Surgeon Variation in Patient Quality of Life After Radical Prostatectomy

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Purpose: We assessed variation among surgeons in patient quality of life outcomes.

Materials and Methods: A survey of standard questions used to examine current urinary and sexual function was mailed to 1,500 randomly selected patients from the Utah Cancer Registry who met certain criteria, including prostatectomy for cancer cure more than 1 year previously, current age 70 years or less and no metastatic disease or other cancer therapy. Questionnaire information was linked to cancer registry and hospital discharge abstract information. Hierarchical mixed models were used to examine whether surgeons varied with respect to risk adjusted outcomes.

Results: The cooperation rate was 64%. Of the 678 qualifying responders 22% reported leaking urine more than once per day, 7% used more than 1 pad per day and 40% reported no erection without medication. Surgeon variation was significant for 3 patient outcomes, including erectile strength, urine leakage and length of hospital stay (each $p < 0.001$). Surgeon risk adjusted erectile outcomes significantly correlated with leakage outcomes ($r = 0.84$, $p < 0.0001$) and length of stay ($r = -0.55$, $p = 0.0004$). Annual surgeon volume significantly correlated with less leakage and shorter length of stay ($r = 0.34$ and -0.36, respectively, each $p = 0.05$). Compared to open retropubic surgery, robotic surgery was associated with a shorter stay. The perineal approach was associated with shorter stay, less urine leakage and weaker erection.

Conclusions: Patient quality of life outcomes after prostatectomy varies substantially among surgeons. Administering patient surveys through cancer registries may provide valuable data for improving prostatectomy outcomes statewide.

Key Words: penis, penile erection, prostatectomy, clinical competence, quality improvement

RADICAL prostatectomy often cures prostate cancer[1] but it may adversely affect quality of life. Surgeon influence on outcomes has been examined in previous studies using electronic government databases to compare surgeons with respect to perioperative mortality, length of hospital stay and codes suggesting perioperative complications, late urinary complications and recurrence.[2–5] Comparisons have also been made using medical record data on positive margins, blood transfusion or biochemical recurrence.[6,7] However, neither government databases nor medical records provide precise information on sexual and urinary function.[8–12]

Accepted for publication October 22, 2012.

Study received University of Utah institutional review board approval.

Supported by the Huntsman Cancer Foundation, Beaumont Foundation, Utah Cancer Registry funded by National Cancer Institute Contract HHSN261201000026C, Utah State Department of Health and University of Utah, and Huntsman Cancer Institute and Huntsman Cancer Center Support Grant P30 CA42014 from National Cancer Institute (Utah Population Database).

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† Financial interest and/or other relationship with Amarex, Amgen, Augmenix, Bayer, Bristol Myers Squibb, Cambridge Endo, Caris, Envisioneering Medical, GlaxoSmithKline, Janssen Biotech, Johnson & Johnson, Medivation, Myriad Genetics, Steba Biotech, Ortho-Clinical Diagnostics, Viking Medical and Wilex.

0022-5347/13/1894-1295/0
THE JOURNAL OF UROLOGY®

http://dx.doi.org/10.1016/j.juro.2012.10.118
Vol. 189, 1295-1301, April 2013
Printed in U.S.A.

In a recent study long-term sexual and urinary function was assessed by the treating physician.[13] We assessed these outcomes using questionnaires administered to a statewide random sample in Utah.

MATERIALS AND METHODS

In 2009 the Utah Cancer Registry mailed surveys to patients with prostate cancer who met certain criteria, including 1) currently alive, 2) prostatectomy at least 1 year before the survey, 3) age 70 years or less at the time of the survey and 4) Utah residency. Patients who completed the survey were removed from analysis if they reported radiation therapy or adjuvant therapy, or the registry recorded a SEER (Surveillance, Epidemiology and End Results) summary stage of 3 or 4. All study patients underwent surgery between 1988 and 2008. Patients consented to the study and the study was approved by the University of Utah institutional review board.

