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Urinary Tract-Related Quality of Life after Radical Prostatectomy: Open Retropubic versus Robot-Assisted Laparoscopic Approach

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Key Words

Health service research • Quality of life • Continence •
Radical prostatectomy • Open retropubic surgery •
Robot-assisted surgery • ICIQ-MLUTS

Abstract

Background: The best technique of radical prostatectomy – open retropubic versus robot-assisted surgery – is a subject of controversy. **Patients and Methods:** Between January 1st, 2007 and December 31st, 2011, 2,177 men underwent radical prostatectomy at our department. 252 (12%) cases were laparoscopic robot-assisted, the remainder open retropubic procedures. In Germany, certified prostate cancer centers are required to collect urinary tract-related outcome data after radical prostatectomy using the International Consultation of Incontinence Questionnaire Male Lower Urinary Tract Symptoms. The questionnaire data were used to compare both surgical approaches concerning the urinary tract-related outcome 1, 2 and 3 years postoperatively. **Results:** Neither the voiding score nor the incontinence score or the bother scale sum differed between the two cohorts at any of the measurement times. **Conclusions:** Concerning continence recovery, in this series, there were no detectable differences between robot-assisted and open radical prostatectomy.

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Introduction

The best surgical technique for radical prostatectomy is a subject of controversy [1–3]. In Germany, prostate cancer centers certified by the Deutsche Krebsgesellschaft (German Cancer Society) are required to collect urinary tract-related outcome data after radical prostatectomy using the International Consultation of Incontinence Questionnaire Male Lower Urinary Tract Symptoms (ICIQ-MLUTS) [4]. In this study, we used these data to compare the urinary tract-related outcome of open and laparoscopic radical prostatectomy at our department during a 5-year period.

Methods

Between January 1st, 2007 and December 31st, 2011, 2,177 men underwent radical prostatectomy at our department. 252 (12%) were laparoscopic robot-assisted radical prostatectomies, the remainder were open retropubic ones. Institutional review board approval was obtained. The mean age of the whole sample was 65.0 years. The mean PSA in patients without neoadjuvant hormonal treatment was 9.6 ng/ml; 67% of patients had organ-confined disease.

After becoming a certified prostate cancer center in December 2007, at our institution, all radical prostatectomies are being performed by surgeons with an experience of more than 100 radical

Table 1. Demographic data stratified by the surgical technique

Criterion	Open	Robot-assisted	p
Organ-confined tumor ¹	1,261 (66.5)	194 (77.0)	0.0003
Positive lymph nodes	176 (9.7)	4 (1.8)	<0.0001
Specimen Gleason score 8–10	244 (12.8)	9 (3.6)	<0.0001
Mean PSA, ng/ml ²	10.0	6.4	<0.0001
Positive margins	242 (13.0)	33 (13.9)	0.68
Mean age, years	65.2	62.8	<0.0001

Figures in parentheses indicate percentages.

¹ pT2 and node-negative.

² Concerns patients without neoadjuvant hormonal treatment.

prostatectomies or under surveillance of a surgeon with such experience. During the recruitment period of this study, 3 of the 7 involved surgeons performed their 100th radical prostatectomy; the other 4 had already greater experience at the beginning of recruitment. During the time of this study, 4 surgeons performed robot-assisted and 7 (including the four robot surgeons) open retropubic radical prostatectomy.

The da Vinci® robot (Intuitive Surgical Systems Inc.) was introduced in March 2006. So, the initial learning curve of robot-assisted radical prostatectomy (32 cases) was not included in this analysis. Robot-assisted radical prostatectomy was offered to patients with appropriately favorable tumor and general medical criteria. Demographic data stratified by the surgical technique are given in table 1. Overall, patients selected for robot-assisted surgery were younger and had more favorable tumor parameters. Open retropubic radical prostatectomy remained the standard procedure performed in the majority of cases.

The ICIQ-MLUTS questionnaire [4] was obtained from the International Consultation of Incontinence Modular Questionnaire (<http://www.iciq.net/ICIQ.MLUTS.html>). This validated questionnaire consists of 13 items, 5 voiding-related (items 2–6, called voiding score), 6 incontinence-related (items 7–12, called incontinence score) and two questions on voiding frequency (items 13 and 14). Each question may be answered with 5 preformulated answers scored with 0–4 points according to severity, and a subjective bother scale ranging from 0–10. The voiding and incontinence scores are calculated by adding the points of the answers to the questions disregarding the bother scale.

According to the prostate cancer center certification requirements, the questionnaire was sent to all patients who underwent radical prostatectomy during this time period 1, 2 and 3 years after surgery. After February 15th, 2008, all patients selected for radical prostatectomy were asked to complete the questionnaire already prior to surgery as a baseline measure. Questionnaires in which one or more questions were left unanswered were excluded from this analysis.

The following criteria assessed by the ICIQ-MLUTS questionnaire were used for comparison: the voiding score (adding the answers to items 2a–6a, range: 0–20); the incontinence score (adding the answers to items 7a–12a, range: 0–24), and the sum of the bother scales calculated by adding the bother scales of all items of the questionnaire.

Fig. 1. Mean values, 95% confidence intervals and ranges of the voiding score of the ICIQ-MLUTS questionnaire (sum of the answers to questions 2a, 3a, 4a, 5a, 6a) adjusted to the number of completed questionnaires preoperatively and 1, 2 and 3 years after radical prostatectomy. Preop. = Preoperatively.

