Doing Right By Our Patients Through Patient-Centered Metrics: Minimal Clinically Important Difference for Functional Outcome Measures After Intertrochanteric Fracture Fixation

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INTRODUCTION:

Intertrochanteric fractures (ITFs) are prevalent fragility fractures in older adults requiring urgent surgical intervention often leading to reduced mobility and quality of life. Minimal clinically important difference (MCID) is increasingly adopted in Orthopaedic research to establish if observed statistical significance post intervention is translatable into clinically relevant improvements especially in elective knee and shoulder surgery. However, MCID for functional outcomes of ITF fixation remains poorly defined. To date, there are no studies done to determine the MCID for patient-reported outcome measures (PROMs) related to ITF fixation. The purpose of this study is to investigate the MCID for PROMs related to patients who underwent ITF fixation.

METHODS:

Data from patients who underwent ITF fixation at our institution from 2018 to 2022 were retrospectively collected. PROMs including the Modified Barthel's Index (MBI), Physical Component Score (PCS) and Mental Component Score (MCS) of the SF-36, EQ-5D Health Index (EQ Health), EQ-5D Total Score (EQ Total), Parker Mobility Score (PMS), and Visual Analog Scale (VAS) for pain were recorded by patients at 3 months, 6 months and 12 months postoperatively. Both longitudinal and anchor-based approaches were used to calculate MCID using expectation fulfilment rates and satisfaction rates on a Likert scale as anchors for the change in PROMs. The anchor-based approach used receiver operating curve (ROC) analysis to identify the threshold score of PROMs that best discriminates between expectation fulfilment and satisfaction. Four common distribution-based approaches were used to derive MCID value, including determining the minimal detectable change (MDC) at 95% confidence level as well as using 0.2, 0.5 and 0.8 of the standard deviation of a change score. Ultimately, a combined median MCID using the interquartile range was determined for each PROM.

RESULTS:

646 patients underwent ITF fixation during 2018 to 2022. 88.0% of patients were Chinese with mean age of 80.4 (range: 31-105) years. Mean PMS score, EQ Total, PCS and MBI Total significantly increased over 3, 6 and 12 months of follow up while VAS score significantly decreased at 3 and 6 months of follow up. However, compared to baseline, there was a significant decrease in PMS score, EQ Total, PCS and MBI Total, and a significant increase in VAS score.

At 3 months postoperatively, the proposed median MCID based on expectation fulfilment rates was 0.48, 1.15, 9.53, 0.11, 1.02, 2.47, and 12.00 and the proposed median MCID based on satisfaction rates was 0.48, 0.46, 9.53, 0.14, 2.94, 2.47, and 12.05 for PMS, VAS, EQ Health, EQ Total, PCS, MCS, and MBI Total respectively. (Table 1)

At 6 months postoperatively, the proposed median MCID based on expectation fulfilment rates was 0.45, 1.73, 4.90, 0.15, 2.45, 9.72, and 8.84 and the proposed median MCID based on satisfaction rates was 1.00, 1.73, 3.52, 0.15, 3.92, 14.61, and 8.84 for PMS, VAS, EQ Health, EQ Total, PCS, MCS, and MBI Total respectively. (Table 1)

At 12 months postoperatively, the proposed median MCID based on expectation fulfilment rates was 0.50, 1.08, 9.16, 0.06, 2.29, 7.72, and 9.05 and the proposed median MCID based on satisfaction rates was 1.03, 0.43, 9.16, 0.14, 3.87, 8.00, and 11.39 for PMS, VAS, EQ Health, EQ Total, PCS, MCS, and MBI Total respectively. (Table 1)

DISCUSSION AND CONCLUSION:

This study is the first to define MCID values for common ITF related PROMS, suggesting the minimum loss of function that will allow patients to remain functionally competent while recovering from ITF surgical fixation. Trajectories for recovery are different from elective surgeries as there is a distinct and expected decline early post-surgery accompanied by gradual improvement. The MCID defines the mobility and functional targets required to meet patient satisfaction and expectation at various time points in the post-fracture rehabilitative process. As these values could be impacted by sociocultural differences and healthcare policies unique to each country, further research could be conducted in other populations.

Table 1: MCID estimates at 3, 6 and 12 months based on expectation and satisfaction scores.

Method	Calculated MCID value						
	PMS	VAS	EQ Health	EQ Total	PCS	MCS	MBI Total
At 3 months							
Based on Expectation Scores							
Median MCID (IQR)	0.48	1.15	9.53	0.11	1.02	2.47	12.00
Based on Satisfaction Scores							
Median MCID (IQR)	0.48	0.46	9.53	0.14	2.94	2.47	12.05
At 6 months							
Based on Expectation Scores							
Median MCID (IQR)	0.45	1.73	4.90	0.15	2.45	9.72	8.84
Based on Satisfaction Scores							
Median MCID (IQR)	1.00	1.73	3.52	0.15	3.92	14.61	8.84
At 12 months							
Based on Expectation Scores							
Median MCID (IQR)	0.50	1.08	9.16	0.06	2.29	7.72	9.05
Based on Satisfaction Scores							
Median MCID (IQR)	1.03	0.43	9.16	0.14	3.87	8.00	11.39

Note: MCID: minimum clinical important difference IQR: Interquartile Range