
Prospective Evaluation of Short-Term Impact and Recovery of Health Related Quality of Life in Men Undergoing Robotic Assisted Laparoscopic Radical Prostatectomy Versus Open Radical Prostatectomy

Javier Miller, Angela Smith, Erik Kouba, Eric Wallen and Raj S. Pruthi*

From the Division of Urologic Surgery, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina

Purpose: In the last few years there have been increasing claims that robotic assisted laparoscopic radical prostatectomy decreases short-term morbidity in patients undergoing surgical treatment for prostate cancer. However, there is surprisingly little objective evidence to support this point, which is often used to market the procedure to patients. To address this issue we prospectively evaluated patients undergoing open and robotic assisted laparoscopic radical prostatectomy at baseline and weekly through the postoperative period using a validated questionnaire.

Materials and Methods: A total of 162 men undergoing radical prostatectomy, including open radical prostatectomy in 120 and robotic assisted laparoscopic radical prostatectomy in 42, for clinically localized prostate cancer completed the SF-12™, version 2 Physical and Mental Health Survey Acute Form preoperatively and each week postoperatively for 6 weeks. Physical and Mental Component Scores were calculated from the questionnaires at each time point. Comparisons between the 2 surgical approaches were made at each time point.

Results: No significant differences were seen between the open and robotic assisted laparoscopic radical prostatectomy groups with regard to patient age, clinical stage or preoperative prostate specific antigen. Mean surgical blood loss was significantly higher in the open group compared to that in the robotic assisted laparoscopic group. Physical Component Scores in the robotic assisted laparoscopic group were significantly higher than those in the open cohort beginning postoperative week 1 and extending through week 6. On statistical extrapolation Physical Component Scores returned to baseline between weeks 5 and 6 postoperatively in the robotic assisted laparoscopic group and between weeks 6 and 7 in the open group. Mental Component Score scores were not statistically different between the groups except preoperatively.

Conclusions: This study helps prospectively define short-term health related quality of life in patients undergoing robotic assisted laparoscopic vs open radical prostatectomy. Higher physical scores were seen in the robotic assisted laparoscopic group than the open group beginning postoperative week 1 and continuing weekly throughout the 6-week study period. Physical Component Score scores returned to baseline sooner in the robotic assisted laparoscopic group than in the open group.

Key Words: prostate, prostatic neoplasms, laparoscopy, prostatectomy, robotics

Recently there has been a remarkable expansion of treatment options for clinically localized prostate cancer. In the last 5 years laparoscopic methods, cryotherapy, high energy ultrasound and other novel modalities have emerged as potential therapeutic alternatives to radical prostatectomy and radiation therapy.¹ One such approach that has achieved widespread acceptance by patients and physicians alike is RALRP, a procedure that is becoming increasingly mainstream in the United States and abroad. Currently there are more than 350 robotic systems in use throughout the United States and an estimated 35,000 RALRP procedures will be performed this year, becoming

the most common robotic procedure performed.² Recent data suggest an exponential increase in such procedures worldwide. As RALRP becomes a more common treatment modality for prostate cancer, it is imperative to objectively evaluate the many goals and outcomes of this procedure, ie oncological end points, functional outcomes and perioperative morbidities, compared to the current surgical standard, ORP.

Although recent reports provide much needed preliminary information on short-term oncological results and functional outcomes, there is little information regarding the ability of RALRP to actually decrease perioperative morbidity and allow patients more rapid physical recovery, which is a common impression and basic premise of this minimally invasive procedure. Indeed, the addition of robotic surgery as a treatment modality for prostate cancer was primarily introduced in an attempt to further decrease perioperative morbidity through minimally invasive surgery.³ Although there is anecdotal evidence to suggest improved QOL following RALRP in terms of return to preoperative functioning

Submitted for publication January 22, 2007.
Study received approval from the University of North Carolina Institutional Review Board.

* Correspondence and requests for reprints: Division of Urologic Surgery, University of North Carolina at Chapel Hill, 2140 Bioinformatics Building, CB7235, Chapel Hill, North Carolina 27599 (telephone: 919-966-2574; FAX: 919-966-0098; e-mail: rpruthi@med.unc.edu).

compared to ORP,³ to date there are little objective data to support this notion.