Comparisons of demographic data were made with the χ^2 or Fisher exact test. The distributions of quantitative variables were compared with U tests. The scores were analyzed in linear models of the variance analysis for repeated measures with compound symmetry of the covariance structure. Tukey adjustment was done in all multiple comparisons. The statistical analyses were performed with the Statistical Analysis Systems (SAS Institute, Cary, N.C., USA) statistical package.

Results

The completion rates of the questionnaires were the following: preoperatively 81%, one year postoperatively 77%, 2 years postoperatively 57% and 3 years postoperatively 38%. Incompleteness of questionnaires was influenced by the facts that preoperative questionnaires were introduced on February 15th, 2008, and that not all patients have already received the three postoperative questionnaires because of short follow-up. The incompleteness of the questionnaires did not differ between patients who underwent open and robot-assisted surgery ($p = 0.11$).

The comparison of the voiding scores are shown in figure 1, that of the incontinence scores in figure 2 and that of the bother score sums in figure 3. There were no significant differences at any time between the assessed parameters.

Fig. 2. Mean values, 95% confidence intervals and ranges of the incontinence score of the ICIQ-MLUTS questionnaire (sum of the answers to questions 7a, 8a, 9a, 10a, 11a, 12a) adjusted to the number of completed questionnaires preoperatively and 1, 2 and 3 years after radical prostatectomy. Preop. = Preoperatively.

Fig. 3. Mean values, 95% confidence intervals and ranges of the sum of the bother scales of the ICIQ-MLUTS questionnaire (sum of the answers to questions 2b–14b) adjusted to the number of completed questionnaires preoperatively and 1, 2 and 3 years after radical prostatectomy. Preop. = Preoperatively.

Discussion

Although two recent meta-analyses suggested a superiority of robot-assisted radical prostatectomy over open and conventional laparoscopic surgery concerning continence recovery [5, 6], the controversies on the best technique will continue. In contrast to these meta-analyses, this study did not reveal any differences concerning voiding function and continence recovery between open and robot-assisted radical prostatectomy. However, comparisons between both techniques – even if done in a randomized trial – are susceptible to various biases rendering valid comparisons difficult. Due to selection, in the retropubic cohort of this current study, the mean age was somewhat higher, and the tumor parameters were less favorable (table 1). On the other hand, the surgeons who performed robot-assisted radical prostatectomy in this study were more experienced in open than in robot-assisted surgery. It may not be ruled out that the results of robot-assisted surgery may improve further with greater experience.

Several studies suggested better continence recovery after robot-assisted compared with open retropubic radical prostatectomy [7–9]. There are some possible reasons for these conflicting results. Selection favoring robot-assisted surgery is possible. As in this study, in the series of

Ficarra et al. [9] patients selected for robot-assisted surgery were significantly younger; in the cited study [9], the difference was even more pronounced than in this study. A small but statistically significant difference was also seen in a study by Kim et al. [7], whereas in a matched study by Rocco et al. [8], there was no difference in age between both techniques. It is conceivable that further non-measurable biases exist putting open surgery at a disadvantage and rendering a statistical control of risk factor differences difficult. For example, it has been reported that apart from higher age, more advanced disease stages were less likely to be selected for robot-assisted surgery [10].

During a time period of about 3.5 years, in one study, one surgeon performed 528 robot-assisted and 235 open retropubic procedures [8]. The authors suggested that continence recovery was superior with robot-assisted surgery [8]. They illustrated, however, an impressive learning curve with inferiority of robot-assisted surgery during the first 132 cases of the learning curve, narrowly equal results with cases 133–264 and better results thereafter [8]. Similar experiences were also made by others. In one study, the continence recovery rate of robot-assisted surgery reached that of open radical prostatectomy after about 200 cases [11]. These results do not necessarily indicate superiority of robot-assisted surgery. They may

be interpreted as a consequence of the rapidly growing experience of the surgeon frequently performing robot-assisted surgery as well. The skills and the experience of the surgeon are probably of greater importance for outcome than the technique of radical prostatectomy he or she prefers [12, 13]. The need to justify the high investment costs for the robot, the enthusiasm of surgeons for this exciting new technique and the preference of journal editors for positive results may be further hypothetical explanations for the predominance of studies suggesting superiority of robot-assisted surgery. Determining the degree of such possible publication bias reliably will be difficult in this particular clinical setting.

In the scientific literature, there are also data favoring open over robot-assisted surgery. In a population-based study, there was a trend towards an improved continence recovery after open compared with robot-assisted radical prostatectomy that only narrowly failed the significance level [14]. In another population-based study, there was a higher rate of incontinence diagnoses after robot-assisted radical prostatectomy compared with open surgery [15]. Although these studies have been criticized for their methodologies [5], the exclusion of both large population-based analyses [14, 15] revealing contrary findings limits the validity of the results of the above-cited meta-analysis [5].

This study has several limitations. Due to the limited follow-up, the response to questionnaires was incomplete. Furthermore, the proportion of robot-assisted pro-

cedures was still relatively small compared with other studies. Therefore, it was not possible to determine whether super-specialization and greater experience could make a demonstration of differences possible. It is, however, unclear whether such differences – if there were any – would be of clinical significance. Furthermore, the involvement of several surgeons with their own techniques and skills could have made it more difficult to demonstrate differences.

Conclusion

Concerning continence recovery, in this study, there were no detectable differences between robot-assisted and open radical prostatectomy.

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Disclosure Statement

The authors perform radical prostatectomy with the da Vinci® robot (Intuitive Surgical Systems Inc.) and attended the console training offered by Intuitive Surgical Systems Inc.

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