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CORR Insights®: Standard Comorbidity Measures Do Not Predict Patient-reported Outcomes 1 Year After Total Hip Arthroplasty

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Where Are We Now?

A majority of patients who undergo hip replacement surgery report good clinical outcomes at 1 year followup. This is reflected in high-mean utility scores (EQ-5D index), high-mean VAS

scores of self-reported health state (EQ-VAS), patient satisfaction scores with the outcomes of surgery (VAS Satisfaction), and low-mean VAS scores of pain (VAS Pain) [4]. However, approximately 9% of patients report persisting pain after surgery [2], and approximately 16% are not completely satisfied with their surgical results [3]. This large variance—a majority of patients with good patient reported outcome measure (PROM) scores, but a meaningful minority with poor PROM scores—can partially be explained by patient age, gender, preoperative health status, or comorbidities.

The current study by Greene and colleagues combines the detail of a multicenter cohort study nested within the solid framework provided by a national joint registry and serves as an example for future PROM studies [4]. Greene and colleagues have shown

that detailed comorbidity measures have no added value to the preoperative Charnley classification in explaining PROM score variability [4]. These important findings simplify future PROM research: In order to account for patient comorbidities, we only need to know whether (1) the other hip is affected, and (2) whether the patient suffers from other joint pain or has any comorbidity which affects her/his ability to ambulate.

Where Do We Need To Go?

Because therapeutic options for patients with poor outcomes after total hip replacement are limited, it is important to try to identify those patients at highest risk for complications or dissatisfaction before they undergo the procedure. Low-risk patients could undergo hip replacement immediately and, ideally, high-risk patients would undergo perioperative optimization in order to lower the risk of a poor outcome. The perfect prediction model would allow for an accurate prediction

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of the risk of a poor outcome, based on a number of readily available predictors, and it would explain close to 100% of the variance of the PROM score. Unfortunately, no such model exists now.

Greene and colleagues have shown that roughly 10% of the variance in the EQ-5D index and EQ-VAS scores can be explained by the Charnley classification and the preoperative PROM score [4]. Three percent of the VAS Pain could be explained by the Charnley classification and the preoperative PROM score and 1% of the VAS Satisfaction could be explained by the Charnley classification [4]. These r^2 -values probably underestimate the true explained PROM score variance because the PROM scores are not normally distributed but left-skewed. However, it is clear that there is much room for improvement in all four studied PROMs, and in the predictive models that we can derive from them.

How Do We Get There?

Much of the PROM score variance described in the study by Greene and colleagues is currently unexplained. The added value of new predictors should be studied in conjunction with all currently known predictors. Candidate predictors include the

preoperative radiographic severity of osteoarthritis, which appears relevant in some PROM dimensions [8]. The role of other patient characteristics, such as the highest attained level of education, is more controversial [1, 5, 6].

Future studies should not only focus on discovering unknown predictors, but should also try to replicate findings of previous studies, thereby minimizing the risk of publication bias. Both discovery and replication studies need consecutive cohorts of hip replacement patients. Future studies should also use the probability of a clinically important difference or patient acceptable symptom state as a primary outcome measure, as these probabilities are more relevant for individual patients we encounter in clinical practice who either do or do not achieve an acceptable state or relevant improvement [11]. Recently, minimal clinically important differences and patient acceptable symptom states have been estimated for the SF-36 [7], EQ-5D, HOOS [10], and Oxford Hip Score [9]. Those findings offer helpful thresholds that can help us construct more-robust predictive models from data available in national registries using those endpoints, and, perhaps, to identify those patients at greatest risk for persistent pain or disability after hip replacement.

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