

The Trajectory of Patient-Reported Outcomes and Minimal Clinically Important Differences in Isolated and Polytraumatic Pelvis and Acetabular Fractures

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INTRODUCTION: Patient-reported minimal clinically important differences (MCID) provide a standard to compare clinical outcomes. The purpose of this study was to calculate the MCID of the Patient-Reported Outcomes Measurement Information Systems (PROMIS) Physical Function (PF), Pain Interference (PI), Anxiety (AX), and Depression (DEP) scores in patients with pelvis and/or acetabular fractures.

METHODS:

All patients with operatively treated pelvic and/or acetabular fractures were identified. Patients were categorized as either only pelvis and/or acetabular fractures (PA) or polytrauma (PT). PROMIS PF, PI, AX, and DEP scores were evaluated at 3-month, 6-month, and 12-month intervals. Distribution-based MCID and anchor-based MCID were calculated for the overall cohort, PA, and PT groups.

RESULTS:

Demographics, injury characteristics, and surgical complications are presented in Table 1, 2, and 3, respectively. The overall distribution-based MCIDs were PF(5.19), PI(3.97), AX(4.33), and DEP(4.41). The overall anchor-based MCIDs were PF(7.18), PI(8.03), AX(5.85), DEP(5.00). The percentage of patients achieving MCID for AX was 39.8-54% at 3 months and 32.7-56% at 12 months. The percentage of patients achieving MCID for DEP was 35.7-39.3% at 3 months and 32.1-35.7% at 12 months (Table 4). The PT group had worse PROMIS PF scores than the PA group at all time points [postoperative, 3-month, 6-month, and 12-month scores, (28.3 (6.3) vs. 26.8(6.8) P=0.016), (38.1(9.2) vs. 35.0(8.7) P=0.037), (42.8 (8.2) vs. 39 (9.6) P=.015), (46.2(9.7) vs. 41.2(9.7) P=.011)].

DISCUSSION AND CONCLUSION: MCIDs provide an opportunity to evaluate patient's progress or examine differences in treatment options. For operatively treated pelvic ring and acetabular fractures, surgeons should have confidence in a PROMIS PF of 5.19-7.180, PROMIS PI 3.970-8.030, PROMIS AX of 4.33-5.850, and PROMIS DEP of 4.410-5.00. The PT group had lower PF scores at all timepoints, however, there were no differences between the percentages of patients achieving MCID across all PROMIS domains. The percentage of patients achieving MCID for AX and DEP plateaued at 3 months postoperatively. There is a need to further investigate anxiety and depression in the pelvic ring and acetabular fracture population, as only a third of patients achieved MCID 12 months after injury.

Table 2. Injury characteristics between cohorts

Characteristics	Pelvis and/or Acetabular Only (N=69)	Polytrauma (N=142)	p-value
ISS: Mean (SD)	10.8(8.1)	17.9(10.8)	<.001*
Achieve Union: N (%)	67 (97.1%)	161 (99.4%)	.213
Open Fracture: N (%)	3 (4.3%)	4 (2.3%)	.429
Pelvic Ring Injury Types: N (%)	-	-	.349
LC1	16 (23.2%)	44 (27.2%)	
LC2	6 (8.7%)	19 (11.7%)	
LC3	1 (1.4%)	10 (6.2%)	
APC1	2 (2.9%)	3 (1.9%)	
APC2	6 (8.7%)	11 (6.8%)	
APC3	0 (0%)	4 (2.3%)	
Vertical Shear	0 (0%)	2 (1.2%)	
Sacral fracture (H-Type and L-shaped Sacral Fractures)	1 (1.4%)	3 (1.9%)	
Acetabular Injury Types: N (%)	-	-	.336
Anterior Wall	2 (2.9%)	4 (2.3%)	
Posterior Wall	11 (15.9%)	29 (17.9%)	
Posterior Column + Posterior Wall	2 (2.9%)	2 (1.2%)	
Transverse	8 (11.6%)	6 (3.7%)	
Transverse with Posterior Wall	3 (4.3%)	14 (8.6%)	
Both Columns	6 (8.7%)	10 (6.2%)	
Anterior Column	5 (7.2%)	8 (4.9%)	
Posterior Column	1 (1.4%)	1 (0.6%)	
T-Type	3 (4.3%)	12 (7.4%)	
Both Pelvis and Acetabular Fractures	4 (5.8%)	21 (13%)	.163

