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Severity classification of the quality of recovery-15 score—An observational study

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ABSTRACT

Background: The quality of recovery-15 (QoR-15) is a patient-reported outcome measurement measuring QoR after surgery and anesthesia. The scale is arbitrary and ranges from 0 to 150. We aimed to classify the QoR-15 score into four severity classes; excellent, good, moderate, and poor recovery.

Materials and methods: Data from one prospective observational cohort study and two randomized clinical trials were merged and comprised 276 adult patients with an American Society of Anesthesiologists class of I-III undergoing acute laparoscopic surgery for suspected appendicitis. Merged data were split into a "training" set and a "validation" set. Optimal cutoff points for classifying the QoR-15 into excellent, good, moderate, and poor recovery were identified in the "training" set. The four severity classes according to the QoR-15 score were validated in the "validation" set using prespecified hypotheses.

Results: The QoR-15 scores for excellent, good, moderate, and poor recovery were 136-150, 122-135, 90-121, and 0-89, respectively. A better severity class of recovery based on the QoR-15 score measured repeatedly six times over 30 d was associated with an increased chance of resuming recreational and occupational activities ($P < 0.001$). Patients with a better severity class of recovery on the first postoperative day had a lower incidence of postoperative complications within 30 d of surgery ($P = 0.001$).

Conclusions: After surgery and anesthesia, patients can be classified as being in poor, moderate, good, or excellent recovery based on the QoR-15 score.

Introduction

Patient-reported outcome measurements are important, and many available scales for postoperative recovery have been developed.[1-4] The quality of recovery-15 (QoR-15) is a patient-reported outcome measurement validated to measure QoR after surgery and general anesthesia. It ranges from 0 to 150 with a higher score indicating better recovery.[5-9] The QoR-15 is a smaller version of the QoR-40; the psychometric properties are comparable, but the QoR-15 is more practical to use because it is shorter and takes less time to complete.[5,10,11] Recently the minimal clinically important difference (MCID) of the QoR-15 has been reported as a change in value of 8.[12] The clinical interpretation of absolute values of the QoR-15 is unknown.

MCIDs on an individual level are not the same as important clinical differences between groups.[13,14] Analyzing treatment effect using differences in population mean and in population

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proportions may result in different interpretations of treatment estimates.[14] The mean difference in population level may be below the MCID, but a significant proportion of patients may still have had a clinically significant effect.[14] Effect of an intervention could be analyzed using the proportion of patients in longitudinal studies having a clinically important change or the proportion of patients in a better category of the outcome in cross-sectional studies.

Defining what QoR-15 scores correspond to different degrees of recovery would enable us to classify the recovery of the individual patient. This would make it possible to report numbers needed to treat and to harm in interventional cross-sectional studies using the QoR-15 score as a patient-reported outcome measurement of QoR.

Recovery is the pathway to restoration of the patient's normal function and daily life. It seems reasonable to assume that patients with poorer recovery are less likely to be discharged or to have completed their convalescence. Using discharge status and the end of convalescence in an anchor-based method, we aimed to classify the QoR-15 score into four severity classes: excellent, good, moderate, and poor recovery. To validate the classification, we hypothesized that the four severity classes based on the QoR-15 score on postoperative day one would be associated with postoperative complications and that when used repeatedly, they would be associated with the end of convalescence.

Material and methods

A retrospective analysis was performed using merged data from one prospective observational study[15] and two randomized clinical trials.[16,17] All the studies examined the postoperative course after acute laparoscopic surgery for suspected appendicitis. One of the trials randomized patients to receive 8 mg of preoperative dexamethasone or placebo, administered intravenously. The other trial randomized patients to receive 125 mg of preoperative methylprednisolone or placebo, administered intravenously. The observational study was approved by the Danish Data Protection Agency. In accordance with Danish legislation, no ethical approval was necessary. The Danish Data Protection Agency, the Danish Health and Medicines Authority (EudraCT no. 2014-005040-18 and no. 2015-004800-46), and the Regional Ethics Committee (H-3-2014-163 and H-15017338), Capital Region of Denmark, approved the two randomized clinical trials. The studies were registered at www.clinicaltrials.gov (NCT02415335 and NCT02711449) and monitored by the Good Clinical Practice unit at Copenhagen University Hospital. All patients provided written consent. The study is reported according to the Strengthening the Reporting of Observational Studies in Epidemiology statement.[18]

Setting

The observational study was performed at the Department of Surgery at the University Hospital of North Zealand between July and December 2014. The two randomized clinical trials were performed at the Departments of Surgery of North Zealand Hospital and Zealand University Hospital. Study periods were between April and September 2015 and April and August 2016. All the participating departments provide both elective and acute surgical service.

Total intravenous anesthesia is standard at both the institutions. Patients usually receive 4 mg of ondansetron at the end of surgery. Patients underwent diagnostic laparoscopy, and in cases of appendicitis, a three-port laparoscopic appendectomy was the standard procedure. In case of conversion, open appendectomy was usually performed through a McBurney incision. If other pathology was encountered, procedures followed the standards of our institutions. A doctor in training, either supervised or unsupervised by a more experienced surgeon, usually performed surgery. In case of complicated appendicitis (perforated, abscess formation, or diffuse peritonitis), patients were prescribed a 3-d course of antibiotics either orally or intravenously. Patients with appendicitis (both uncomplicated and complicated) received perioperative antibiotics according to the standards of our institutions. A basic postoperative analgesic regime of paracetamol, nonsteroidal anti-inflammatory drugs, and rescue opioids was used. Patients were discharged as soon as their clinical condition allowed a safe discharge, and they were informed that they were allowed to resume recreational and occupational activities the day after discharge.

Participants

All adult patients with an American Society of Anesthesiologists class I-III scheduled for acute laparoscopic surgery because of suspected appendicitis were eligible for inclusion in the studies. In all three studies, patients were excluded if they were known to have inflammatory bowel disease, to be pregnant or breastfeeding, or had presumed poor compliance with study protocol. For reasons of safety, additional exclusion criteria were applied in the two randomized clinical trials. In both the trials, patients known to have autoimmune disease, chronic pain, glaucoma, myasthenia gravis, ocular herpes simplex, Cushing's disease, systematic use of corticosteroids or other immunosuppressive drugs, or to have been vaccinated within the previous 14 d were excluded. In addition, patients with reduced kidney function (glomerular filtration rate <30 mL/min), liver cirrhosis, or heart failure (ejection fraction under 40%) were excluded from the study relating to high-dose methylprednisolone.

Assessment, follow-up, and definitions

The follow-up of patients was identical in the three studies and examined the postoperative recovery phase during the first 30 d after laparoscopic surgery for suspected appendicitis. Patient demographics were recorded through the patient chart and by a short interview on the first postoperative day. Perioperative data were collected through the patient chart or directly in case report forms. Methods are described in detail elsewhere.[15-17]

Patients filled out a QoR-15 questionnaire on postoperative days 1, 2, 3, 7, 14, and 30 (Supplementary Fig. 1) and were reminded by phone to complete their questionnaires. The QoR-15 is a 15-item questionnaire that measures the patient's QoR. Each item is answered on an 11-point numerical rating