

Preoperative Patient-Reported Outcome Measure Thresholds Should Not be Used for Indicating Total Hip Arthroplasty

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INTRODUCTION:

While Medicare requires patient-reported outcome measures (PROM) for many quality programs, some commercial insurers have begun requiring preoperative PROMs when determining patient eligibility for total hip arthroplasty (THA). Concerns exist that this data may be used to deny THA to patients above a specific PROM score, but the optimal threshold is unknown. This study's purpose was to evaluate postoperative outcomes following THA based on theoretical PROM thresholds.

METHODS:

We retrospectively analyzed 18,006 consecutive primary THA patients from 29 facilities and 44 surgeons from 2016 to 2019. Hypothesized preoperative HOOS-Jr. cutoffs of 40, 50, 60, 70 points were used. Preoperative scores below each threshold were considered "approved" surgery, while preoperative scores above each threshold were considered "denied" surgery. In-hospital complications, 90-day readmissions, discharge disposition were evaluated. HOOS-Jr. scores were collected preoperatively and one year postoperatively. Minimum clinically important difference (MCID) achievement was calculated using previously validated anchor-based methods.

RESULTS:

In patients with preoperative HOOS-Jr. scores below thresholds of 40, 50, 60, 70 points, achievement of MCID at one year was 92%, 90%, 86%, 84%, respectively. In-hospital complication rates for approved patients were 3.3%, 3.0%, 2.8%, 2.7%, respectively. Ninety-day readmission rates for approved patients were 5.1%, 4.4%, 4.2%, 4.1%, respectively. Patients with preoperative scores below each threshold ("approved" surgery) had a higher rate of achieving MCID ($p < 0.001$), but also higher rates of discharge to rehabilitation ($p = 0.01$) and 90-day readmission ($p = 0.036$) compared to patients with scores above each threshold ("denied" surgery).

DISCUSSION AND CONCLUSION:

The majority of patients achieved MCID at all theoretical PROMs thresholds for THA eligibility with low complication and readmission rates. Setting a preoperative PROM threshold to approve a THA surgery did not guarantee clinically successful outcomes. Such a future policy will create access to care barriers for patients who would otherwise benefit from THA.

	Total Data	Denied Group	Approved Group	P Value	PPV	Number of patients denied a positive result
	N=14751	N=10388	N=4362			
MCID 1 Year:				<0.001	0.919	3.15
No	1614 (10.9%)	1432 (13.8%)	179 (4.1%)			
Yes	6556 (44.4%)	4714 (45.3%)	2042 (46.5%)			
Any Complication:				0.001	0.033	40.89
No	14327 (97.3%)	10141 (97.6%)	4186 (95.7%)			
Yes	354 (2.4%)	248 (2.4%)	106 (2.4%)			
Non-Home Discharge:				<0.001	0.065	18.11
No	13076 (88.7%)	9344 (90.0%)	3732 (85.5%)			
Yes	904 (6.1%)	638 (6.2%)	266 (6.1%)			
90 Day Readmission:				<0.001	0.051	26.93
No	14158 (95.6%)	10017 (96.4%)	4141 (94.7%)			
Yes	565 (3.8%)	372 (3.6%)	151 (3.4%)			

Table 1. Outcomes of Patients with a Preoperative HOOS-Jr. Score Below 40 Points. Denied Group: Patients who were above the theoretical threshold who would have been denied from having surgery. Approved Group: Patients who were below the theoretical threshold who would have been approved for surgery. PPV, positive predictive value; Number of patients denied a positive result; in the denied cohort, number of patients who either achieved MCID or improvement of PROMs at one year OR avoided negative outcomes compared to the number of patients who did not, for the denied cohort.

