

# Impact of Obesity on Early Erectile Function Recovery after Robotic Radical Prostatectomy

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## ABSTRACT

**Background and Objective:** Studies are limited regarding the impact of obesity on early erectile functional outcomes after robotic radical prostatectomy. Our goal was to determine this impact using patient-reported validated questionnaires.

**Methods:** International Index of Erectile Function (IIEF-6) scores were prospectively collected with institutional review board approval, for patients who underwent robotic radical prostatectomy with bilateral nerve sparing from February 2007 to October 2009. The data were categorized into nonobese and obese groups and subsequently into 2 subgroups based on risk for postprostatectomy erectile dysfunction. Low risk is preoperative IIEF-6  $\geq 19$  and high risk is IIEF-6  $< 19$ . The groups and subgroups were compared using chi-square analysis.

**Results:** Of 190 consecutive patients, 67 were excluded for preoperative severe erectile dysfunction (IIEF-6  $< 7$ ), or lack of IIEF-6 scores, or both. There were 69 nonobese patients of which 88% were potent preoperatively and 20% regained potency at 12 months postoperatively. Of 54 obese patients, 85% were potent preoperatively and 25% at 12 months. There was no difference in erectile function recovery rates between the groups ( $P=0.755$ ). In both groups, patients with low risk of postoperative erectile dysfunction had statistically similar postoperative mean IIEF-6 scores at 6 and 12 months ( $P=0.580$  and  $P=0.389$ , respectively), and no difference in erectile function recovery rates existed at 12 months ( $P=0.735$ ).

**Conclusion:** Obesity has no major contribution to the rate of early erectile function recovery after robotic radical prostatectomy. Preoperative erectile function remains the

determining factor in postradical prostatectomy erectile dysfunction.

**Key Words:** Radical prostatectomy, Sexual function recovery, Prostate cancer, Prostatectomy outcomes.

## INTRODUCTION

Oncologic control, continence, and sexual functions (SF) are outcomes monitored after treatment for localized prostate cancer (CaP). Most of the treatment available for CaP will however affect sexual quality of life. Often, men with a healthy sexual life will choose the treatment method with less effect on their sexual quality of life (QOL) for fear of feeling less masculine, because the value sexual potency holds in patients' lives vary.<sup>1-3</sup> Comorbidities, such as obesity, hypertension, hyperlipidemia, diabetes, and coronary artery disease can affect SF preoperatively, and SF recovery postradical prostatectomy (RP) could be subpar due to preoperatively impaired erectile hemodynamics, significantly affecting QOL.

Obesity has been associated with increased risk of erectile dysfunction (ED) by 30% to 90% due to its association with metabolic syndrome (MS) recently associated with male hypogonadism that leads to severe ED.<sup>4-6</sup> Several researchers have investigated the impact of obesity on health-related quality of life (HRQOL) after RP and reported that while obesity is generally correlated to lower pre- and postsurgical HRQOL, the recovery rate of HRQOL in obese men is similar to that of normal weight men.<sup>7,8</sup> In contrast, other studies have also reported adverse effects on post open or laparoscopic radical prostatectomy outcomes.<sup>9,10</sup> However, the majority of these HRQOL studies heavily investigate the impact of obesity on urinary and bowel function recovery with less emphasis on erectile function recovery. In addition, the definitions of potency used in the studies are inconsistent, because the methods of measuring potency vary.

This study compares the impact of obesity on the recovery of erectile function while considering preoperative potency and using validated questionnaires, such as the International Index of Erectile Function (Questions 1-5

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and 15, also called IIEF-6) for an objective measure of erectile function.<sup>11,12</sup>

## MATERIALS AND METHODS

Institutional review board approval was obtained for a prospectively collected database of patients who underwent robotic-assisted laparoscopic radical prostatectomy (RALP) with bilateral nerve sparing for localized prostate cancer from February 2007 to October 2009. All procedures were performed by a single surgeon (JCJ) whose preferred method of radical prostatectomy is with robotic technology.

JCJ is a fellowship-trained urologic oncologist with experience in open, conventional, and robotic radical prostatectomy. He is currently the chief of robotic surgery at a tertiary institution in Huntington, West Virginia. He has performed over 1000 robotic cases, including over 700 robotic radical prostatectomy cases with unilateral and/or bilateral nerve sparing, depending on disease involvement. The antegrade method was used for the proximal dissection while the apex and distal one-third was done with the retrograde method.

