

# Impact of Radical Prostatectomy on Urinary Incontinence, Erectile Dysfunction and General Quality of Life

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## Abstract

The aims of this study were to evaluate the impact of radical retropubic prostatectomy on patient's quality of life. Patients undergoing radical retropubic prostatectomy were followed for six months after surgery. We used quality of life questionnaires to study specific urinary symptoms and general health. WHOQOL-Bref (World Health Organization for Quality of Life) questionnaire was used to evaluate general health aspects, ICIQ-SF (International Consultation on Incontinence Questionnaire-Short Form), OABq (Overactive Bladder) and IPSS (International Prostatic Symptom Score) to evaluate incontinence and overactive bladder symptoms and Male Sexual Quotient to assess postoperative sexual dysfunctions. The questionnaires were scheduled before surgery, one, three and six months after surgery. Regarding the OAB-q scores, I-PSS and WHOQOL-Bref (physical, psychological, environmental, general, Question 1 and Question 2), symptoms worsened after one month if compared to preoperative symptoms. After six months, the WHOQOL's social domain, the ICIQ-SF and QS-M scores remained worse if compared to preoperative evaluation. The incidence of sexual dysfunctions after six months was 0.83. In conclusion, urinary incontinence affects patient's quality of life with gradual recovery after six months postoperatively. The social domain was the most common aspect affected by urinary incontinence. Our sexual dysfunction incidence was higher than other studies and this fact could be explained by many surgeries having been done by residents.

## Keywords

Prostate Cancer, Prostatectomy, Urinary Incontinence, Erectile Dysfunction, General Quality of

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**Life**

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## 1. Introduction

Prostate cancer is the second most common type of tumor in Brazil and the sixth most common in the world. This disease accounts for about 10% of all cancers cases and its incidence rate is about six times higher in developed countries than in developing countries [1] [2]. The risk of prostate cancer is linked to aging, being directly proportional to the age of man [3]-[5]. The development of the prostate-specific antigen test (PSA) greatly contributed to earlier detections of prostate cancer cases. However, there is a dilemma in its use, as the test does not guarantee a reduction in mortality rates and the treatment may alter the quality of life of these patients [6]-[8]. Nowadays, patients diagnosed with localized prostate cancer have only the following treatment options: active surveillance, external beam radiotherapy, brachytherapy, and radical prostatectomy [9]. Radical prostatectomy is considered as a safe and effective treatment for localized prostate cancer [10]. The complications of radical prostatectomy are well established and it is estimated that post-prostatectomy urinary incontinence (PPUI) occurs with 5% to 25% of patients and erectile dysfunction (ED) with 16% to 86% of patients, even if techniques for nerve bundles preservation are adopted during the surgical procedure [11]-[13].

The PPUI has a strong negative impact on these patients' quality of life. It might be temporary, appearing in the first weeks immediately after the surgery and with progressive and spontaneous improvement after that. In case PPUI persists for longer than six months after surgery, the disease has a lower rate of spontaneous healing [14]. An ED caused by radical prostatectomy is related to injury of the neurovascular bundles of the corpora cavernosa. ED may also be temporary and it is estimated that the sexual function recovery period may last 18 months. Fortunately, patients under 65 years of age with no prior complaints of ED are better candidates to retain good erectile function, if submitted to surgical approaches with preservation of the neurovascular bundles [15]. Patients who underwent radical prostatectomy were evaluated by one-year post surgery and most of them stated to be satisfied with the results, despite the inherent morbidity of the surgery [16].

Quality of life was a vital concern for patients who underwent therapeutic intervention for prostate diseases [17]. The term quality of life needs the appreciation of broader parameters, rather than only post operative symptoms, decrease in mortality and increase of life expectancy. Therefore, new approaches to assess the patients' perception of their illness and the needs and preferences for treatment, as well as the psychosocial aspect individually, beyond the traditional focus on the evolution of the disease, should be considered [18]-[20]. So far, Inoue *et al.* are the few authors who have studied the impact of radical prostatectomy in men (Japanese population) for a five-year period after the surgery. However, data from Japanese men can hardly be extrapolated to other populations, because, in agreement with O'Boyle, quality of life is highly influenced by culture [21]-[29]. On the other hand, Abouassaly *et al.* state quality of life changes after radical prostatectomy, due to complications of the treatment [30]-[33], although, up to now, there are few articles that assess the impact of radical prostatectomy on quality of life. This being the case, the impact of RRP on the overall quality of life and quality of life needs to be fully understood. The WHOQOL-Bref is the abbreviated version of the WHOQOL-100, detailed instrument, with 100 questions divided into six different topics, covering various questions related to quality of life. The WHOQOL-Bref is a reduced version of the WHOQOL-100, composed of four domains. All forms of the questionnaire are correlated, so the WHOQOL-Bref version can be converted to the original version of the questionnaire, the WHOQOL-100 [34]. The WHOQOL-Bref has been increasingly used to measure quality of life, but it has never been used to assess quality of life in patients who undergo radical prostatectomy. Among the main factors that lead to a poor quality of life in these patients, urinary incontinence and erectile dysfunction should be highlighted. Therefore, in this study, using the WHOQOL-Bref questionnaires, ICIQ-SF, OAB-q, I-PSS and QS-M, we aim to evaluate the impact of voiding dysfunction and erectile dysfunction on the overall radical prostatectomy patients' quality of life for a six-month period after the surgical procedure.

