	0 (0.00%)
Age	69.1 (11.1)	74.8 (10.6)	69.8 (14.7)	72.9 (10.5)	70.7 (10.2)	73.2 (10.7)	65.4 (15.4)	80.2 (10.0)	77.1 (13.0)	72.4 (20.9)	74.6 (10.6)
Sex - Female	31 (75.6%)	31 (77.5%)	6 (54.5%)	25 (61.0%)	14 (77.8%)	22 (68.8%)	4 (80.0%)	10 (62.5%)	36 (57.1%)	13 (59.1%)	43 (79.6%)
BMI	27.4 (6.51)	28.0 (5.18)	26.1 (5.57)	29.7 (5.75)	28.4 (6.58)	29.1 (6.42)	24.7 (1.95)	25.9 (8.45)	27.0 (5.69)	27.6 (5.98)	28.7 (6.89)
Smoking:											
Nonsmoker	18 (43.9%)	38 (95.0%)	11 (100%)	38 (92.7%)	15 (83.3%)	23 (71.9%)	3 (60.0%)	16 (100%)	57 (90.5%)	20 (90.9%)	49 (90.7%)
Smoker	23 (56.1%)	2 (5.00%)	0 (0.00%)	3 (7.32%)	3 (16.7%)	9 (28.1%)	2 (40.0%)	0 (0.00%)	6 (9.52%)	2 (9.09%)	5 (9.26%)
CKD	1 (2.44%)	3 (7.50%)	1 (9.09%)	7 (17.1%)	2 (11.1%)	2 (6.25%)	0 (0.00%)	1 (6.25%)	13 (20.6%)	2 (9.09%)	14 (25.9%)
PVD	3 (7.32%)	4 (10.0%)	2 (18.2%)	3 (7.32%)	1 (5.56%)	1 (3.12%)	2 (40.0%)	1 (6.25%)	13 (20.6%)	3 (13.6%)	9 (16.7%)
Diabetes	2 (4.88%)	3 (7.50%)	2 (18.2%)	8 (19.5%)	2 (11.1%)	5 (15.6%)	2 (40.0%)	3 (18.8%)	16 (25.4%)	3 (13.6%)	16 (29.6%)

Table 2. Surgical characteristics based on surgeon training.

	Arthroplasty *n=263*	Other *n=36*	Trauma *n=44*	p-value
Treatment:				<0.001*
ORIF	29 (11.0%)	15 (41.7%)	28 (63.6%)	
Revision THA	234 (89.0%)	21 (58.3%)	16 (36.4%)	
Vancouver:				<0.001*
B1	35 (13.3%)	8 (22.2%)	22 (50.0%)	
B2	212 (80.6%)	28 (77.8%)	18 (40.9%)	
B3	16 (6.08%)	0 (0.00%)	4 (9.09%)	
Cemented Primary:	14 (7.25%)	2 (6.90%)	3 (12.0%)	0.570
Reoperation:	50 (19.0%)	9 (25.0%)	14 (31.8%)	0.134
Nonunion:	14 (6.33%)	4 (11.1%)	3 (8.57%)	0.463
Malunion:	14 (6.33%)	4 (11.1%)	3 (8.57%)	0.505
Infection:	23 (10.3%)	5 (13.9%)	5 (14.3%)	0.631
Instability:	22 (9.69%)	2 (5.56%)	4 (11.4%)	0.659
Ambulatory at 3-months postoperatively:	214 (89.9%)	29 (82.9%)	31 (86.1%)	0.341
Ambulatory at 6-months postoperatively:	207 (95.4%)	29 (96.7%)	28 (93.3%)	0.872

*Indicates statistical significance (p<0.05). Data is presented as N (%).
Abbreviations: Open Reduction Internal Fixation (ORIF), Total Hip Arthroplasty (THA).