Data collected included patients' demographics, PSA, prostate volume, prostate biopsy results, perioperative variables, and pre- and postoperative IIEF-6 scores at 3, 6, 9, and 12 months. All IIEF-6 questionnaires were provided to the patients during check-in by the secretary or nurse at the registration desk. These forms were to be completed by the patients without assistance and returned to the nurse before leaving the clinic. These questionnaires became part of patient's medical records. The scores were then collected and input into a database according to postoperative months. An IIEF-6 score from a prior visit was carried over to the next visit unless a new score existed. Patients without preoperative IIEF-6 scores and/or with severe preoperative erectile dysfunction (ED) were excluded from the study. Erectile functions were defined as severe ED (IIEF-6 <7), moderate ED, (7-15) mild ED, (16-21) and potent. (22-30) We designated patients with no or mild ED as "potent" and those with moderate or severe ED as "impotent," with or without erectile aids. The data were stratified by body mass index (BMI) and categorized into nonobese (BMI <30) and obese (BMI >30) groups. Each group was subsequently divided into 2 subgroups by risk of postprostatectomy ED. Low risk is defined as preoperative IIEF-6 ≥19 and high risk is preoperative IIEF-6 <19. Statistical analyses to compare both groups and subgroups were performed using

Medcalc software for Windows version 11.1.1. All P values were 2-tailed with a 95% confidence interval.

## RESULTS

A total of 123 patients are included in the cohort comprising of 69 nonobese and 54 obese men. Both groups were similar in terms of patient demographics with the exception of BMI (**Table 1**). The mean BMI was 26.5kg/m<sup>2</sup> and 32.9kg/m<sup>2</sup>, respectively (P<0.0001). Erectile function rehabilitation program with low doses of phosphodiesterase-5 inhibitors (PDE5I) were recommended for all patients after RALP, if they were preoperatively sexually active with or without erectile aid and not contraindicated. They received samples and prescriptions for these pharmacological agents to take routinely and could be discontinued if the patient no longer desired them. Overall, 72% of men in the cohort had no ED preoperatively, while 15% had mild ED and 13% moderate ED (overall preoperative potency=87.0%). Overall, the 12-month postoperative potency rate among those who responded to the IIEF-6 questionnaire at that period was 22.5%. This percentage improved to 27.1% if data were analyzed on preoperatively potent patients only. The distribution of the recovery rates by postoperative period over 12 months is shown in **Table 2**.

The mean IIEF-6 scores recorded for each subgroup were statistically similar at every postoperative period analyzed for patients of all ages and for patients ≤60 years old (**Table 3**). The percentage of patients who were potent at 12 months was statistically similar in both groups (**Table 2, 4**) (P=0.755), while the majority of the patients remained with postprostatectomy ED. In low-risk patients, there was no significant difference in potency rate between both groups at 12 months (P=0.735). This rate improved from 12.8% at 6 months to 24.4% at 12 months in the nonobese patients comparable to 14.3% at 6 months to 31.0% at 12 months in the obese patients, with no statistically significant difference in rates at each postoperative period. In patients with a high-risk for postprostatectomy ED, the recovery rate remained similar between the groups. As expected, these patients remained relatively impotent at 12 months.

Since age plays a significant role in potency rates and erectile hemodynamic changes, the data were re-analyzed for preoperative potent men 60 years and younger. The erectile function recovery rates as expected were higher in patients ≤60 years old. Twenty-eight percent of the nonobese low-risk patients were potent at 12 months, statistically similar to 30% for the obese low-risk patients

**Table 1.**

Clinical and Demographic Data of 123 Patients in This Cohort Treated with Robotic-Assisted Laparoscopic Radical Prostatectomy

	Nonobese (BMI <30; n=69)	Obese (BMI >30; n=54)	<sup>b</sup> P
Mean age, years (range)	61.1 (41–83)	60.3 (46–74)	0.536
BMI, kg/m <sup>2</sup> (SD)	26.5 (2.1)	32.9 (2.5)	<0.0001
Mean preop IIEF-6 (SD)	25 (6.6)	24 (6.7)	0.407
No ED, n (%)	52 (75.4)	36 (66.7)	0.390
Mild ED, n (%)	9 (13.0)	10 (18.5)	0.557
Potent, n (%)	61 (88.4)	46 (85.2)	0.800
Moderate ED, n (%)	8 (11.6)	8 (14.8)	0.800
Comorbidities			
Hypertension, n (%)	35 (50.7)	27 (50.0)	0.917
Diabetes, n (%)	5 (7.2)	6 (11.1)	0.664
Dyslipidemia, n (%)	22 (31.9)	8 (14.8)	0.048
CAD, n (%)	12 (17.4)	5 (9.3)	0.304

<sup>a</sup>CAD=coronary artery disease; ED=erectile dysfunction; SD=standard deviation.<sup>b</sup>Pearson's  $\chi^2$ , P-values are 2-sided, and <0.05 is considered significant.**Table 2.**

Erectile Function Recovery from Patient-Reported IIEF-6 Questionnaires Over a 12-Month Postsurgery Period