## 2. Patients and Methods

### 2.1. Patients

Seventy-two patients with adenocarcinoma of the prostate who underwent radical retropubic prostatectomy between January 2008 and December 2009 were included and evaluated in this study using questionnaires in

Urology, Escola Paulista de Medicina-UNIFESP Hospital.

Patients who were unable to complete the questionnaire due to cognitive impairments with inability to answer the questions asked, with cognitive, (psychiatric disease, senile dementia, Alzheimer's disease, etc.) and those who have failed to understand and clearly answer the questionnaires or were absent to the scheduled postoperative returns at the outpatient unit at UNIFESP, where they were followed-up after surgery.

## 2.2. Methods

All patients were assessed by questionnaires. The questionnaires used were WHOQOL-Bref, ICIQ-SF, OAB-q, I-PSS, QS-M (attachments).

Patients were asked to complete the same questionnaire at four different points in time: preoperative, one, three and six months postoperatively. The QS-M was not applied in the first month after surgery, a period in which most of these patients have not regained sexual activity.

The first interview (preoperative) was conducted in the infirmary of the Discipline of Urology, Escola Paulista de Medicina/UNIFESP, located at Hospital São Paulo, upon admission to radical prostatectomy. The post-operative interviews were conducted at the Voiding Dysfunction of the Discipline of Urology, Escola Paulista de Medicina/UNIFESP.

All the patients were interviewed by the same researcher during the data collection period.

The WHOQOL Bref consists of twenty six (26) questions. Two (02) of them assess general quality of life, and the other twenty-four (24) raise issues related to four domains: physical, psychological, social relationships and environment. These instruments have been translated to Brazilian Portuguese and validated to the Brazilian population by FLECK *et al.* 2000 [34].

The ICIQ-SF (International Consultation on Incontinence Questionnaire-Short Form) is a questionnaire that assesses the impact of urinary incontinence on the patients' quality of life and it also quantifies the magnitude of their urinary incontinence.

OAB-q (Overactive Bladder questionnaire): This questionnaire comprises eight questions that assess symptoms associated with overactive bladder.

I-PSS (International Prostatic Symptom Score): This questionnaire assesses symptoms of the lower urinary tract. Its last question is concerned to quality of life.

QS-M (Male Sexual Quotient): evaluate male sexual function in different ways, including sexual desire and interest, self-confidence, the quality of erection, ejaculation control, the ability to achieve orgasm and sexual satisfaction obtained by the man and given to his partner.

## 2.3. Statistical Analysis

Qualitative variables were summarized as absolute frequencies and percentages. Quantitative variables were described as means and standard deviations when normality assumption was considered appropriate or as median and interquartile range (IQR) otherwise. Changes related to urinary symptoms and loss of urine have been described by bar graphs over time. Scores obtained by the instruments OAB-q, ICIQ-SF, PSS-I, QS-M and WHOQOL-Bref were illustrated by graphs of the mean profiles obtained with 95% of confidence intervals. For comparisons between different groups and time-points, we used generalized linear models taking into account the dependence between measurements performed in the same patient.

Scores obtained by the OAB-q, ICIQ-SF, I-PSS, QS-M and WHOQOL-Bref testing were correlated using the Spearman correlation coefficients.

All analyses were performed with SPSS software (version 17.0), with a significance level of 5%.

## 3. Results

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

### 3.1. Patients' Characteristics

We evaluated 72 patients with a mean age of 62 years of age (SD = 7.7). The average PSA value was 7.4 ng/ml

(SD = 3.7). Patients' demographic characteristics and clinical background are shown in **Table 1**. Their pathological staging is described in **Table 2**. Next, we describe the scores obtained from the patients in different subsections. In the last one, we show the correlated data.

### 3.2. Quality of Life versus Urinary Symptoms

Using the I-PSS questionnaire, patients were asked how they would feel if kept their current urinary condition for the rest of their lifetime. In the preoperative period, 80.6% of patients rated their quality of life regarding urinary symptoms as "Good". This percentage dropped to 47.2% one month after the surgery. Perceptions of urinary symptoms scores improved three and six months after the surgery (**Table 3**).

