

Preoperative Patient Reported Mental Health is Associated with High Grade Complications after Radical Cystectomy

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Purpose: Psychological distress has been associated with an impaired immune response and poor wound healing. We hypothesized that preoperative patient reported mental health would be associated with high grade 30-day complications after radical cystectomy.

Materials and Methods: We retrospectively identified patients who underwent radical cystectomy for bladder cancer who completed Short Form 12 (SF-12) surveys for self-assessment of health status less than 6 months before surgery. Median physical and mental composite scores were calculated. An expert model including known predictors of postoperative high grade complications was developed, and SF-12 physical composite score and mental composite score were added to determine their association with this end point.

Results: From January 2010 to August 2014, 472 patients underwent radical cystectomy for bladder cancer, of whom 274 (58.1%) completed preoperative SF-12 questionnaires. Responders were more likely to be white ($p=0.024$), have higher preoperative albumin ($p=0.037$), receive neoadjuvant chemotherapy ($p=0.002$), have pT3/T4 disease ($p=0.044$) and have positive soft tissue surgical margins ($p=0.006$). Median SF-12 physical composite score was 43.1 (IQR 33.0–51.5) and mental composite score was 48.5 (IQR 39.5–54.7) in responders. Overall 46 (16.8%) responders experienced a high grade 30-day complication. Patients with a high grade complication had a lower preoperative median SF-12 mental composite score (44.8 vs 49.8, $p=0.004$) but no difference in physical composite score (39.2 vs 43.8, $p=0.06$). SF-12 mental composite score was also a significant predictive variable when added to our expert model ($p=0.01$).

Conclusions: Preoperative patient reported mental health was independently associated with high grade complications after radical cystectomy. Therefore, patient self-assessment of health status before surgery through validated questionnaires may provide additional information useful in predicting short-term postoperative outcomes.

Key Words: mental health, postoperative complications, cystectomy, urinary bladder neoplasms

RADICAL cystectomy is an effective treatment for locally advanced bladder cancer but is associated with a high degree of patient morbidity.

A recent population based analysis reported 30-day complication, hospital readmission and mortality rates of 66.0%, 32.2% and 5.3%, respectively.¹

Abbreviations and Acronyms

ASA = American Society of Anesthesiologists®
BC = bladder cancer
BMI = body mass index
CCI = Charlson comorbidity index
MCS = mental composite score
NAC = neoadjuvant chemotherapy
NPQ = New Patient Questionnaire
PCS = physical composite score
QOL = quality of life
RC = radical cystectomy
SF = Short Form

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Several clinical based measures, such as comorbidity, BMI and hypoalbuminemia, have been examined as predictors of complications after RC, and proposed as targets to reduce adverse outcomes.^{2–5} However, some evidence has suggested that patient self-assessment of health is an important prognostic marker of outcomes and may be superior to physician reported assessments as predictors of all cause mortality.^{6,7} Patient self-appraisal of health status has also been shown to be predictive of mortality, regardless of clinical, lifestyle and socio-demographic factors in certain patients with cancer after initial treatment.⁸

Prior studies have suggested that poor baseline mental health can lead to more significant postoperative complications due to the impaired immune response associated with higher levels of stress.⁹ This can delay wound healing and the ability to fight infection in the postoperative state.¹⁰ Although self-appraisal of overall well-being may mediate physiological responses to surgery, patient reported health status has not been extensively studied among patients with BC to date, and to our knowledge its use for predicting postoperative outcomes, such as complications, has not been previously examined.

Quality of life surveys, such as the Medical Outcomes Study Short Form (SF-12), allow patients to appraise their own health, and quantify the effects of disease and treatment on their overall well-being. The SF-12 is a standardized, validated questionnaire that measures physical and mental components of health that can be benchmarked to normative population scores.^{11,12} It has been used to measure health related QOL in patients with chronic conditions such as diabetes as well as in postoperative settings.^{13,14} In this study we evaluate the association of preoperative patient reported physical and mental health measured by the SF-12 with short-term postoperative outcomes after RC.

METHODS

Patients and Data Source

The study population included patients with BC treated with radical cystectomy and urinary diversion from January 2010 to August 2014 who were identified retrospectively in an institutional review board approved departmental cystectomy database. The departmental cystectomy database collects demographic, clinical and postoperative outcomes data on patients who undergo RC at our institution, and is updated by departmental data analysts.

We used SF-12 data collected as part of the HLMCC (H. Lee Moffitt Cancer Center) New Patient Questionnaire. The NPQ is an electronic clinical intake form designed to replace nonstandardized paper forms that had previously been used to collect demographic and personal

health information from patients. The majority of patients complete the NPQ at home via the Internet using a patient portal account. Otherwise patients complete the NPQ on electronic tablets in the clinic waiting area at their first appointment. NPQ findings were reported into the electronic health record for use by clinicians and discretely captured in the HLMCC Health and Research Informatics platform.

For this study we used the Health and Research Informatics data warehouse to identify patients who completed SF-12 questionnaires as part of the NPQ less than 6 months before RC. Patients were identified using an algorithm using the codes for bladder cancer (C670–C679) filtered by SEER (Surveillance, Epidemiology, and End Results) site specific surgery codes for radical cystectomy (60–64 in males, 71 in females). No patient captured had an incomplete or partial response on the SF-12 questionnaire.

Study Variables and Measures

SF-12 is a multipurpose survey with 12 questions selected from the SF-36 Health Survey which, when combined, scored and weighted, results in physical and mental composite scores.¹² The SF-12 is a validated QOL instrument that is not age or disease specific, and provides a comprehensive, psychometrically reliable and efficient way to measure patient reported physical and mental health. PCS and MCS were computed using the responses of the 12 questions, and range from 0 to 100 with lower scores corresponding to lower levels of health and higher scores corresponding to higher health states.

Complications were captured via retrospective chart review of the patient's postoperative course (ie progress notes and discharge summary) and subsequent clinic visits up to 30 days after RC. The Clavien-Dindo classification was used to categorize 30-day complications. The primary end point of this study was the development of a high grade complication (defined as Clavien IIIa or greater) within 30 days after surgery and the highest grade was assigned to cases of multiple complications. Length of stay, defined from the time of RC until the date of initial discharge home, was also captured in a similar fashion.

Clinical study variables such as patient demographics (age, gender, race), smoking status, BMI (kg/m^2), age adjusted CCI, ASA score, preoperative albumin and creatinine levels, use of neoadjuvant chemotherapy, number of NAC cycles administered and history of prior pelvic radiation therapy were abstracted from the departmental cystectomy database. Conditions contributing to CCI were identified through review of individual patient health records at the time of surgery. ASA score was recorded based on anesthesiologist assessment of the patient 2 to 3 hours before surgery. Finally, preoperative albumin and creatinine levels were obtained from solitary measurements drawn 1 to 2 weeks before surgery.

Disease specific characteristics such as clinical tumor histology, pathological tumor (pT) and nodal stage (pN), and soft tissue margin status were also abstracted from the departmental cystectomy database. Clinical tumor histology was based on the examination of the most recent transurethral resection specimen, and all tumor

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