Postop Period	Baseline	3 Months	6 Months	9 Months	12 Months
Nonobese <sup>a</sup>					
N	69	49	56	55	49
No ED, n (%)	52 (75.4)	2 (4.1)	5 (8.9)	3 (5.5)	6 (12.2)
Mild ED, n (%)	9 (13.0)	1 (2.1)	1 (1.8)	6 (10.9)	4 (8.2)
Potent, n (%)	61 (88.4)	3 (6.1)	6 (10.7)	9 (16.4)	10 (20.4)
Moderate ED, n (%)	8 (11.6)	6 (12.2)	12 (21.4)	10 (18.2)	14 (28.6)
Severe ED, n (%)	0 (0.0)	40 (81.6)	38 (67.9)	36 (65.5)	25 (51.2)
Obese					
N	54	36	46	45	40
No ED, n (%)	36 (66.7)	1 (2.8)	3 (8.3)	3 (6.6)	5 (12.5)
Mild ED, n (%)	10 (18.5)	0 (0.0)	3 (8.3)	3 (6.6)	5 (12.5)
Potent, n (%)	46 (85.2)	1 (2.8)	5 (10.9)	6 (13.3)	10 (25.0)
Moderate ED, n (%)	8 (14.8)	5 (13.9)	7 (15.2)	10 (22.2)	9 (20.0)
Severe ED, n (%)	0 (0.0)	30 (83.3)	33 (71.7)	29 (64.4)	21 (52.5)

<sup>a</sup>ED=erectile dysfunction.

(P=0.854). Majority of the high-risk patients remained impotent but more importantly, there was no difference in the erectile function recovery rate between the groups at 12 months.

## DISCUSSION

Obesity has been associated with poor recovery after a surgical procedure, starting with poor surgical wound healing to func-

**Table 3.**  
Mean IIEF-6 Scores by Preoperative Risk of Postprostatectomy Erectile Dysfunction

	Low Risk			High Risk		
	Nonobese	Obese	P <sup>a</sup>	Nonobese	Obese	P <sup>a</sup>
	Mean IIEF-6 (range)	Mean IIEF-6 (range)		Mean IIEF-6 (range)	Mean IIEF-6 (range)	
<b>All Ages</b>						
Baseline	28 (19–30)	27 (20–30)	0.153	13 (7–17)	14 (8–17)	0.476
3 months	5 (1–27)	4 (1–24)	0.459	2 (1–7)	3 (1–9)	0.509
6 months	7 (1–28)	6 (1–30)	0.580	5 (1–13)	5 (1–16)	1.000
9 months	7 (1–24)	7 (1–30)	1.000	4 (1–9)	5 (1–16)	0.675
12 months	9 (1–30)	11 (1–30)	0.389	5 (1–12)	5 (1–16)	1.000
<b>≤60 Years Old</b>						
Baseline	28 (20–30)	28 (21–30)	1.000	11 (7–17)	13 (9–17)	0.489
3 months	5 (1–22)	5 (1–24)	1.000	1 (1)	3 (1–6)	0.448
6 months	6 (1–22)	7 (1–30)	0.661	6 (2–13)	6 (1–16)	1.000
9 months	7 (1–22)	8 (1–30)	0.677	5 (2–9)	6 (1–16)	0.800
12 months	10 (1–30)	11 (1–30)	0.724	8 (3–12)	5 (1–16)	0.448

<sup>a</sup>Student *t* test analysis, P-values <0.05 are considered significant, and all values are 2-sided.