**Table 1.** Demographic and background data.

Variables	n (%)
Marital Status	
Married	60 (83.3%)
Single	1.0 (1.4%)
Divorced/separated	4.0 (5.6%)
Widower	7.0 (9.7%)
Education	
Illiterate	7.0 (9.7%)
Not Complete Elementary	48 (66.7%)
Not Complete Intermediate	12 (16.7%)
Not Complete High School	1.0 (1.4%)
College (not complete/complete)	4.0 (5.6%)
Alcoholism	2.0 (2.8%)
Smoking	12 (16.7%)
Smoking Time <sup>§</sup>	25 (18; 35)
Systolic hipertension	45 (62.5%)
Others diseases	12 (16.7%)
Sexual Activity	66 (91.7%)

\*\*Medium (standard deviation); <sup>§</sup>Median (IIQ).

**Table 2.** Distribution of patients according to pathological staging.

Staging	n (%)
pt1a	1.0 (1.4%)
pt2a	6.0 (8.6%)
pt2b	4.0 (5.7%)
pt2c	1.0 (1.4%)
pt2c	52 (74.3%)
pt3a	8 (11.1)
Total	72 (100.0%)

**Table 3.** Quality of life due to urinary symptoms.

Characteristics	Time evaluation			
	Pre	1 month	3 months	6 months
Good (happy, well, overall good and regular)	58 (80.6%)	34 (47.2%)	45 (62.5%)	55 (76.4%)
Poor (discomfort, unfortunate and terrible)	14 (19.4%)	38 (52.8%)	27 (37.5%)	17 (23.6%)
Total	72 (100.0%)	72 (100.0%)	72 (100.0%)	72 (100.0%)
Comparations	P			
1 month × pré	<0.001*			
3 months × pré	0.016*			
6 meses × pré	0.525			
3 months × 1 month	0.065			
6 months × 1 month	<0.001*			
6 months × 3 months	0.083*			

\*Significant difference. P-value obtained from the chi-square test.

### 3.3. Urinary Incontinence Assessed by the ICIQ-SF Instrument

The answers to the question “When was the last time you lost urine without meaning it” are represented in **Table 4**. It is noteworthy that, in the pre-surgery questionnaire, 75.0% of the patients stated that had never lost urine. One month after surgery, only 11.1% of patients remained stating that had never lost urine, while 69.4% of patients reported “I lose when I cough or sneeze”. At the first post-surgical time point, three months, the most frequently answer was “I miss when I’m doing physical activities”, mentioned by 65.3% of patients. This condition was also reported at the six-month time-point by 53.7% of patients.

### 3.4. Behavior Assessment Scores

Behavior scores were obtained with the instruments OAB-q, ICIQ-SF, PSS-I, QS-M and WHOQOL and are represented in the graphs of average profiles 1-11. Comparisons between scores obtained over time-points are shown in **Table 5**.

On average, the OAB-q score (**Figure 1(a)**) shows a significant increase in the first month after surgery, followed by a decrease in the following months. Noteworthy to mention that the score values are very similar at time-points preoperative compared to six-month postoperative and quite distinct at time-points preoperative compared to one-month postoperative.