ISS = Injury Severity Score

Table 1. Demographics and injury characteristics between cohorts

Characteristics	Pelvis and/or Acetabular Only (N=69)	Polytrauma (N=142)	p-value
Age			0.328
Mean (SD)	43.5 (16.9)	41.1 (16.1)	
Female: N (%)	23 (33.3%)	65 (40.1%)	0.376
BMI: Mean (SD)	28.2 (7.4)	31.6 (25.6)	.288
ASA Class: Mean (SD)	2.0 (.8)	2.4 (1)	.009*
Ethnicity: N (%)			0.700
Not Hispanic/Latino	65 (94.2%)	146 (90.1%)	
Hispanic/Latino	4 (5.8%)	14 (8.6%)	
Choose not to disclose	0 (0%)	2 (1.2%)	

BMI = Body Mass Index, ASA = American Society of Anesthesiologists

Table 3. Outcomes between cohorts

Characteristics	Pelvis and/or Acetabular Only (N=69)	Polytrauma (N=142)	p-value
Outcomes: N (%)	-	-	-
Infection	1 (1.4%)	6 (3.7%)	.677
Removal of Hardware / Heterotopic Ossification	8 (11.6%)	9 (5.6%)	.165
Conversion to THA	1 (1.4%)	13 (8%)	.07
Any Secondary Surgery	9 (13%)	24 (15%)	.838
Anxiety Disorder	0 (0%)	8 (4.9%)	.109
Depression	0 (0%)	5 (3.1%)	.326
PTSD	3 (4.3%)	3 (1.9%)	.368
Any Psych Issue	3 (4.3%)	10 (6.2%)	.76

PTSD = Post-Traumatic Stress Disorder

Table 4. Percentage of patients reaching MCID over the post-operative period across groups

Distribution-Based MCID	Pelvis and/or Acetabular Only: N (%)	Polytrauma: N (%)	Fisher's P	Anchor-Based MCID	Pelvis and/or Acetabular Only: N (%)	Polytrauma: N (%)	Fisher's P
Physical Function: 5.19				Physical Function: 7.18			
3 months	44 (12.2%)	73 (58.0%)	0.076	3 months	37 (60.7%)	60 (51.0%)	0.276
6 months	32 (19.2%)	79 (56%)	0.676	6 months	34 (77.3%)	73 (71.2%)	0.540
12 months	30 (18.2%)	64 (45%)	0.003	12 months	29 (82.9%)	60 (75.9%)	0.471
Pain Interference: 3.97				Pain Interference: 8.03			
3 months	35 (71.4%)	69 (82.2%)	0.285	3 months	23 (66.9%)	38 (34.2%)	0.138
6 months	21 (63.6%)	25 (63.4%)	<.001	6 months	13 (39.4%)	22 (39.5%)	<.001
12 months	20 (74.3%)	47 (88.3%)	0.026	12 months	16 (59.3%)	29 (60.5%)	0.308
Anxiety Score: 4.33				Anxiety Score: 5.85			
3 months	27 (44%)	52 (58.2%)	0.752	3 months	24 (69%)	41 (69.8%)	0.385
6 months	18 (60%)	36 (68.8%)	0.283	6 months	15 (59%)	31 (60.9%)	0.391
12 months	14 (60%)	22 (60%)	0.228	12 months	10 (69%)	14 (52.7%)	0.613
Depression Score: 4.41				Depression Score: 5			
3 months	11 (39.3%)	26 (23%)	<.001	3 months	10 (35.7%)	20 (37%)	<.001
6 months	11 (47.9%)	14 (38.8%)	0.432	6 months	10 (41.5%)	13 (34.2%)	0.587
12 months	5 (33.2%)	10 (35.7%)	<.001	12 months	5 (33.2%)	9 (32.1%)	<.001