To assess the potential for RALRP to decrease short-term morbidity we performed a prospective evaluation of HRQOL in men undergoing RALRP with regard to preoperative and short-term postoperative assessments using a validated HRQOL instrument. We compared these results to those in patients undergoing ORP. To our knowledge this study is the first to add objective data to the anecdotal discussions of improved short-term postoperative recovery with RALRP.

MATERIALS AND METHODS

Study Methods

In accordance with the principles and practices of the University of North Carolina Institutional Review Board, and in recognition of and compliance with Health Insurance Portability and Accountability Act guidelines (United States Health Insurance Portability and Accountability Act of 1996) approximately 300 men between July 2002 and August 2006 undergoing ORP or RALRP were prospectively evaluated for short-term HRQOL. These men completed the SF-12, version 2 Physical and Mental Health Survey Acute Form (1-week recall period) preoperatively and each week serially during postoperative weeks 1 through 6. The acute form of the SF-12 was designed for applications in which health status would be measured weekly. The SF-12, version 2 Health Survey is a reliable and scientifically valid, patient reported survey to evaluate physical and mental health status. It serves as a validated QOL instrument used to gauge and prove the benefits of improved functioning and other patient reported outcomes in many disease states. Patient reported health outcomes evaluated by SF-12 include information measuring 8 domains of health, such as physical functioning, role limitations due to physical health, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems and mental health. Questions include self-assessments of level of functioning in various daily activities, eg moving a table and visiting with friends, general health perceptions, limitations due to physical and emotional health, and pain assessment.

PCS and MCS were calculated from the questionnaires at each time point. The forms were completed at the patient homes and were mailed or brought to the department during followup. Higher scores indicate better functioning and the component scores have been validated to have a mean \pm SD of 50 ± 10 . Overall we had a return rate approaching 80%. However, complete data were available on 60% of subjects for an overall complete response rate of approximately 50% (162 respondents) with similar response rates observed in the open and robotic subgroups. These 162 respondents were used in data analysis. Demographic and clinical information, including age, race, initial prostate specific antigen, clinical and pathological stage, and EBL were also evaluated.

Procedure

From July 2002 until January 2005 the standard surgical approach for patients with clinically localized (cT1-T2) prostate cancer at our institution was ORP and from February 2005 through August 2006 the standard approach was RALRP. Accordingly there was no selection bias between the 2 surgical modalities because the surgical approach reflected

the time alone. SF-12 QOL questionnaires were delivered to all patients undergoing surgery.

Patients with ORP underwent anatomical retropubic radical prostatectomy via a 10 to 12 cm infraumbilical midline incision, as previously described.⁴ Patients with RALRP underwent surgery with the da Vinci® Surgical System using 4 robotic and 2 assistant ports in a manner similar to that previously described by Menon et al.⁵ In patients undergoing ORP as well as RALRP the urethral catheter was removed on postoperative day 10. In addition, in each group a nerve sparing procedure was performed when oncologically appropriate and in patients who were potent preoperatively.

Statistical Methods

Separate models were estimated for mental and physical QOL domains. Repeated measures multivariate ANCOVA was used to assess treatment differences in QOL following surgical intervention. In each model postoperative measures of QOL taken weekly served as the dependent variables along with patient age, EBL (greater than 500, or 500 ml or less) and surgical procedure. Because the study design precluded random assignment to surgical condition, preoperative QOL measures were included as an additional covariate. The t test and chi-square statistics were used to assess demographic and background characteristics. Statistical significance was considered at 2-sided $p \leq 0.05$. Statistical analyses were performed with SAS®, version 9.1. In addition to direct statistical comparisons of PCS and MCS between the ORP and RALRP subgroups, differences in QOL scores were also evaluated based on a difference of at least 0.3 SD between the groups, a value determined to potentially represent a clinically meaningful difference based on prior empirical experience with such HRQOL data in patients with prostatectomy.⁶

RESULTS

Of the 162 men in the study 42 (26%) underwent RALRP and 120 (74%) underwent ORP. Mean patient age was 60.8 years and there was no statistical difference between those undergoing RALRP and ORP (61.1 and 60.6 years, respectively, $p = 0.66$). Mean EBL was 424 ml (range 100 to 1,200) and it was significantly greater in patients with ORP than in patients with RALRP (490.4 vs 232.1 ml, $t = 7.13$, $p < 0.0001$). Similarly the ORP group showed more patients with EBL greater than 500 ml (chi-square 16.37, $p < 0.0001$). In the RALRP group there was a main effect of age ($F_{1,38} = 11.72$, $p = 0.002$), such that older patients reported higher PCS. However, EBL was not associated with PCS in participants who underwent RALRP ($F_{1,38} = 0.05$, $p = 0.827$). In the ORP group there was a main effect of age ($F_{1,116} = 5.76$, $p = 0.018$) and EBL ($F_{1,116} = 23.53$, $p < 0.0001$), such that older patients reported higher PCS and lower EBL was associated with higher PCS.