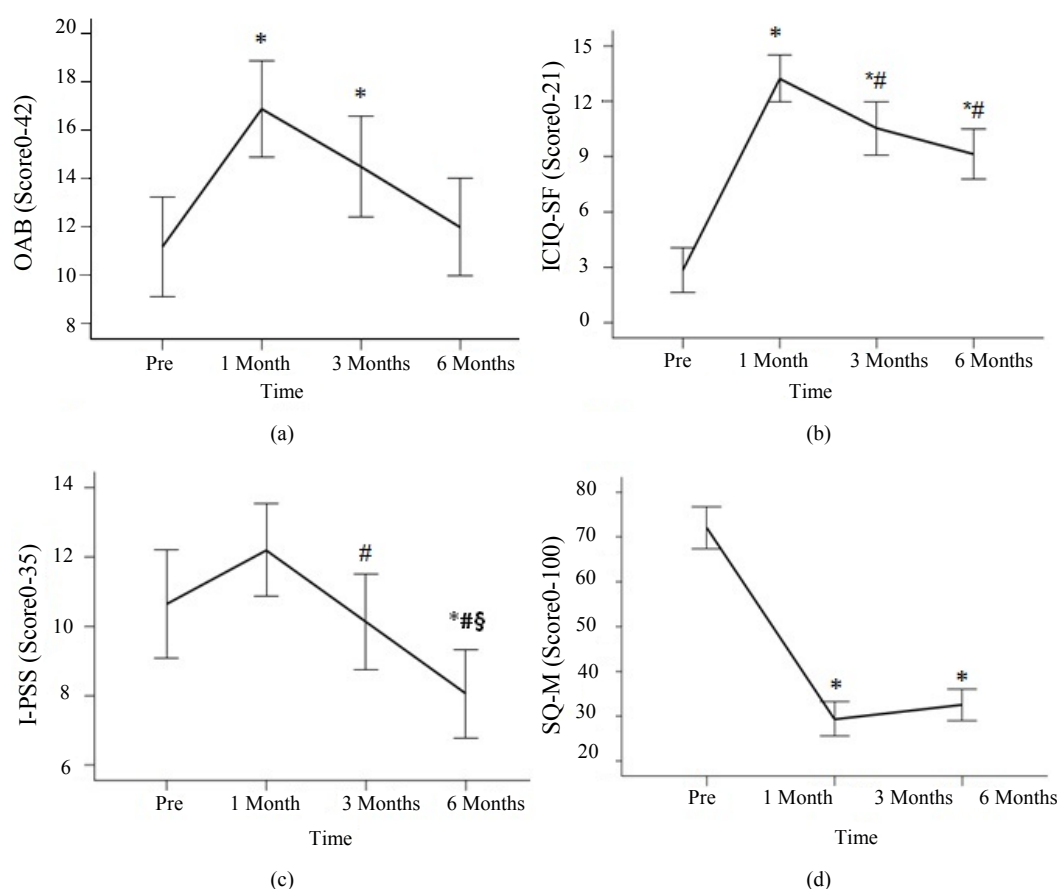
Regarding the ICIQ-SF score (**Figure 1(b)**), there is a significant increase in the first month and a gradual reduction throughout the postoperative period. Nevertheless, this reduction is not enough to regain the medium values observed in the preoperative period. As for the OAB score, score values variability was high among different patients.

In the I-PSS scores (**Figure 1(c)**), highest averages were observed one month after surgery, followed by a significant decrease at the postoperative time-points (one, three and six months). Curiously, at the six-month time-point scores obtained were lower than those obtained for the preoperative baseline.

In the QS-M score (**Figure 1(d)**), we observed a significant decrease in the scores only at the three-month time-point, decrease also observed after 6 months of the surgery. All postoperatively score values were significantly lower than the preoperative ones.

When considering the physical domain of the WHOQOL (**Figure 2(a)**), there is a significant decrease between the preoperative period and the first month measures. Between the first and third month there is a significant increase in these values, followed by stabilization of the values, so that the values obtained at 6 months were similar to those obtained before surgery.

Regarding the psychological domain (**Figure 2(b)**), we find a significant decrease in the values in one month after surgery, followed by an increase between one and six months evaluations.



**Figure 1.** Average profile and 95% of confidence intervals for OAB scores (a); ICIQ-SF (b); I-PSS (C); QS-M (d); \*P-value < 0.05 when compared with the pre moment. #P-value < 0.05 when compared to one (01) month. §P-value < 0.05 when compared to three (03) months. OAB, overactive bladder; ICIQ-SF, international consultation on incontinence questionnaire; SQ-M, sexual quotient-male.