Initial criteria for patient selection were met by 2,761 patients. Surveys were mailed to 1,500 patients randomly selected from 3 strata based on the number identified with the surgeon in the registry. A higher percent of patients in the medium and high volume strata were sampled to increase the number of surgeons who had enough patients to be evaluated individually. Responders missing outcome measures and major risk factors were telephoned. Those missing other data elements were sent a letter requesting specific additional information.

Most survey questions came from the standardized EPIC (Expanded Prostate Cancer Index Composite) questionnaire, which was designed to measure urinary, bowel and sexual function.[11] Additional questions were related to demographic information, nonoperative treatment, surgical procedure (open, robotic or perineal), cancer recurrence, urinary, bowel and sexual functioning before treatment, and surgeon name. Because surgeons had no role in data collection and all data were obtained by the same team in the same way, the impact of surgeon bias and coding variation was eliminated.[14]

Claims and Registry Data

Additional data linked to survey responses were provided by the Utah Cancer Registry and Utah Population Database. The registry provided patient age, ZIP Code, SEER summary stage and surgery date. We coded patients as living in a metropolitan urban center if their ZIP Code was in a metropolitan area core or high commuting area.[15]

The Utah Population Database provided investigators with a list of ICD-9 codes required to identify individual risk factors and complications important for patients with prostatectomy[2] and to create the Charlson index.[16,17]

Outcomes

At the beginning of the study we mailed a short survey to some randomly selected patients to test whether it increased the response rate. Because it did not, we included the full EPIC questionnaire in our final instrument. For most patients who provided information on all EPIC questions we analyzed the EPIC subscales for incontinence, sexual function and patient satisfaction. To incorporate participants who submitted a shorter questionnaire, we included measures of incontinence and sexual function based on single questions, which each had answers scored from 1 to 5 on an ordinal scale. The incontinence measure was a single question from the EPIC, "In the last 4 weeks, how often have you leaked urine?" The sexual function question was "How would you rate the strength or firmness of your erection during the last 4 weeks without medication?" The EPIC sexual function score included questions on sexual desire, ability to achieve orgasm, and the frequency of sexual activity and sexual intercourse. Erectile strength may possibly be more influenced by surgery than shown by the full EPIC score.

Surgeon Groups

To decrease the variance of estimates of surgeon performance, we only analyzed as individual surgeons the 11 surgeons with 28 to 87 patients in the study sample. In addition to these 11 surgeons, we created 3 composite surgeons by combining the patients of surgeons with certain characteristics into a group. Surgeons in these groups did not have enough patients to be analyzed individually. Group 1 included the total of 57 patients of the 22 surgeons with 5 or fewer study patients. Group 2 included the total of 52 patients of 6 surgeons with 6 to 18 patients. Group 3 included the 30 patients who did not report their surgeon (21), whose surgeon moved out of state (5) or who were treated with surgery out of state (4). The Utah Cancer Registry determined the average annual volume of the surgeons in each group but was not permitted to release this information.

Statistical Testing

To facilitate interpretation, patient characteristics and outcomes were dichotomized and results are reported as percents. However, for statistical testing the outcomes were analyzed on an ordinal scale.

Logistic regression with surgeon as a fixed effect was used to test for surgeon variation in the complication rate. For all other outcomes linear mixed models were used to test surgeon variation as a random effect. Covariates included in the equation for a given outcome were selected using SAS® stepwise regression procedures with the ordinal forms of all variables mentioned in this report. As a risk adjusted measure of the surgeon results of a specific outcome, we used the surgeon coefficient from the mixed model. The correlation of surgeon coefficients of 2 outcomes was weighted by the number of cases that the surgeon had in the study sample. Statistical analyses were performed using SAS, version 9.

RESULTS

Patient Characteristics

Of the 1,500 participants who were mailed surveys 767 completed a questionnaire, including 577 who completed the full EPIC and 190 who completed a shorter version. Of the 733 nonresponders 285 did not receive the questionnaire because they had moved without providing a forwarding address or telephone number, while 9 were too ill to participate