

ERECTILE DYSFUNCTION AND URINARY INCONTINENCE AFTER RADICAL PROSTATECTOMY – IMPORTANT FACTORS IN THE PERCEPTION OF THE QUALITY OF LIFE

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Keywords: urinary incontinence, erectile dysfunction, radical prostatectomy, quality of life, postoperative

Abstract: Erectile dysfunction (ED) and the urinary incontinence (UI), are the most important complications after radical prostatectomy (RP), with a strong impact on the quality of life and the satisfaction of the patients. **Materials and Methods:** The study involved 98 patients with prostate cancer, from Fundeni Clinical Institute selected for retropubic RP. The prospective analytical observational non-randomized study had two steps: 2014-2015 and 2017-2018 at 3 years postoperatively. **Results and discussions:** On discharge, postoperative UI was present in 83.7% of the patients, up to 1 year in 21.9%, after two years in 13.6% and finally, after more than three years in 9.4%. 81% of the patients with serious postoperative ED were >60 years, the Chi-square test- $p=0.075$, and 16.7% of the patients declared declare “medium/low erection” at 3 years. There is a probability of >9.23 or (2.62-32.46), $p=0.001$, of presenting mild ED after surgery if nerve sparing is to be preserved. The aspects of quality of life differ significantly statistically depending on postoperative ED, Lawley-Hotelling test- $p=0.0017$. **Conclusions:** RP can negatively affect the quality of life, causing both UI and ED, which is way, enhancing postoperative sexual continence and function, can be done through changes in the lifestyle, physical exercises, and pharmacotherapy.

INTRODUCTION

Prostate cancer is now the most common cancer in American men after skin cancer. The American Cancer Society estimates, for 2018, that there will be about 164.690 new cases in the United States and around 30.000 reported cases of prostate cancer deaths (1 man of 41), thus being the second cause of death by cancer in men after lung cancer, and in the world, it represents the fifth cause of death in men by cancer.(1)

Erectile dysfunction (ED) and Urinary incontinence (UI) are the most important complications after radical prostatectomy (RP) with a strong impact on the quality of life and the satisfaction of the patients. Erectile dysfunction after radical prostatectomy is the sexual issue most discussed in the specialized literature.

During the RP, with all meticulous dissection of the neurovascular bundles, there is evidence that the lack of oxygenation, neurapraxia, fibrosis and the apoptosis of the cavernous smooth muscle affects sexual function, leading to severe effects on the sexual satisfaction of patients.(2)

Quality of life is adversely affected by urinary incontinence met in a large percentage of men who have undergone surgical treatment of prostate cancer. In the prostate cancer study (PCOS), six months after surgery, 66,4% of patients appreciated the urinary incontinence a problem, and 15,2% thought it was moderate to severe and they believed that it was significantly associated with affecting physical and mental well-being.(3)

AIM

Assessment of erectile function, urinary incontinence and quality of life, three years after the surgical treatment of prostate cancer.

MATERIALS AND METHODS

The study involved 98 patients with prostate cancer, admitted to the Center for Urology and Renal Transplantation of Fundeni Clinical Institute, Bucharest, who met all the conditions (life expectancy>15 years, no major comorbidities) to perform retropubic radical prostatectomy. Patients with history of pelvic radiotherapy or other tumours in the last 5 years, even neoadjuvant hormonal treatment, were excluded from the analysis. The study carried out with the consent of the institution. In the first stage, between 17.03.2014 – 16.03.2015, it was a prospective observational, non-randomized study. A second step followed, with a telephone approach to patients over the period 2017-2018 in order to subjectively assess the following variables: erectile dysfunction, urinary incontinence and quality of life up to three years after surgery.

In the first stage of the research we have analyzed several preoperative, intraoperative and postoperative parameters: age, origin environment, prostatic specific antigen (PSA), Gleason score, classification of malignant tumors (TNM), the questionnaire for evaluating male sexual function IIEF-5/ SHIM (Sexual Health Inventory for Men), the duration of the operation, the preservation of nerve-sparing, the presence of erection and urinary incontinence. Mention must be made of the fact that patients were informed in this research and have given their consent to the use of their personal data by signing the I.C. Fundeni consent validated in that period of time.