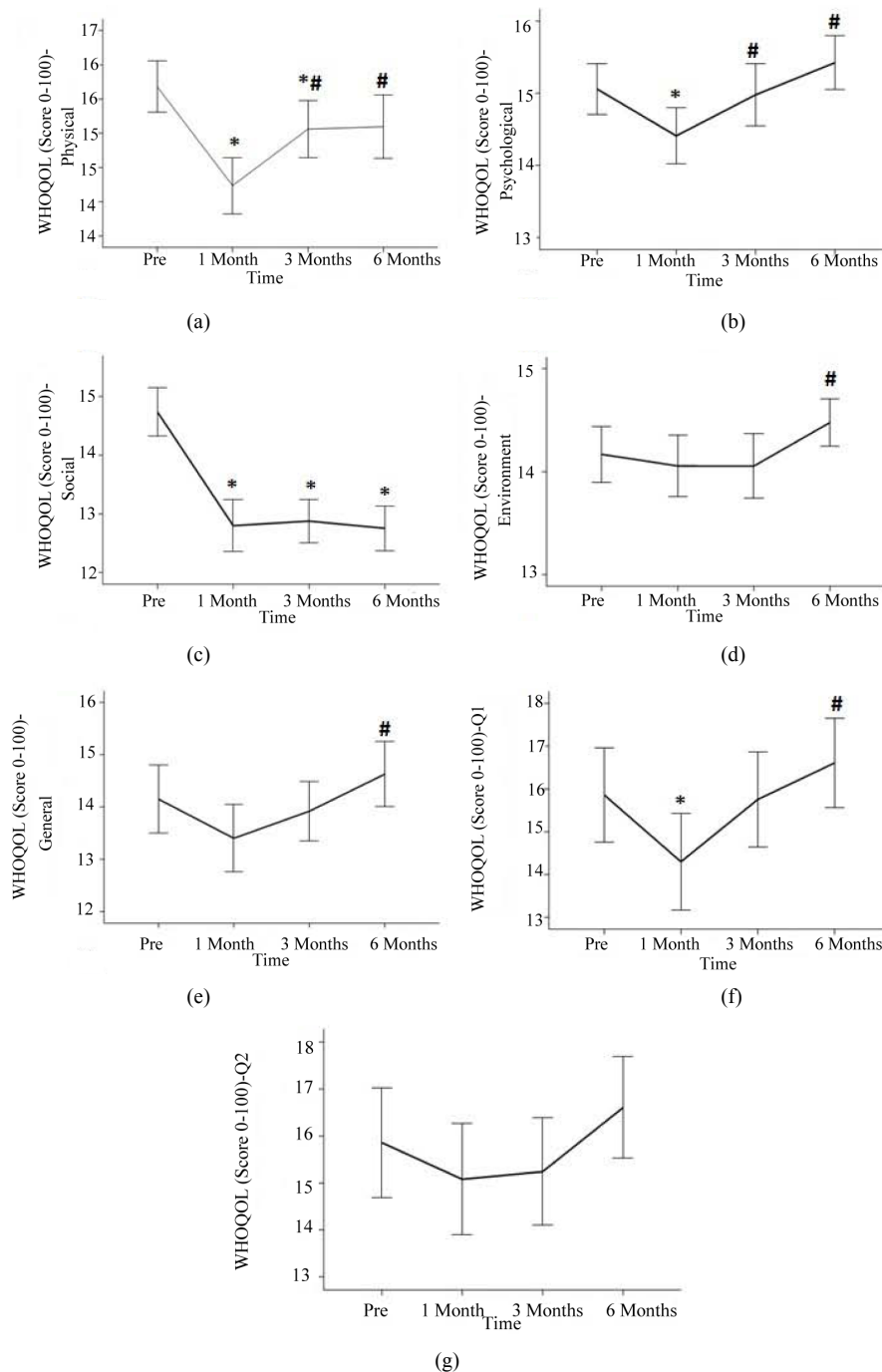
**Table 4.** Responses to the question: When you lose urine?

Characteristics	Time Avaluation			
	Pre	1 month	3 months	6 months
Never	54 (75.0%)	8.0 (11.1%)	11 (15.3%)	13 (19.4%)
Lost before reaching the bathroom	15 (20.8%)	28 (38.9%)	18 (25.4%)	12 (17.9%)
I lose when I cough or sneeze	1.0 (1.4%)	50 (69.4%)	43 (59.7%)	34 (50.7%)
I lose when I'm sleeping	2.0 (2.8%)	31 (43.1%)	14 (19.4%)	10 (14.9%)
I lose when I'm doing physical activities	2.0 (2.8%)	47 (65.3%)	47 (65.3%)	36 (53.7%)
Lose when finished urinating and I'm wearing	6.0 (8.3%)	26 (36.1%)	21 (29.2%)	10 (14.9%)
Lost without obvious reason	3.0 (4.2%)	29 (40.3%)	18 (25.0%)	22 (32.8%)
I lose all the time	2.0 (2.8%)	13 (18.1%)	5.0 (6.9%)	3.0 (4.5%)

Described percentages of total responses to each statement in each instant of time.

When the social field is considered (**Figure 2(c)**), there is a significant decrease in the mean values after the first month, with no significant changes in the following evaluations. After 6 months, the WHOQOL social domain score is significantly lower than that observed before surgery.

In the environment domain (**Figure 2(d)**), there is a decrease in values obtained in the postoperative time-



**Figure 2.** Average profile and 95% of confidence intervals for the WHOQOL score-physical domains (a); Psychology (b); social (c); environment (d); general (e); WHOQOL-Q1 (f); WHOQOL-Q2 (g). \*P-value < 0.05 when compared with the pre. #P-value < 0.05 when compared to one (01) month. §P-value < 0.05 when compared to three (03) months. WHOQOL, World Health Organization for Quality of Life. Q1, Question 1; Q2, Question 2.

point, followed by significant increases between the three and sixth months. Last collected values are similar to those obtained before surgery.

As to the overall score WHOQOL (**Figure 2(d)**), there is no significant decrease in the average value during the first month after surgery, and a significant increase at the six-month time-point, so that the score values obtained at the last collection were significantly higher than those observed in the first month of monitoring.

