

COMPARATIVE ANALYSIS OF RESULTS BETWEEN ROBOT-ASSISTED AND OPEN RADICAL PROSTATECTOMY

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Summary

We aimed to compare results between patients with early-stage prostate cancer who underwent robot-assisted and open radical prostatectomy. We examined preoperative and postoperative data, early and late complications, and analysed oncological and functional outcomes (continence and erectile function) during follow-up.

We studied the data of 123 patients with localized prostate cancer, operated with nerve-sparing retropubic radical prostatectomy, divided into two groups. Group 1 included 70 patients who underwent robot-assisted radical prostatectomy (RARP). Group 2 included 53 patients, on whom open retropubic radical prostatectomy (RRP) was performed. We compared preoperative data, complications rate, oncological, and functional outcome (continence and erectile function) during the follow-up period.

Operative time was significantly lower in the RRP group. Blood loss and earlier removal of the urinary catheter were significantly lower in the RARP group. The percentage of significant postoperative complications (Clavien-Dindo III-IV) was 0% in the first group and 3% in the second group. During follow-up, the improvement in the functional outcome - continence and erectile function was significantly better in the robot-assisted surgery patients.

There were statistically significant better functional outcomes in patients operated on using the robot-assisted technique. The operating time was shorter in the classic radical prostatectomy. The application of robot-assisted radical prostatectomy may help achieve earlier recovery, as compared to open radical prostatectomy.

Key words: robot-assisted radical prostatectomy, retropubic radical prostatectomy, oncological, functional outcomes.

Introduction

Prostate cancer (Pca) is one of the most common cancer in men in many countries. In Bulgaria, prostate cancer ranks second, with an incidence of 17% frequency. It is the second most common cause of death in men, accounting for 9.3% of malignant diseases [1]. During the last couple of years, there is an increasing tendency in detecting Pca and diagnosing men with early-stage (T1-T2) prostate cancer (64%). Radical prostatectomy is the most often applied radical treatment for patients with prostate cancer and organ-confined disease. Patients and urologists often face a problem choosing

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Received: November 20, 2019

Revision received: December 02, 2019

Accepted: December 02, 2019

which radical prostatectomy technique is better and preferable: open, laparoscopic, or robot-assisted? [2]. The answer to this question is very difficult because of scarce data and the lack of randomized controlled trials. Such trials are difficult to carry out, because urologists and patients have different predilections for optimal techniques, and there is no substantial evidence to allow comparing these techniques. Data is restricted to single limited series, systemic reviews, and metaanalysis.

We aimed to compare preoperative and postoperative results in patients operated with open radical prostatectomy(ORP) and robot-assisted radical prostatectomy (RARP), examine the rates of complications, and analyze the data of functional outcomes (continence and erectile function) during follow-up.

Material and methods

Medical University- Pleven is the first centre for robotic urologic surgery in Bulgaria. There are three generations of da Vinci surgical systems that have been in use for urologic surgery since 2010 at the university hospitals in Pleven. During that period, 305 patients with localized prostate cancer were operated on in the urology clinics of Georgi Stranski University Hospital and St Marina University Hospital. Of these, 70 patients underwent bilateral nerve-sparing robot-assisted radical prostatectomy (group 1) (Figure 1). The operations were performed by one surgeon, using three different models of da Vinci systems – S, Si, and X. Of the patients in group 2, 53 underwent bilateral nerve-sparing open radical prostatectomy. In other 39 of the