Repeated ANCOVA demonstrated a significant main effect of operative condition on postoperative physical QOL measures ($F_{1,153} = 17.70$, $p < 0.0001$). Specifically the RALRP group demonstrated significantly greater physical QOL compared with that in patients with ORP. In contrast, mental QOL was not significantly related to operative condition ($F_{1,153} = 2.28$, $p = 0.133$). The table shows mean PCS for the open and robotic groups, and the respective p values at each time point as well as mean MCS for each group.

PCS and MCS							
	Mean ± SD Preop	Mean ± SD Wk 1	Mean ± SD Wk 2	Mean ± SD Wk 3	Mean ± SD Wk 4	Mean ± SD Wk 5	Mean ± SD Wk 6
PCS:							
Open	56.9 ± 6.0	31.7 ± 6.6	37.5 ± 7.2	42.1 ± 7.0	45.5 ± 7.3	49.7 ± 5.9	52.8 ± 4.7
Robotic	57.6 ± 2.4	34.7 ± 7.6†	42.0 ± 6.6†	48.6 ± 3.9†	52.8 ± 3.3†	55.6 ± 2.2†	56.4 ± 1.7†
Overall	57.1 ± 5.3	32.5 ± 7.1	38.7 ± 7.3	43.8 ± 7.0	47.4 ± 7.3	51.2 ± 5.8	53.7 ± 4.4
p Value*	0.672	0.422	0.08	<0.001	<0.001	<0.001	0.003
MCS:							
Open	45.7 ± 9.8	54.6 ± 7.6	54.7 ± 7.5	56.1 ± 5.8	57.0 ± 5.6	57.1 ± 5.1	58.0 ± 4.7
Robot	49.8 ± 6.2†	52.7 ± 8.5	53.8 ± 6.5	55.5 ± 7.3	57.0 ± 5.2	56.5 ± 4.7	57.4 ± 4.3
Overall	46.7 ± 9.2	54.1 ± 7.8	54.5 ± 7.3	56.0 ± 6.2	57.0 ± 5.4	56.9 ± 5.0	57.9 ± 4.6
p Value*	0.032	0.031	0.184	0.253	0.557	0.517	0.304

* Adjusted for age, EBC greater than 500, or 500 ml or less and corresponding pretreatment values.
 † Potentially meaningful difference vs OPN (0.3 × SD or greater).

Figure 1 shows overall MCS and PCS with the 95% CI. Figures 2 and 3 show PCS and MCS for ORP vs RALRP, respectively. Because a curvilinear relationship was present in PCS for the 2 groups, we determined the return to baseline for each group via linear extrapolation through later time points using data on weeks 3, 4 and 5. This method estimated the return to baseline for RALRP between weeks 5 and 6, and for ORP between weeks 6 and 7. The statistically estimated difference in return to baseline between RALRP and ORP (5.57 vs 6.89 weeks) was 1.32 weeks.

DISCUSSION

RALRP was first described in 2001 by Abbou et al⁷ and it was shortly thereafter standardized and popularized by Menon et al.⁸ In the last few years radical prostatectomy has become the most commonly performed robotic assisted surgical procedure in the United States and some predict that RALRP will become the new gold standard for the surgical treatment of prostate cancer.² As RALRP becomes a prominent therapeutic modality for prostate cancer, it is important to evaluate and compare the outcomes of this (and any novel) therapeutic intervention, including oncological and functional end points, in addition to measures of perioperative morbidity and short-term physical recovery.