The assessment questionnaire for sexual function was approved by the Ethics Committee of I.C. Fundeni, also used in other situations within the Institute. This questionnaire complies with the International Code on the Application of Social and Marketing Sciences and its Rules ICC/ESOMAR.(4)

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Article received on 21.07.2019 and accepted for publication on 28.08.2019
ACTA MEDICA TRANSILVANICA September;24(3):4-7

The documentation sources were: anamnesis and direct interview with the patient, the self-administered questionnaire for erection assessment, observation sheets, laboratory analyzes, discharge letters. The data acquired were entered into a database created using the Microsoft Excel program. Expression of the variables to be analyzed has been defined as a percentage of the variables to be categorized, for the continuously distributed variables the usage has been done as an average and the standard deviation (SD), and for the abnormally distributed continuing in mid-form and interquartile range (IIQ). In order to identify the risk factors associated with ED after surgery, the association of variables was evaluated by the help of the uniformed and multivaried binary logistics function, together with the selection method Stepwise Backward, by calculating OR (Odds Ratio) and the confidence interval of 95% (IC 95%). In the regression models, all the variables that submitted have been entered a $p < 0.02$ when comparing subgroups.

RESULTS AND DISCUSSIONS

This article made a selection of the research carried out in the two periods: 2014-2015 and 2017-2018 and we analyzed the urinary incontinence, erectile dysfunction and quality of life from discharge to three years postoperatively.

The general characteristics of the postoperatively studied group regarding the suggested variables are described in the table below (table no. 1):

Table no. 1. General characteristics of the postoperatively studied group regarding the suggested variables

VARIABLES	Total (n=96) - percentage		
Presence of postoperative erection			
3 months after surgery	2.1%		
6 months after surgery	8.3%		
12 months after surgery	21.8%		
24 months after surgery	18.8%		
36 months after surgery	16.7%		
Urinary incontinence after surgery			
discharge from hospital	83.7%		
6 months	24%		
12 months	21.9%		
24 months	13.6%		
36 months	9.4%		
Questionnaire SHIM after surgery (Classifies ED severity)	after 1 year	after 2 years	after 3 years
No ED (22-25)	0%	0%	0%
Mild ED (17-21)	6.2%	4.2%	4.1%
Mild to Moderate (12-16)	9.5%	5.2%	3.4%
Moderate ED (8-11)	6.2%	9.4%	9.4%
Severe ED (1-7)	78.1%	81.2%	83.1%
Quality of life after surgery	after 1 year	after 2 years	after 3 years
Satisfactory - rated 6	8.3%	8.3%	10.4%
Good - rated 7	38.5%	40.6%	32.3%
Good - rated 7.5	27.1%	33.4%	43.8%
Good - rated 8	18.8%	12.5%	9.4%
Very good - rated 9	7.3%	5.2%	4.1%

n- Number of patients in the study; ED – erectile dysfunction; SHIM – Questionnaire Sexual Health Inventory for Men / International Index of Erectile Function (IIEF-5).

Table no. 2. Urinary incontinence within up to 3 years postoperatively depending on the age of patients

Age	Patients	Urinary incontinence after surgery								
		1 year			2 years			3 years		
		Yes, effort	1-2 drops	No	Yes, effort	1-2 drops	No	Yes, effort	1-2 drops	No
43-59	22	6	1	15	4	1	17	2	3	17
60-69	58	11	1	46	5	7	46	5	5	48
70-78	16	4	2	10	4	3	9	2	4	10
TOTAL	96	21 (21.9%)	4	71 (73.6%)	13 (13.6%)	11	72 (75%)	9 (9.4%)	12	75

By comparing table no. 1 and table no. 2, the urinary incontinence section, we see that postoperatively, on discharge, 83.7% patients were presenting UI, and one year later the

percentage dropped to 21.9%, two years after the surgery at 13.6% and after three years it dropped at 9.4% (9 patients). We mention that we have taken into account any daily loss of urine, patients answering that they lose involuntary urine under certain conditions e.g. effort – „YES effort”. We have also noted the rare episodes of the urinary incontinence (once a week or less frequently) with “1-2 drops”, but these patients have entered the percentage of postoperative continents.