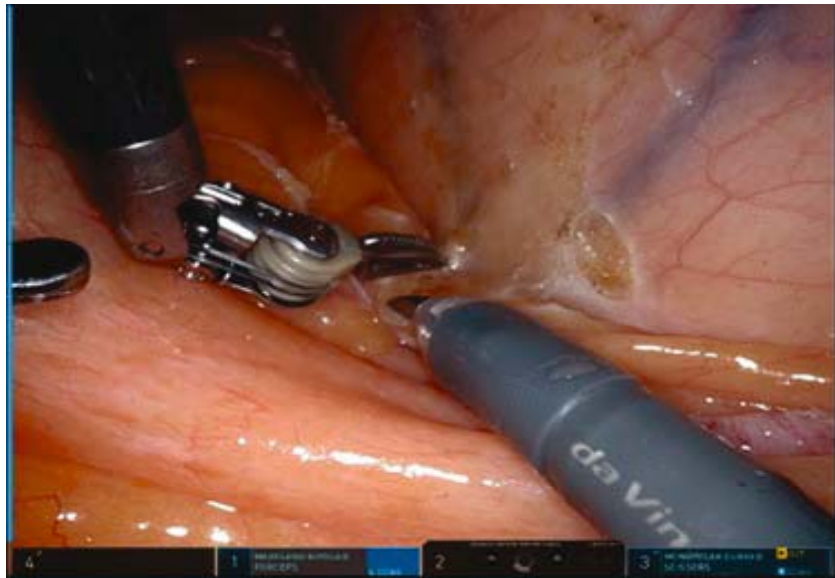


Figure 1. Robotic nerve-sparing bilateral radical prostatectomy. (N. Kolev, personal archives)

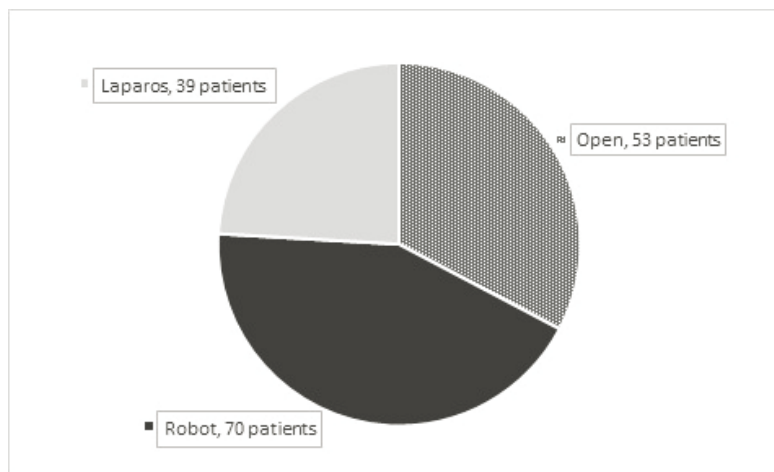


Figure 2. Distribution of patients according to type of operative intervention.

cases, laparoscopic radical prostatectomies were performed (Figure 2).

We compared preoperative, postoperative, and complication rates of the first two groups. Functional outcomes, including the continence rate and erectile function of patients was evaluated in the follow-up period. Continence was defined as no urinary leakage or the need for only one incontinence pad per day. Potency was defined as erections satisfactory for intercourse with or without the use of phosphodiesterase-5 (PDE-5) inhibitors. All patients were requested to complete a non-validated standardized questionnaire.

Results

The preoperative indicators in both groups (PSA, Gleason score, clinical stage) are shown in Table 1.

The only difference detected was that in the prostate volume of the two patient groups,

$p < 0.005$. No conversions were required for ORP in the RARP group procedures. The operative time was 180 min in the RARP group and 130 min in the ORP group ($p < 0.005$). The blood loss was lower in the RARP group 230 ml, as compared to 460ml in the ORP group ($p < 0.005$). Earlier removal of urinary catheters in the RARP group was observed (6 vs. 9 days, $p < 0.005$). The level of minor complications (Clavien-Dindo I-II) was not significantly different in the two groups. In 2 patients from the group with ORP, reoperations were performed because of postoperative hemorrhage. The percentage of significant postoperative complications (Clavien-Dindo III-IV) was 0% in RARP and 3% in ORP, respectively ($p < 0.005$) (Table 2).

The percentages of patients with positive surgical margins, postoperative PSA, and administration of adjuvant therapy in the two groups were comparable. (Table 3).