**Table 4.**  
Potency Percentages at 6 and 12 Months Post-RALP by Risk of Post-Prostatectomy Erectile Dysfunction

Potency	All Patients			Low-Risk			High-Risk		
	Non-Obese 6mos/12mos	Obese 6mos/12mos	P 6mos/12mos	Non-Obese 6mos/12mos	Obese 6mos/12mos	P 6mos/12mos	Non-Obese 6mos/12mos	Obese 6mos/12mos	P 6mos/12mos
<b>All Ages</b>									
No ED, %	8.9/12.2	6.5/12.5	0.937/0.779	10.6/14.6	8.6/17.2	0.941/0.969			
Mild ED, %	1.8/8.2	6.5/12.5	0.481/0.752	2.1/9.8	5.7/13.8	0.791/0.891	0.0/0.0	9.1/9.1	0.919/0.870
Moderate ED, %	21.4/28.6	15.2/22.5	0.586/0.682	19.1/26.8	11.4/20.7	0.523/0.762	33.3/37.5	27.3/27.3	0.842/0.978
Severe ED, %	67.9/51.0	71.7/52.5	0.842/0.942	68.1/48.8	74.3/48.3	0.715/0.840	66.7/37.5	63.6/63.6	0.744/0.510
Potent, %	10.7/20.4	13.0/25.0	0.960/0.793	12.8/24.4	14.3/31.00	0.896/0.735	0.0/0.0	9.1/9.1	0.919/0.870
Impotent, %	89.3/79.6	87.0/75.0	0.526/0.793	87.2/75.6	85.7/69.0	0.896/0.735	100/100	90.9/90.9	0.919/0.870
<b>Age ≤60 years</b>									
No ED, %	6.5/10.7	10.3/14.8	0.948/0.959	7.1/12.0	13.6/20.0	0.775/0.748			
Mild ED, %	3.2/14.3	3.4/11.1	0.496/0.961	3.6/16.0	0.0/10.0	0.909/0.882	0.0/0.0	14.3/14.3	0.646/0.646
Moderate ED, %	25.8/39.3	20.7/22.2	0.872/0.280	25.0/36.0	18.2/25.0	0.816/0.640	33.3/66.7	28.6/14.3	0.546/0.366
Severe ED, %	64.5/35.7	65.5/51.9	0.850/0.348	64.3/36.0	68.2/45.0	0.991/0.760	66.7/33.3	57.1/71.4	0.674/0.673
Potent, %	9.7/25.0	13.8/25.9	0.927/0.819	10.7/28.0	13.6/30.0	0.900/0.854	0.0/0.0	14.3/14.3	0.646/0.646
Impotent, %	90.3/75.0	86.2/74.1	0.927/0.816	89.3/72.0	86.4/70.0	0.900/0.854	100/100	85.7/85.7	0.646/0.646

tional outcomes. It has also been associated with erectile dysfunction by way of metabolic syndrome and low testosterone levels, and as such erectile function recovery in the obese patient continues to be an area of interest with HRQOL studies.

The impact of obesity on the outcomes of open, laparoscopic, or robotic radical prostatectomy has been extensively investigated but with inconsistent conclusions. For instance, some studies have reported no

effect of obesity on potency after open and/or robotic radical prostatectomy<sup>13,14</sup> while others reported adverse effects.<sup>9,10</sup> It is important to note that in all these HRQOL studies, the definitions of potency and how it is measured, subjectively or objectively, vary to a great extent. This leads to the inconsistent potency rates reported for each surgical approach investigated. In this study, we defined potency as IIEF-6  $\geq 16$  with or without the use of pharmacological erectile aid. Our overall potency in patients of all ages with available IIEF-6 score at 12 months postoperatively was 23%, 25% in patients that are  $\leq 60$  years old. Although this potency rate is low, it is within the range reported for 12-month follow-up periods in the literature. Significant potency recovery may still be possible at 36 to 40 months post-surgery.<sup>15</sup>

The objective of this study was to investigate the impact of obesity on erectile function recovery or potency rate at postoperative periods. According to our analysis, there is no significant difference in erectile function recovery between nonobese and obese patients (all  $P > 0.05$ ). The preoperative potency in each group was similar (**Table 1**), thus eliminating any bias that existed preoperatively. We also divided the patients into 2 groups based on risk for postprostatectomy erectile dysfunction, and the rates of erectile function recovery remained similar between the nonobese and obese patients at every postoperative period up to 12 months (all  $P > 0.05$ ). Although we arrived at this conclusion with data from patients of all ages, further analysis of data from younger patients ( $\leq 60$  years old) did not alter the conclusion.

There are a few limitations in this study that should be mentioned. The low attrition rate could be a significant bias. The actual response rate for the 12-month IIEF-6 questionnaire was 54% in the nonobese group and 51% in the obese group. Bringing forward IIEF-6 scores from prior visits increased the response rate to 71% and 74%, respectively. This practice of “worse case scenario” IIEF-6 scores, the majority being impotent, contributes to the low overall potency rate in our study. The low number of patients at each postoperative period could also lead to a low statistical power to detect any significant difference between the groups. The IIEF-6 questionnaires could be mailed out but there were concerns of recalling biases associated with these validated questionnaires.

Comorbidities mentioned in **Table 1** could have an impact on erectile function recovery as well. The ideal test to investigate the impact of obesity in this study

would be a multivariate regression analysis to adjust for the covariates. Another limitation is our inability to determine if the IIEF-6 scores reported are with or without PDE5I; therefore, it is possible that differences in erectile function recovery exist between the groups if analyzing IIEF-6 scores without PDE5I usage. Lastly, since there is documented evidence of erectile function recovery up to 40 months postoperatively,<sup>15</sup> additional studies with prolonged follow-up periods would be invaluable.

## CONCLUSION

The rate of early erectile function recovery after robotic-assisted laparoscopic radical prostatectomy for localized prostate cancer is similar in obese and nonobese patients, irrespective of preoperative potency. Preoperative potency status remains a higher risk factor for postprostatectomy erectile dysfunction than obesity does.

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