**Table 5.** Comparison of scores over time.

Score	Time instant			
	Pre	1 month	3 months	6 months
OAB-q	11.46 (1.09)	17.31 (1.06)*	14.49 (1.04)*	11.97 (1.01)#
ICIQ SF	3.03 (0.65)	13.24 (0.66)*	10.54 (0.73)*#	9.13 (0.69)*#
I-PSS	10.67 (0.85)	12.64 (0.71)	10.13 (0.69)#	8.06 (0.64)*#§
QS-M	72.42 (2.47)	-	29.31 (1.93)*	32.54 (1.78)*
Physical-WHOQOL	15.71 (0.20)	14.31 (0.22)	15.10 (0.21)*#	15.10 (0.23)#
Psychological-WHOQOL	15.01 (0.18)	14.44 (0.20)*	15.01 (0.22)#	15.42 (0.19)#
Social-WHOQOL	14.63 (0.22)	12.65 (0.24)*	12.85 (0.19)	12.76 (0.19)*
Environment-WHOQOL	14.13 (0.15)	14.06 (0.16)	14.07 (0.16)	14.48 (0.12)#
General-WHOQOL	14.36 (0.32)	13.50 (0.34)	14.00 (0.28)	14.63 (0.31)#
Q1-WHOQOL	16.23 (0.55)	14.58 (0.59)*	15.89 (0.55)	16.60 (0.52)#
Q2-WHOQOL	16.15 (0.59)	15.10 (0.64)	15.36 (0.57)	16.60 (0.54)

Data were presented as mean (standard error). \*P-value < 0.05 when compared to the pre (significant effect of time); #P-value < 0.05 when compared 1 month ago (significant effect of time); §P-value < 0.05 when compared to 3 months (mean time effect).

Considering the WHOQOL score—Question 1 (How would you evaluate your quality of life?—**Figure 2(f)**), it is noticed that the values observed in the first month are statistically lower than those observed before surgery. Values increase at the three and six-month time-points, being the last collected values similar to those obtained in the preoperative period.

Regarding the WHOQOL score—Question 2 (How satisfied are you with your health?—**Figure 2(g)**), no significant changes of the average values were observed over the six-month follow-up.

### 3.5. Behavior Assessment Scores Associated with Continence and Sexual Function

Patients were considered continents, if making use of up to one absorbent within a 24-hour period and potent, if able to maintain erection for satisfactory sexual intercourse. All patients were considered continent preoperatively and after the six-month follow-up period, 76.4% of these patients remained continent. Although 25% of patients reported some degree of urinary incontinence preoperatively, none of them reported wearing absorbent.

In **Table 6**, we can observe the scores obtained for continent and for incontinent patients. Moreover, we could also observe that patients with incontinence obtained, on average, worse scores than those obtained by continents patients in the OAB-q, ICIQ-SF and I-PSS, tests, but there was no statistically significant difference in the erectile dysfunction scores between continent and incontinent patients obtained by the WHOQOL (**Table 6**).

No statistically significant differences were observed between patients with and without erectile dysfunction. Among the seventy-two patients included in this study, sixty-six of them reported to have sexual activity before the surgery and only six of them reported no sexual activity at all (**Table 7**).

Among these sixty-six patients who used to have sexual intercourse before surgery, Erectile function was conserved (QS-M Question-6: After the sexual arousal his erection sufficiently rigid to ensure a satisfactory sexual intercourse?) in fifty-eight of them. The other eight patients did not clearly answer this question. Among these fifty-eight patients, 48 (83%) had erectile dysfunction at the six-month time-point and only ten patients (17.0%) reported not having experienced erectile dysfunction. The six patients who had no sexual activity before surgery maintained erectile dysfunction at six months.

### 3.6. Correlations between the Assessment Scores

Quality of life according to urinary symptoms questionnaire item I-PSS with the WHOQOL social OAB-q, ICIQ-SF and QS-M values obtained at different time-points were compared using the Spearman correlation



**Table 6.** Comparisons between continent and incontinent compared to scores.

Score	Continents (n = 55)	Incontinent (n = 17)	P-value
General-WHOQOL	14.7 (2.7)	14.2 (2.2)	0.522
Physics-WHOQOL	15.4 (1.9)	14.8 (1.6)	0.208
Psychological-WHOQOL	15.4 (1.5)	14.7 (1.4)	0.102
Social-WHOQOL	12.8 (1.7)	12.4 (1.3)	0.343
Environmental-WHOQOL	14.5 (1.0)	14.1 (1.2)	0.206
ICIQ-SF	7.3 (5.4)	13.5 (3.8)	<0.001
OAB-q	8.4 (6.2)	16.8 (7.0)	<0.001
I-PSS	7.4 (5.8)	10.8 (4.7)	0.032

**Table 7.** Erectile situation at the end of follow-up according to sexual activity observed before surgery.

Sexual activity before	Erectile situation at 6 months		
Surgery	Without erectile Dysfunction	With erectile Dysfunction	Total
Yes	10.0 (17.0%)	48.0 (83.0%)	58 (100.0%)
No	0.00	6.00 (100.0%)	6.00 (100.0%)

coefficients (**Table 8**).