Improvement in functional outcome during the follow-up period is shown in Table 4. Full

Table 1. Preoperative patient data

Variable	Comparison	Robot	Open	p
Age	Median (range)	61 (50-71)	65 (49-73)	-
cT	cT1c (%)	40	23	
	cT2 (%)	60	65	$p < 0.005$
	cT3 (%)	0	12	
Volume	Median (range)	42 (30-60)	51 (20-85)	$p < 0.005$
PSA preoperative	Median (range)	9.7 (4.15-18)	10.6 (2.5-19.8)	-
Gl. score -biop.	Median (range)	7 (6-7)	7 (6-7)	-
pT	pT2 (%)	58	59	-
	pT3 (%)	42	41	-
	pT4 (%)	0	0	-
Gl. Score - postop.	Median (range)	7 (6-8)	7 (6-7)	-

Table 2. Postoperative patient data

Variable	Comparison	Robot	Open	p
Surgical Time (min)	Median (range)	180 (120-410)	130 (110-230)	$p < 0.005$
Blood Loss (ml)	Median (range)	230 (50-2000)	460 (150-1500)	$p < 0.005$
Catheter (days)	Median (range)	6 (5-10)	9 (8-17)	$p < 0.005$
Overall complication rate, %	Clavien-Dindo I-II	13	16	-
	Clavien-Dindo III-IV	0	3	$p < 0.005$

Table 3. Postoperative oncological data

Variable	Robot (%)	Open (%)	p
Positive margins	23	25	-
PSA >0.2 ng/ml	9	10	-
Adjuvant therapy	14	16	-

Table 4. Postoperative functional results

Variable (questionnaires)	Robot (%)	Open (%)	p
Continence (0-1 pad):			
after 6 months	89	81	p<0.005
after 12months	91	87	p<0.005
Restored erectile function			
after 12months	46	40	p<0.005

restoring of continence was achieved in 91% of the patients in the RARP group and 87% in the second group. Erection was restored in 46% of the RARP patients, and in and 40% of those in the ORP group.

Discussion

During the last few years, two important emerging phenomena are likely to tilt the balance towards minimally invasive surgeries. Those are the stage-down migration of urological malignancies to initial stages of cancer and increased use of robotic surgery systems. The aim of diagnosing and treating the Pca is to find a balance between benefits (reduced morbidity and mortality) and minimizing damage (reducing overdiagnosis and overtreatment).

The presence of positive surgical margins (PSM) is an important prognostic factor after radical treatment of Pca. In the study of Ahlering et al. the percentage of PSM in RARP and RP is 16% and 20%, respectively [3]. In the retrospective study by Smith et al., 200 patients were evaluated with all three techniques [4]. The percentage of PSM was significantly lower in RARP as compared to RP, i.e., 15% vs. 35%, $p < 0.001$. Ficarra et al. evaluated more than 4000 patients operated with both techniques and found no significant difference concerning PSM [5]. In our study, the results were similar: there was no significant difference in PSM between the two operative techniques.

The operative time was significantly longer in the RARP group -180 min. while in the ORP group, the time was clinically significantly lower - 130 min. The overall early preoperative complications were significantly different in the groups, in favor of the RARP group. The reduction in blood loss in the RARP group was confirmed by a reduction in the postoperative change in Hb level.

The length of catheterization was another

variable measured in the present study. The patients in the RARP group had a significantly shorter hospital stay than those in the ORP group. This result probably represents an increase in the precision of anastomosis and improvement regarding urine leakage.

Ficarra found a significant difference in continence restored (93% vs. 89%) in favour of RARP, as well as in erectile function – 76% vs. 52% [6]. In our study, during the 12-month follow-up, a comparison between the two surgical approaches about the improvement in functional outcome of continence and erectile function showed significantly better results in RARP patients (91%/87% than in the ORP group (46%/40%).

Conclusions

The results from our study demonstrated found better functional outcomes in continence and erectile function in patients operated with RARP. The operating time was shorter in classic ORP. Catheter duration, hospital stay, blood loss, and severe operative complications were significantly better in the patients given RARP.

RARP, as compared to ORP, may offer an early short- and long-term recovery, thus making RARP our first operative choice for patients with organ-confined prostate cancer.

Acknowledgements

The study is based on the results of the author’s clinical experience and is not part of a scientific project. No additional funding.

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