Moreover, we contacted the subjects by phone two and three years postoperatively to inquire about their present state of continence compared to the previous year. The patients assessed subjectively their own status with the expressions “Yes on effort”, “1-2 drops very rarely” or “No” when they were continents. The subjective severity rate of the incontinence scale was based on the disorders caused by disease.

According to table no. 2, most patients 87 (90.6%) at three years postoperatively, were considered continents while 9 (9.4%) of the patients reported to the phone interview that they still had symptoms of urine loss on effort. After the first postoperative year, 21 (21.9%) patients had UI at effort and then the number of these has dropped to 9 (9.4%) patients three years after surgery, so in two years 12 patients (12.5%) of a total of 96 managed to become continent.

In the case of radical prostatectomy that preserves neurovascular bundles, it has been reported in the literature that, unlike the urinary incontinence, the erectile function does not have a quick recovery, it can even reach up to 2 years after the surgery.(5)

Intraoperative nerve lesions caused by ischemia, nerve traction, heat-induced or local inflammatory reactions, can lead to persistent hypoxia in the cavernous body and erectile dysfunction after surgery. These problems cause secondary anatomical and functional changes in the cavernous body.(5,6)

The incidence of erectile dysfunction after radical prostatectomy has been reported depending on study from 10 to 100%.(7,8)

In table no. 3 we notice that over 81% of patients with severe ED (1-7) postoperatively were more than 60 years, the test Chi2 - $p = 0.075$.

In table no. 4 the analysis shows that 16 (16.7%) patients declared at 3 years, the presence of even subjective erection considered “average or poor”. The rest of 80 (83.3%) patients of a total of 96 do not have an erectile function. There is a difference of 5 patients regarding the statement of erectile function observed one year postoperatively (21 patients) and 3 years postoperatively (16 patients). These patients were within the age range 60-69 years, at one year being 13 patients with a certain degree of erectile dysfunction and at 3 postoperative years, we still have 8 patients. Possibly, the reason for severe malfunction that might have been installed in these 5 patients was the increasing age (table no. 4).

Table no. 3. Erectile dysfunction according to age group of patients evaluated one year postoperatively

Erectile function according to age group of patients evaluated one year postoperatively							
Erectile dysfunction ED	Age group						
	43-59		60-69		70-78		Total
	n	%	n	%	n	%	n
No ED (22-25)	0	0	0	0	0	0	0
Mild ED (17-21)	4	57.1	3	42.9	0	0	7
Mild to Moderate (12-16)	2	28.6	5	71.4	0	0	7
Moderate ED (8-11)	2	28.6	5	71.4	0	0	7
Severe ED (1-7)	14	18.7	45	60	16	21.3	75
Total patients	22		58		16		96
Test Chi2 - $p = 0.075$							
Over 81% of patients with severe ED (1-7) were more than 60 years.							

Table no. 4. Postoperative erectile function up to 3 years postoperatively

Age	Patients	Erectile function postoperative								
		1 year			2 years			3 years		
		Yes	Average/low	No	Yes	Average/low	No	Yes	Average/low	No
43-59	22	6	2	14	4	4	14	4	4	14
60-69	58	9	4	45	5	5	48	3	5	50
70-78	16	0	0	16	0	0	16	0	0	16
TOTAL	96	15	6	75	9	9	78	7	9	80

In the study group we have observed and analyzed that preservation of neurovascular bundles is significantly linked to postoperative ED with a higher probability of 9.23 or (2.62-32.46), p=0.001, to keep a normal erectile function or mild ED after surgery if neurovascular bundles were preserved.