The oncological efficacy of this procedure remains the primary and ultimate goal since any novel therapy should not compromise cancer associated outcomes. Due to the rel-

ative novelty of this procedure RALRP series have only been able to evaluate surrogate end points, such as positive margin rates. Correspondingly positive margin rates of a number of RALRP series appear to be comparable to those of open series. In the absence of prospective, randomized trials such case series appear to provide evidence with regard to comparable and appropriate short-term oncological end points.^{7,9-14}

Additionally, functional outcomes remain an important goal for any therapy for prostate cancer, including RALRP. Recent case series demonstrated that urinary and potency end points associated with RALRP appear comparable to those in even the best open studies. Consequently RALRP may serve to maintain cancer therapeutic efficacy and minimize functional deterioration comparable to the outcomes historically observed in open surgical series.^{7,9-14}

Despite early reports demonstrating comparable oncological and functional outcomes of RALRP it remains unclear as to whether perioperative morbidity and short-term recovery are truly improved compared to those in open series. Indeed, the addition of robotic surgery as a treatment modality for prostate cancer was primarily introduced in an attempt to further decrease perioperative morbidity.³ The procedure is

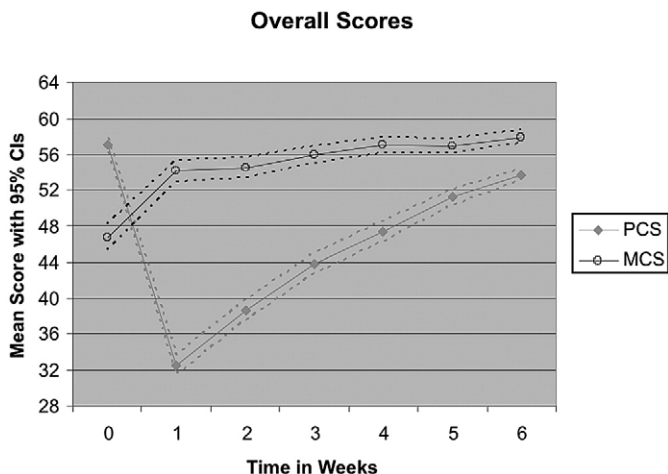


FIG. 1. PCS (diamonds) and MCS (circles) in all patients with 95% CI.

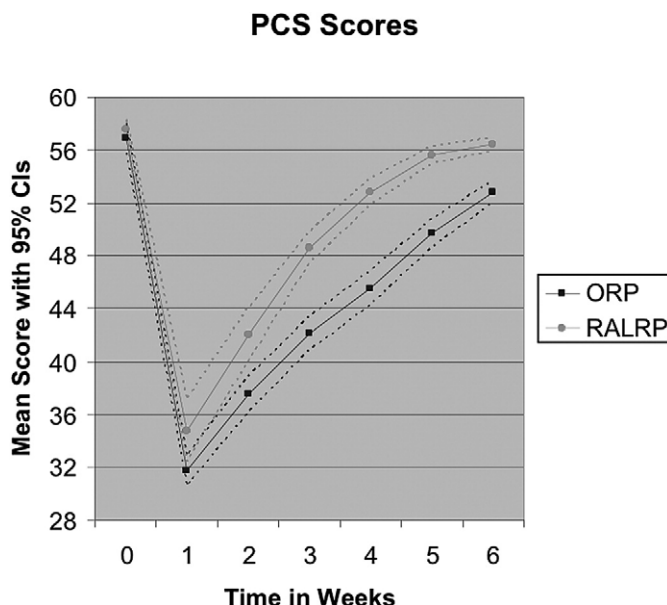


FIG. 2. PCS for patients with RALRP (circles) and ORP (squares) with 95% CI.

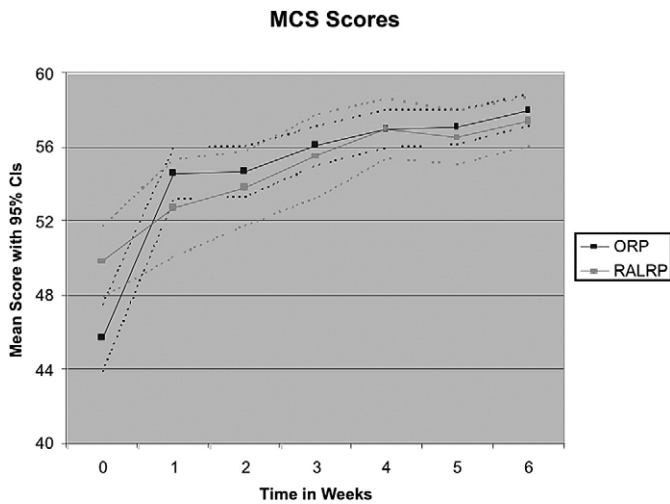


FIG. 3. MCS for patients with RALRP (circles) and ORP (squares) with 95% CI.

often described as minimally invasive with implications about reduced physical impact and morbidity to the patient. Accordingly, expectations for less pain and more rapid recovery are commonly credited to this procedure in a wide variety of physician and patient testimonials alike. Although the potential for RALRP to decrease short-term morbidity and enhance recovery is so widely quoted, such benefits remain only anecdotal without appropriate and necessary objective supportive data.