At all time-points, positive correlations were observed between quality of life scores and I-PSS scores related to urinary symptoms (ICIQ-SF and OAB-q). The correlations of the I-PSS score with the quality of life measured by WHOQOL and the QS-M were of low intensity.

#### 4. Discussion

In the present study we evaluated 72 patients who underwent radical prostatectomy to determine the impact of surgery on the overall quality of life and on urinary incontinence and erectile function, before surgery and at three different time-points of the postoperative period (six months). In general, the overall quality of life evaluation assessed by the WHOQOL, we observed no difference in the total score of the questionnaire. Similarly, Perez *et al.* (1995) noted that although patients they reported erectile dysfunction and some degree of urinary incontinence, quality of life was not affected after radical prostatectomy [35]. When we analyze the domains of WHOQOL alone, we observe, however, that radical prostatectomy had a significant impact on the social domain, clearly associating erectile dysfunction with interpersonal relationship. Our evaluation, restricted by the sixth month postoperatively, demonstrates that radical prostatectomy adversely affects sexual function, in agreement with Namiki *et al.* (2008), who did not observe improvement in sexual dysfunction after a year of surgery. Other studies, with longer follow-ups, reported gradual improvement of erectile dysfunction up to eighteen months after prostatectomy [36].

In the QS-M questionnaire, specific to sexual evaluation, there is a significant decrease in the score values obtained at the last evaluation sessions (six months) of our study. This finding is consistent with Fowler *et al.*, YEAR's observations of the negative effects on quality of life caused by loss or impairment of sexual and urinary functions, but points out that the gradual adaptation process that aims to eliminate the adverse effects caused by radical prostatectomy [37].

Patient's perception of lower urinary tract symptoms shows that worsening of symptoms in one month after surgery, followed by gradual recovery. At the six-month time-point, the urinary questionnaires OAB-q, I-PSS and the physical, environmental, Q1 (How would you rate your quality of life?) And Q2 (How satisfied are you with your health?) WHOQOL revealed us scores values similar to the ones obtained in the preoperative period.

**Table 8.** Correlations between quality of life according to urinary symptoms and other scores.

Score	Correlation with quality of life according urinary symptoms			
	At time			
	Pre	1 month	3 months	6 months
Social-WHOQOL	-0.229	-0.429	-0.047	-0.237
	(0.041) <sup>§</sup>	(<0.001) <sup>§</sup>	(0.693)	(0.053)
Q-OAB-q	0.555	0.441	0.507	0.681
	(<0.001) <sup>§</sup>	(<0.001) <sup>§</sup>	(<0.001) <sup>§</sup>	(<0.001) <sup>§</sup>
ICIQ SF	0.587	0.531	0.743	0.799
	(<0.001) <sup>§</sup>	(<0.001) <sup>§</sup>	(<0.001) <sup>§</sup>	(<0.001) <sup>§</sup>
QS-M	-0.258	-	-0.207	0.001
	(0.021) <sup>§</sup>		(0.081)	(0.991)

<sup>§</sup>Statistically significant correlation with  $P < 0.05$ ; Data described in the Spearman correlation coefficient (P-value).

It also demonstrated an increase in the psychological domain of WHOQOL score, showing an improvement of the patient's emotional state, as observed in other studies [35]-[38].

Emotional state improvements might reflect the gradual and partial recovery of urinary problems, and eventually getting adapted to these problems or simply by modifying his concept of quality of life over time.

In the present study the ICIQ-SF questionnaire assessing urinary incontinence had an increase in the value of the score, demonstrating that urinary continence was not fully recovered at six-month postoperatively time-point. Pre-operative questionnaires demonstrated that 25% of patients had some degree of incontinence, a finding similar to that found by Korfage in 2005, where 12% of patients had incontinence before surgery for prostate cancer [39].

Urinary incontinence in elderly patients may be multifactorial. Neurological disorders, cognitive impairment and medications are some of the factors involved. Radical prostatectomy seems to be an aggravating factor in a situation in which urinary incontinence is likely to be already established.