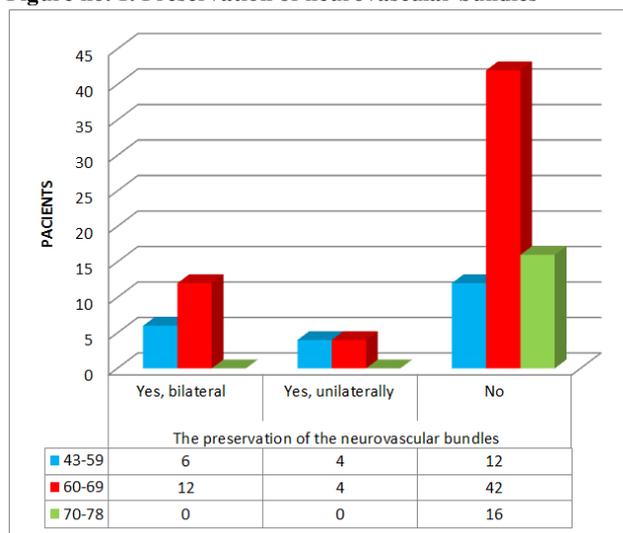
Table no. 5. Association between postoperative ED and preservation of neurovascular bundles

The association between the preservation of the neurovascular bundles and the postoperative ED		
Erectile dysfunction ED	OR (IC 95%)	value p
Mild to Moderate ED / Moderate /Severe ED (12-16)	1	-
No ED / Mild ED (17-25)	9.23 (2.62 - 32.46)	0.001

ED=erectile dysfunction; p= statistical value p

In 72.9% of the patients remaining in the study (96 patients), there has not been performed the preservation of neurovascular bundles, intra-operatively; in 26 of them (27.1%) bilateral or right-hand or left-hand neurovascular bundles have been preserved (figure no. 1). In 8.4% of cases, there has been obtained the preservation of neurovascular bundles unilaterally and in 18.7%, bilaterally.

Figure no. 1. Preservation of neurovascular bundles



The risk factors for postoperative ED, identified by univariate analysis, were the age (OR=1.12; IC 95%=1.03-1.24; p=0.007) and the absence of preservation of neurovascular bundles (OR=48.87; IC 95%=11.7-204; p<0.001), arterial hypertension (OR=3.72; IC 95%=1.30-10.30; p=0.01) and the use of beta-blockers (OR=3.61; IC 95%=0.91-13.40; p=0.05) (table no. 6).

In multivariate analysis, the ED associated independent risk factor, postoperatively, was the absence of the preservation of the neurovascular bundles, which associates a higher probability of ED, providing a 72.9 fold higher risk (OR=72.9; IC 95%=1.49-355; p< 0.001) and the stage cT3-T4 (OR=17.2; IC 95%=1.60-190; p=0.02) (table no.6).(9)

Table no. 6. Univariate and multivariate logistic regression analysis to identify the risk factors associated with postoperative erectile dysfunction

Variable	Univariate binary logistic regression			Multivariate binary logistic regression		
	OR	IC 95%	Value	OR	IC 95%	Value p
Age	1.12	1.03-1.24	0.007	-	-	-
HTA	3.72	1.30-10.30	0.01	-	-	-
Use of Beta-blockers	3.61	0.91-13.40	0.05	-	-	-
cTNM stage cT3-cT4	6.66	0.83-53	0.07	17.2	1.60-190	0.02
Absence of preservation of neurovascular bundles	48.87	11.7-204	<0.001	72.9	1.49-355	<0.001

We asked the patients over the telephone, one year, two and three years after the surgery performed by radical retropubic prostatectomy, how they perceived the quality of life. The assessment of their health status was subjective, we did not apply quality of life questionnaires standardised, they were merely asked to give a grade from 1 to 10 on how they perceived their postoperative life. We explained them how the grades were coded and we asked them to choose one grade. Grades from 1 to 4 have been considered for very bad and bad quality of life. Grades 5 and 6 represented a satisfactory quality of life. Grades 7 and 8 have been granted by patients for a good postoperative quality of life. We mention that there was also codified the grade 7.5 for some patients who have not been determined to choose one of the grades 7 or 8. Grades 9 and 10 were coded for very good quality of life (table no. 7).