Some recent groups attempted to evaluate and compare QOL after various types of prostatectomy but they used longer term end points, eg 1 and 2-year outcomes, with QOL measurements obtained on a monthly or quarterly basis.^{15,16} Also, these studies did not identify significant differences between surgical techniques at these midterm or long-term end points.

Only 1 other prior study compared short-term postoperative outcomes in patients undergoing robotic and open radical prostatectomy. In a study by Webster et al comparisons of postoperative pain using a linear analog scale were made between RALRP and ORP cohorts.¹⁷ This study showed no difference in pain postoperatively between the 2 groups when evaluated for 2 weeks postoperatively with excellent pain control in each cohort. Although pain is an important aspect of postoperative recovery, it is not the only factor that should be evaluated when comparing recovery. The issue of perioperative morbidity could be better evaluated with a QOL study throughout the recovery period, which is generally believed to last approximately 6 weeks. Accordingly in the current study we chose the SF-12 questionnaire, which includes not only pain in its assessment, but also other measures of physical and psychological function, and HRQOL.

Using this HRQOL instrument we noted significantly higher PCS for patients with RALRP vs ORP every week, beginning postoperative week 1 and extending through postoperative week 6. Differences were observed using several measures, including 1) direct statistical comparisons of PCS between the ORP and RALRP subgroups, and 2) evaluations of the clinically meaningful difference of at least 0.3 SD, which was chosen based on empirical experience with HRQOL data.⁶ These results demonstrate that patients un-

dergoing RALRP have greater physical well-being and function than those undergoing ORP throughout the postoperative period.

In addition to improved physical well-being beginning week 1 postoperatively, this study also demonstrates more rapid return to baseline for patients undergoing RALRP (5.6 weeks) compared to ORP (projected to be 6.9 weeks) by an estimated 1.3 weeks. This does not signify that patients return to work or even to a satisfactory level of function at this point because such activities can and often do occur before the actual return to the objective physical baseline. Indeed, the time to return to work or other physical activities, obligations or recreations are likely to occur earlier than a return to baseline depending on the patient, motivations and the type of physical activity performed. Nevertheless, this study demonstrates that such a return should occur on or before 5 to 6 weeks postoperatively in the RALRP cohort and this return occurred earlier than observed for the open procedure.

Interestingly we also found that older patients in the RALRP and ORP groups had higher PCS and those with lower EBL in the ORP group had higher PCS. The higher PCS in older patients may have been due to the elderly patient response to analgesics. Studies show that elderly patients achieve greater analgesia from opiates than younger patients, potentially due to age related changes in the opiate receptor. Increased age is also linked to decreased peripheral nociceptive function.¹⁸ Despite the potential influence of age and EBL on PCS differences in postoperative PCS between the ORP and RALRP groups persisted even when controlling for age, EBL and pretreatment QOL values.

During our study we also found higher MCS preoperatively for the RALRP cohort. This may have been due to patients being more optimistic about undergoing RALRP compared to ORP with higher preoperative expectations for the robotic procedure. However, ultimately the 2 groups had an MCS increase after surgery to similar values between the 2 groups and these scores remained increased throughout the 6-week postoperative evaluation. Other groups noted a similar effect on mental health after prostatectomy.^{19,20} The trend of increased MCS postoperatively may be related to the patient perception of cure by definitive intervention and relief of anxiety related to surgery regardless of surgical technique.

The potential benefits of early and improved short-term recovery demonstrated by our series may come at a financial cost. Several groups examined the potentially increased immediate costs of robotic approaches to prostatectomy. Preliminary cost analyses demonstrated that the robotic assisted approach may add \$1,000 to \$1,500 per surgical case.³ Certainly these costs must now be weighed against the uncalculated savings of health care dollars and potential increase in productivity with patients having improved physical well-being immediately after surgery and returning to baseline approximately 1.3 weeks earlier after RALRP than after ORP. The potential increase in productivity and short-term disability savings alone may legitimize the increased cost of the procedure. Data from the current study may help provide some of the information that is necessary to make appropriate analyses of health care costs and outcomes of this procedure.

