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Response shift of the Western Ontario Rotator Cuff index in patients undergoing arthroscopic rotator cuff repair

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Hypothesis: This study determined the response shift in patients undergoing rotator cuff repair using the Western Ontario Rotator Cuff index (WORC), a disease-specific quality of life questionnaire. We hypothesized there would be a response shift with a positive recalibration (overestimated their preoperative disability) on the WORC and increases over time.

Methods: The study prospectively included 36 patients undergoing arthroscopic rotator cuff repair. At baseline, 3 months (T1), and 1 year (T2) after surgery the WORC, EuroQol (EQ)-5D-3L, and the patient's level of satisfaction after surgery were scored. To evaluate the response shift, patients also completed the WORC at 3 months (Pre-T1) and 1 year (Pre-T2) as how they perceived themselves to have been before surgery.

Results: The result on Pre-T1 and Pre-T2 results revealed that patients retrospectively rated their overall WORC score comparable with the baseline WORC score (Pre-T0; T0 = 40.5 ± 18.4, Pre-T1 = 45.0 ± 22.7, Pre-T2 = 34.3 ± 21.3). No response shift was observed on all domains except a negative recalibrated response shift for emotional disability on T1 ($P = .04$).

Conclusions: No significant group-level response shift was observed using the WORC, except for the subdomain emotional disability at 3 months after arthroscopic rotator cuff repair. With the absence of any shift in patient's perception on the self-administered quality of life–related WORC questionnaire, this study suggests one could retrospectively reliably conduct group-level preoperative baseline information on quality of life up to 1 year after surgery.

Level of evidence: Development or Validation of Outcome Instrument

Keywords: Western Ontario Rotator Cuff index (WORC); rotator cuff repair; rotator cuff tear; shoulder; perception shift; quality of life

Patient-reported outcome measures evaluate treatment interventions and are developed to determine the level of functioning from the patient's perspective instead of the therapist's. However, with the introduction of such parameters,

The St. Antonius Hospital Ethical Committee approved this study (R&D/VL-12.27 with NL41658.100.12).

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questions are raised on what is actually measured and its reliability.

Previous studies have shown quality of life (QoL) assessments may not be in line with the patient's report of satisfaction.[17] That patients with terminal diseases and a deteriorating health status often report a QoL that is stable and not inferior to that of healthy people has also been noted.[2,15] The change in internal standards, values, and conceptualization of health-related QoL over the course of time is called "response shift." [15,16] Besides QoL, this phenomenon is also applicable for physical functioning and psychological well-being (eg, depression). A positive response shift might serve as a buffer to the stressful effect of deteriorating health on psychological well-being.[22]

Response shift in patients with conditions that are not life threatening, such as rotator cuff tears, has not been extensively studied, and its implications are less clear. Current QoL outcome measures are based on the assumption that respondents use measurement scales consistently and that QoL scale scores are directly comparable over time. If there is a change in the respondent's internal standards of measurement or a scale recalibration, then bias is introduced into any longitudinal study in which self-reported outcome measures are used.[15,16] Patients may have recalibrated their baseline situation because of the clinical intervention or there might be a change because patients were giving socially desirable answers to the therapist. The response shift may be particularly important in repeated-measures trials, where efficacy over time for a specific treatment is measured as the change from a pretreatment baseline.[12]

In evaluation research, retrospective measurements are obviously easier and more economical than serial measurements. Despite the apparent advantages of retrospective measurements of change in health-related functional status, there is a suspicion that global or transition questions are biased due to recall problems or present-state effects at follow-up. It is assumed that prospective or serial change assessed by repeated measurement is superior and that the use of retrospective assessment of change in health-related functional status with global or transition questions is definitely not advisable.[5]

Arthroscopic rotator cuff repair is performed to improve QoL. The Western Ontario Rotator Cuff index (WORC) is a health-related QoL patient-administered questionnaire that is validated for rotator cuff repair.[20] The goal of this study was to determine if there was a response shift on the WORC score 3 months and 1 year after arthroscopic rotator cuff repair. Because subjective evaluations of function and pain levels are scored with the WORC questionnaire, its outcome may be easily influenced by a response shift. This study hypothesized there would be a positive group-level response shift (overestimation of preoperative disability) after arthroscopic rotator cuff repair and that it would be expected to increase over time.

Materials and methods

Patients, procedure, and rehabilitation

This prospective designed study was incorporated into a randomized clinical trial that assessed the difference in pain and function between immobilization methods (abduction brace vs. antirotation sling) after arthroscopic rotator cuff repair. Patients were recruited from our Department of Orthopaedic Surgery from October 2012 until January 2014. All patients were asked to provide informed consent during consultation. Eligible patients were adults with a traumatic or degenerative full-thickness tear of the supraspinatus or infraspinatus tendon, or both, of more than 6 months' duration, diagnosed by magnetic resonance imaging (MRI), that was unresponsive to at least 3 months of conservative therapy. Exclusion criteria were a partial-thickness tear, perioperative irreparable or partially reparable, revision surgery, rupture of the subscapularis tendon, glenohumeral osteoarthritis, adhesive capsulitis, body mass index >35 kg/m^2, fibromyalgia, current treatment with opiates, concomitant labral repair, lateral clavicle resection, and patients with insufficient knowledge of the Dutch language.

All patients underwent an arthroscopic rotator cuff repair in the beach chair position using a double-row or single-row suture-bridge technique. Directly after surgery patients, were immobilized and started physiotherapy for passive exercises. The immobilization could be phased out at 6 weeks, starting with active-assisted exercises and strengthening.

Outcome measures

Before surgery and 3 months after surgery, the patients visited the outpatient orthopedic department for a standard consult with the orthopedic surgeon. Patients were subsequently seen by an independent investigator for filling out the WORC questionnaire. At 1 year, the patients completed the WORC at home, which was mailed. Before surgery the patient filled out the WORC questionnaire once (Pre-T0). At 3 months (T1) and 1 year (T2), the patients completed 2 questionnaires: 1 for the current status (Post-T1/T2), and 1 on how they perceived themselves to have been before surgery (Pre-T1/T2). In addition to the WORC questionnaire, 4 separate questions on patient satisfaction were administered at T1 and T2 to determine perceived change.

WORC

This study used the Dutch version of the Western Ontario Rotator Cuff (WORC) index. The WORC questionnaire was originally written in English and has been validated for the Dutch language.[21] The WORC is designed for patients with disorders of the rotator cuff.[20,21] It is a disease-specific health-related QoL questionnaire that has 21 items representing 5 domains, each with a visual analog scale–type response option. The 5 domains are (1) physical symptoms, (2) sports and recreation, (3) work, (4) social function, and (5) emotional disability. Each item is scored on a 100-mm scale ranging from 0 (best) to 100 (worst). The most symptomatic total score is 2100, and the best or asymptomatic total score is 0. To present this in a more clinically meaningful format, the score is reported as a percentage by subtracting the total from 2100, dividing by 2100, and multiplying by 100. Total final WORC scores can, therefore, vary from 0%, the lowest functional status level, to 100%, the highest