	Total Data	Denied Group	Approved Group	P Value	PPV	Number of patients denied a positive result
	N=114719	N=83772	N=30947			
MCID 1 Year:				<0.001	0.896	2.23
No	1614 (1.4%)	1158 (1.4%)	456 (1.5%)			
Yes	6556 (57.2%)	4714 (56.3%)	2042 (66.1%)			
Any Complication:				0.003	0.030	44.19
No	14327 (124.5%)	10141 (121.4%)	4186 (134.2%)			
Yes	354 (3.0%)	248 (3.0%)	106 (3.3%)			
Non-Home Discharge:				<0.001	0.072	19.48
No	13076 (114.5%)	9344 (111.4%)	3732 (117.4%)			
Yes	904 (7.8%)	638 (7.6%)	266 (8.2%)			
90 Day Readmission:				0.008	0.044	27.57
No	14158 (123.4%)	10017 (119.6%)	4141 (127.4%)			
Yes	565 (4.9%)	372 (4.4%)	151 (4.6%)			

Table 2. Outcomes of Patients with a Preoperative HOOS-Jr. Score Below 50 Points. Denied Group: Patients who were above the theoretical threshold who would have been denied from having surgery. Approved Group: Patients who were below the theoretical threshold who would have been approved for surgery. PPV, positive predictive value; Number of patients denied a positive result; in the denied cohort, number of patients who either achieved MCID or improvement of PROMs at one year OR avoided negative outcomes compared to the number of patients who did not, for the denied cohort.

	Total Data	Denied Group	Approved Group	P Value	PPV	Number of patients denied a positive result
	N=14751	N=10388	N=4362			
MCID 1 Year:				<0.001	0.851	1.45
No	1614 (10.9%)	1432 (13.8%)	179 (4.1%)			
Yes	6556 (44.4%)	4714 (45.3%)	2042 (46.5%)			
Any Complication:				0.190	0.028	42.30
No	14327 (97.3%)	10141 (97.6%)	4186 (95.7%)			
Yes	354 (2.4%)	248 (2.4%)	106 (2.4%)			
Non-Home Discharge:				0.002	0.055	16.25
No	13076 (88.7%)	9344 (90.0%)	3732 (85.5%)			
Yes	904 (6.1%)	638 (6.2%)	266 (6.1%)			
90 Day Readmission:				0.018	0.042	26.80
No	14158 (95.6%)	10017 (96.4%)	4141 (94.7%)			
Yes	565 (3.8%)	372 (3.6%)	151 (3.4%)			

Table 3. Outcomes of Patients with a Preoperative HOOS-Jr. Score Below 60 Points. Denied Group: Patients who were above the theoretical threshold who would have been denied from having surgery. Approved Group: Patients who were below the theoretical threshold who would have been approved for surgery. PPV, positive predictive value; Number of patients denied a positive result; in the denied cohort, number of patients who either achieved MCID or improvement of PROMs at one year OR avoided negative outcomes compared to the number of patients who did not, for the denied cohort.

	Total Data	Denied Group	Approved Group	P Value	PPV	Number of patients denied a positive result
	N=14751	N=10388	N=4362			
MCID 1 Year:				<0.001	0.840	0.73
No	1614 (10.9%)	1432 (13.8%)	179 (4.1%)			
Yes	6556 (44.4%)	4714 (45.3%)	2042 (46.5%)			
Any Complication:				0.544	0.027	41.28
No	14327 (97.3%)	10141 (97.6%)	4186 (95.7%)			
Yes	354 (2.4%)	248 (2.4%)	106 (2.4%)			
Non-Home Discharge:				0.010	0.044	21.43
No	13076 (88.7%)	9344 (90.0%)	3732 (85.5%)			
Yes	904 (6.1%)	638 (6.2%)	266 (6.1%)			
90 Day Readmission:				0.038	0.041	34.03
No	14158 (95.6%)	10017 (96.4%)	4141 (94.7%)			
Yes	565 (3.8%)	372 (3.6%)	151 (3.4%)			

Table 4. Outcomes of Patients with a Preoperative HOOS-Jr. Score Below 70 Points. Denied Group: Patients who were above the theoretical threshold who would have been denied from having surgery. Approved Group: Patients who were below the theoretical threshold who would have been approved for surgery. PPV, positive predictive value; Number of patients denied a positive result; in the denied cohort, number of patients who either achieved MCID or improvement of PROMs at one year OR avoided negative outcomes compared to the number of patients who did not, for the denied cohort.