A limitation in the study design is that as a prospective recall study patients may have been biased in their recollections of the preceding week, which may have influenced objective measures of outcome. In addition, there may have existed a reporting bias because not all men returned the questionnaire. Only approximately half of our patients returned the questionnaire completely and accurately. Although it remains unclear how such a return bias may influence mean PCS and MCS outcomes, those who returned the SF-12 questionnaire may have been different or unique from those who failed to return the questionnaire accurately or at all. This represents an inherent shortcoming of any such questionnaire based study that does not have a complete response rate. Also, the study was weakened by the lack of demographic information about the patients. Results, particularly when comparing racial or age groups, may be biased by differing education levels, socioeconomic status, work status and insurance status, among others. Lastly, we evaluated only 2 forms of extirpative surgical therapy for prostate cancer, that is the open retropubic approach and the robotic assisted laparoscopic approach. What remains uncertain is the impact of the perineal approach on patient reported, short-term QOL outcomes, in addition to nonsurgical forms of treatment in the short term.

CONCLUSIONS

To our knowledge this study is the first to add much needed data supporting anecdotal discussions of decreased morbidity associated with RALRP. Patients have benefited from studies comparing the functional and oncological outcomes of RALRP vs ORP when considering treatment modalities for prostate cancer but to date data have not objectively supported claims of decreased morbidity. Our data demonstrating higher PCS and more rapid return to baseline with RALRP will aid patients and urologists in tailoring treatment plans for patients with prostate cancer. This study not only adds validity to the discussions of improved recovery with RALRP, it potentially helps justify the additional costs associated with RALRP. Further studies verifying these results should also investigate the effect of surgical technique on disability claims.

Abbreviations and Acronyms

EBL	=	operative estimated blood loss
HRQOL	=	health related QOL
MCS	=	Mental Component Score
ORP	=	open radical prostatectomy
PCS	=	Physical Component Score
QOL	=	quality of life
RALRP	=	robotic assisted laparoscopic radical prostatectomy

REFERENCES

- Ahmed S, Lindsey B and Davies J: Emerging minimally invasive techniques for treating localized prostate cancer. *BJU Int* 2005; **96**: 1230.
- Kaul S and Menon M: Robotic radical prostatectomy: evolution from conventional to VIP. *World J Urol* 2006; **24**: 152.
- El-Hakim A, Leung RA and Tewari A: Robotic prostatectomy: a pooled analysis of published literature. *Expert Rev Anticancer Ther* 2006; **6**: 11.
- Richman M, McLaughlin S, Maygarden S and Pruthi RS: Initial incision of lateral pelvic fascia and early ligation of vascular pedicles during radical prostatectomy: potential to reduce positive margin rates. *BJU Int* 2005; **95**: 40.
- Menon M, Shrivastava A, Kaul S, Badani KK, Fumo M, Bhandari M et al: Vattikuti Institute prostatectomy: contemporary technique and analysis of results. *Eur Urol* 2007; **51**: 648.
- Litwin MS, Melmed GY and Nakazon T: Life after radical prostatectomy: a longitudinal study. *Urology* 2001; **166**: 587.
- Abbou CC, Hoznek A, Salomon L, Olsson LE, Lobontiu A, Saint F et al: Laparoscopic radical prostatectomy with a remote controlled robot. *J Urol* 2001; **165**: 1964.
- Menon M, Shrivastava A, Tewari A, Sarle R, Hemal A, Peabody JO et al: Laparoscopic and robot assisted radical prostatectomy: establishment of a structured program and preliminary analysis of outcomes. *J Urol* 2002; **168**: 945.
- Pasticier G, Rietbergen JB, Guillonneau B, Fromont G, Menon M and Vallancien G: Robotically assisted laparoscopic radical prostatectomy: feasibility study in men. *Eur Urol* 2001; **40**: 70.
- Ahlering TE, Woo D, Eichel L, Lee DI, Edwards R and Skarecky DW: Robot-assisted versus open radical prostatectomy: a comparison of one surgeon's outcomes. *Urology* 2004; **63**: 819.
- Tewari A, Srivasatava A and Mennon M: A prospective comparison of radical retropubic and robot-assisted prostatectomy: experience in one institution. *BJU Int* 2003; **92**: 205.
- Hull GW, Rabbani F, Abbas F, Wheeler TM, Kattan MW and Scardino PT: Cancer control with radical prostatectomy alone in 1,000 consecutive patients. *J Urol* 2002; **167**: 528.
- Han M, Partin AW, Chan DY and Walsh PC: An evaluation of the decreasing incidence of positive surgical margins in a large retropubic prostatectomy series. *J Urol* 2004; **171**: 23.
- Roehl KA, Han M, Ramos CG, Antenor JA and Catalona WJ: Cancer progression and survival rates following anatomical radical retropubic prostatectomy in 3,478 consecutive patients: long term results. *J Urol* 2004; **172**: 910.
- Ball AJ, Gambill B, Fabrizio MD, Davis JW, Given RW, Lynch DF et al: Prospective longitudinal comparative study of early health-related quality-of-life outcomes in patients undergoing surgical treatment for localized prostate cancer: a short-term evaluation of five approaches from a single institution. *J Endourol* 2006; **20**: 723.
- Namiki S, Egawa S, Terachi T, Matsubara A, Igawa M, Terai A et al: Changes in quality of life in first year after radical prostatectomy by retropubic, laparoscopic, and perineal approach: Multi-institutional longitudinal study in Japan. *Urology* 2006; **67**: 321.
- Webster TM, Herrell SD, Chang SS, Cookson MS, Baumgartner RG, Anderson LW et al: Robotic assisted laparoscopic radical prostatectomy versus retropubic radical prostatectomy: a prospective assessment of postoperative pain. *J Urol* 2005; **174**: 912.
- Caumo W, Schmidt AP, Schneider CN, Bergmann J, Iwamoto CW, Adamatti LC et al: Preoperative predictors of moderate to intense acute postoperative pain in patients undergoing abdominal surgery. *Acta Anaesthesiol Scand* 2002; **46**: 1265.
- Yang BK, Young MD, Calingaert B, Albala DM, Vieweg J, Murphy BC et al: Prospective and longitudinal patient self-assessment of health-related quality of life following radical perineal prostatectomy. *J Urol* 2004; **172**: 264.
- Roesch SC, Adams L, Hines A, Palmores A, Vyas P, Tran C et al: Coping with prostate cancer a meta-analytic review. *J Behav Med* 2005; **28**: 281.