In table no.7 we notice that the grades were between 6 and 9, most of the patients, approximately 85%, considered they had a good quality of life over the three years, marking with the grades 7, 7.5 and 8.

It should be noted that the 82 patients with moderate/severe ED (table no. 3) were mostly confined to the quality of life mentioned between 7 and 8 grades.

Table no. 7. Life quality after surgical intervention evaluated subjectively by patients

Quality of life after surgery	Rated	after 1 year		after 2 years		after 3 years	
		n	%	n	%	n	%
Satisfactory	6	8	8.3	8	8.3	10	10.4
Good	7	37	38.5	39	40.6	31	32.3
Good	7.5	26	27.1	32	33.4	42	43.8
Good	8	18	18.8	12	12.5	9	9.4
Very good	9	7	7.3	5	5.2	4	4.1
Total	Total	96	100.0	96	100.0	96	100.0

n= Number of patients

Table no. 8. Association between the quality of life after surgical intervention evaluated by patients and the postoperative ED

Erectile dysfunction ED	OR(95%IC)	p
No ED / Mild ED (17-25)	1	-
Mild to Moderate ED / Moderate /Severe ED (12-16)	0.2(0.06-0.66)	0.008

Life quality after surgery evaluated by patients is inversely statistically significantly associated with ED from mild to severe (score 1-16) OR (95%IC) = 0.2 (0.06-0.66), p=0.008 (table no. 8.). The quality of life differs significantly statistically depending on the postoperative ED, Test Lawley-Hotelling - p = 0.0017 (table no. 9).

Table no. 9. Life quality after surgical intervention evaluated by patients and erectile function evaluated postoperatively

Erectile dysfunction ED postoperative	n	Quality of life after surgery				
		Average	Standard deviation	Minimum	Median	Maximum
No ED / Mild ED (17-25)	6	8.2	0.7	7.5	8.0	9.0
Mild / Moderate ED (12-16)	8	7.9	0.6	7.0	8.0	9.0
Moderate/Severe (1-11)	82	7.3	0.6	6.0	7.0	9.0
Total	96	7.4	0.7	6.0	7.5	9.0
Test Lawley-Hotelling - p = 0.0017						
The means of quality of life evaluated by the patient differ statistically significantly depending on the postoperative ED.						

Radical Prostatectomy (RP) may adversely affect the quality of life, causing both transitory or permanent urinary incontinence and erectile dysfunction. On the other side, RP may improve the quality of life by improving the symptoms of the lower urinary tract when these symptoms exist before surgery. Because patients treated for prostate cancer have a life expectancy of about 14 years, it is imperative to consider the long-term impact of the quality of life, both on survival and treatment decision.(10,11)

CONCLUSIONS

Radical prostatectomy may adversely affect the health-related quality of life, causing both temporary or permanent urinary incontinence, as well as erectile dysfunction.

Some age-related comorbidities, such as a preoperative erectile dysfunction, HTA, obesity, diabetes are independent prognostic factors for the recovery of continence and erectile function after operation.

It is important that doctors take into account integrated clinical management of the patient and all associated factors to prevent urinary incontinence and erectile dysfunction after radical prostatectomy. A careful assessment of the basic functional, oncological and psychological features should be carried out for each patient before surgery.

Erectile dysfunction is considered as an important element of the risk associated with comorbidities. That is why the health-related quality of life, by improving the continence and postoperative sexual function, can be achieved through changes in the lifestyle, physical exercises and pharmacotherapy for cardiovascular risk factors.

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