The I-PSS questionnaire demonstrated an improvement of the urinary tract symptoms after radical prostatectomy. This improvement might be due to some of these patients having symptoms of storage and emptying of the lower urinary tract related to increased prostatic hyperplasia. Therefore surgical removal of the gland relieves urinary obstruction. In agreement with our study, Slova Lapor in 2007 observed the same results. Men with lower urinary tract moderate or severe symptoms show gradual improvement after radical prostatectomy [40].

To assess how urinary incontinence affects quality of life measured by WHOQOL general, patients were divided into two groups: continents (up to one absorbent within a 24h period) and incontinent. The comparison between these groups showed no difference in the quality of life measured with WHOQOL general. This finding may be explained by the patient's adaptation to the adverse effects of radical prostatectomy, as noted by Arai *et al.*, for whom patients are willing to accept some comorbidities for the benefit of survival after prostate cancer [41]. In addition to that, Martin *et al.*, 2011 concluded that urinary incontinence has low impact on quality of life, although 31% of patients have some level of anxiety due to urinary symptoms [42]. Hoffman *et al.* in 2003 found that among those who developed post-prostatectomy urinary incontinence, 75% reported that the inconvenience was small [43].

According to the WHOQOL (World Health Organization for Quality of Life), the concept of quality of life is individual. The idea of health status, consisting of physical, functional, psychological and social interaction differs between individuals, and is directly related to the socio-cultural context in which the individual is inserted, making of it not a unique concept, accepted as synonymous with quality of life [34] [44].

Quality of life evaluations of the I-PSS questionnaire with WHOQOL social domain, OAB-q, ICIQ-SF and QS-M obtained at all different time-points, provided positive correlations between quality of life score and the I-PSS scores related to urinary symptoms (ICIQ-SF and OAB-q). Correlations of the I-PSS score with quality of

life measured by the WHOQOL and the QS-M were of low intensity. Similar findings were obtained by, although the study involved patients with benign prostatic hyperplasia. Moreover, Haltbakk *et al.* in 2011 concluded that the WHOQOL instrument may be very comprehensive and unable to detect the influence of specific symptoms on quality of life. Despite the WHOQOL is an instrument accepted by the World Health Organization, it might not have been properly adapted to detect quality of life changes in certain group of patients [45]. Historically, the SF-36 (Short Form Health Survey) is the most frequently used questionnaire to assess quality of life of patients who underwent radical prostatectomy or other forms of treatment. Worthy to mention the studies conducted by Jim *et al.*, who used the SF-36 associated with the UCLA Prostate Cancer Index to evaluate the characteristics of the patient and of the tumor to predict continence, sexual function and quality of life for up to one year after the surgery and concluded that patients aging less than 65 years are more likely to return to continence base, sexual function and quality of life [46].

In our group of patients, we could observe a state of resignation concerning to urinary symptoms and to erectile dysfunction, while maintaining the expectation of symptom improvement over time. In this short follow-up, it is likely that the main concern of patients remained targeted at the malignant disease, since quality of life is the perception that the patient has of himself, a perception that can change along the postoperative period.

The rehabilitation of these patients should not only target the physical aspect, but also psychological and social aspects that directly affect their quality of life. Aaronson (1990) and Buron *et al.* (2007) stated that studies on quality of life in oncology should consider the various needs and perception of each individual, in order to assess the subjective aspects and consider personal aspects associated with social and cultural classes [47] [48].

Some authors believe that quality of life is directly linked to better survival rates and consider the necessity to build more consistent methods to assess cancer patients' quality of life, reflecting the evolutionary changes of the disease. The same patient can adjust his quality of life perception within time, therefore change in the same questionnaire should be reapplied at different times postoperatively [49]-[52].

For some researchers, measuring the perceived quality of life enriches clinical research and therefore the questionnaires to assess patients' perceptions are of utmost importance [53].

Our study contributes to the evaluation of patients of the public health service with their own socioeconomic and cultural characteristics and quality of life perceptions. The ideal questionnaire for this group of patients has yet to be developed and we hope that this study can be an useful tool in the assembly of this clinical research instrument.

## 5. Conclusions

Radical prostatectomy adversely affects quality of life, but the effects are temporary, with return to the preoperative levels after six months, except for the social domain of the WHOQOL.

The lower urinary tract symptoms assessed by the I-PSS improved after radical prostatectomy. Urinary continence measured by the ICIQ-SF worsened after radical prostatectomy in all periods. Erectile dysfunction worsened after radical prostatectomy at all checked time-points.

There is no difference in the quality of life assessment of WHOQOL between continent and incontinent patients. The lower urinary tract symptoms as measured by the OAB-q worsened temporarily, but returned to the preoperative levels six months after the surgery.

Quality of life scores, as measured by the I-PSS, correlates with the OAB-q and ICIQ-SF scores, but not with the ones obtained by the WHOQOL and QS-M.

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