EDITORIAL COMMENTS

The authors assessed prospective but nonrandomized HRQOL in the short term after RALRP and ORP. Study weaknesses include the mentioned typical problem with response rates, low study numbers, and the lack of demographics and comorbidities, which might impact scores. Several methodological issues exist in the literature, including the lack of validation of the SF-12 instrument, questions in the acute postoperative period and the definition of a clinically meaningful difference in scores.¹ Some groups have used at least a 5 or 10-point difference.² Given that most of the differences in scores representing statistical differences in the study are in this range, it remains questionable how much clinical significance these differences and the 1.3-week improved convalescence represent. In our experience and studies only minor differences are present in postoperative pain (reference 17 in article), hospitalization, etc, while the most interesting and clinically meaningful outcomes remain margin and recurrence data, continence and the preservation of sexual function.

S. Duke Herrell

Department of Urologic Surgery
Vanderbilt University Medical Center
Nashville, Tennessee

1. Wu CL, Naqibuddin M, Rowlingson AJ, Lietman SA, Jermyn RM and Fleisher LA: The effect of pain on health-related

quality of life in the immediate postoperative period. *Anesth Analg* 2003; **97**: 1078.

2. Litwin MS, Melmed GY and Nakazon T: Life after radical prostatectomy: a longitudinal study. *J Urol* 2001; **166**: 587.

This partially prospective study has a number of issues. Only 50% of the patients responded with no breakdown for either group. Patients undergoing the newer, potentially less morbid procedure may be biased in their recollections and the lack of demographic data may be a significant short-fall. Another major problem is unequal numbers between the groups. Presumably this difference could be addressed, provided that the study has been ongoing.

The conclusions regarding justification of cost is speculation at best and can only be considered hypothesis generating. I agree with the authors that to date little has been reported to prove that this operative modality represents a significant improvement over what already is an effective and relatively minimally morbid procedure. I am unsure that a 1.3-week improvement in return to baseline is all that impressive, especially when one considers the cost. Finally, no mention is made of the other approaches, particularly radical perineal prostatectomy, which is considered a less morbid open procedure and in competent hands is associated with equal oncological and QOL outcomes in the short and long term. Expanding the study to include laparoscopic and perineal prostatectomies would be interesting.

Thomas E. Keane

Medical University of South Carolina
Charleston, South Carolina