Quality of sexual life after radical prostatectomy

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KEYWORDS
Sexual life; Erectile dysfunction; Radical prostatectomy; Prostate cancer; International Index of Erectile Function; Mexico.

Abstract
Background: Prostate cancer is one of the most frequent tumors in men and radical surgery is the most widely used therapeutic option at early stages of the disease.

Aims: The aim of this study was to determine the quality of sexual life of the patients that underwent radical prostatectomy.

Methods: Within the time frame of January 2003 to January 2013, the International Index of Erectile Function (IIEF), which analyzes erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction, was applied as a means of evaluating the quality of sexual life before and after surgery.

Results: The case records of 63 patients with prostate cancer diagnosis that underwent radical prostatectomy within the time frame of January 2003 to January 2013, and that met the inclusion and exclusion criteria, were analyzed. Before the surgery, 8 patients presented with mild erectile dysfunction, 27 had some degree of orgasmic dysfunction, and 26 patients presented with reduced sexual desire. After the surgery, one patient presented with severe erectile dysfunction, 61 patients presented with moderate dysfunction, and one patient had mild-to-moderate dysfunction. One hundred percent of the patients presented with some degree of orgasmic dysfunction and decrease in sexual desire and intercourse satisfaction. Orgasmic dysfunction resulted in a p of 0.015 and erectile dysfunction produced a p of 0.314 in favor of bilateral vs. unilateral sparing of the neurovascular bundles.

Conclusions: Despite the fact that the majority of patients presented some degree of dysfunction, the main determining factor of quality of sexual life in relation to both erectile and orgasmic functions was the unilateral or bilateral sparing of the neurovascular bundles.

Calidad de vida sexual posterior a prostatectomía radical

Resumen

Introducción: El cáncer de próstata es uno de los tumores más frecuentes del hombre, en etapas tempranas la cirugía radical es la opción terapéutica más utilizada.

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Introduction

Prostate cancer is a frequent pathology and in Mexico corresponds to the second cause of death by cancer. The incorporation and massive use of prostate-specific antigen (PSA), community education, and the ever more frequent control of the at-risk population has led to an increase in early diagnosis of this pathology, which in turn has resulted in a large number of patients being candidates for curative treatment.\(^{1,2}\)

The different options that are currently employed for treating this pathology are radical surgery, radiotherapy, and brachytherapy and all are used in patients presenting with organ-confined disease with similar oncologic results and complication rates.\(^3\)

Suprapubic radical prostatectomy is one of the most widely accepted and validated treatments. It is a technique that allows complementary treatments to be performed if control of the disease failed to be complete. An example of this is the addition of radiotherapy to the treatment of patients with postoperative residual disease that has provided selected groups with disease-free survival.\(^{4,5}\)

The use of PSA and early detection enables prostate cancer patients to be diagnosed and treated at an earlier age. The current 10-year survival rate for radical prostatectomy is above 92%, and 25% to 75% of the patients that have undergone radical prostatectomy present with erectile dysfunction.

Even though an attempt is made to spare the nerve bundles when performing radical prostatectomy, the erector nerves are stretched when they are separated from the prostate; this can cause a sometimes irreversible neurologic lesion called "neuapraxia". Erections are not produced while there is neuapraxia. In addition, the pudendal arteries can be injured during radical prostatectomy, leading to arterial insufficiency of the corpora cavernosa.\(^6\)

Both neuapraxia and arterial insufficiency cause a long period of absence of erections, which leads to a maintained reduction of oxygen output to the corpora cavernosa. Such chronic ischemia favors corpora cavernosa sinusoid smooth muscle fibrosis and, in turn, occlusive corporovenous dysfunction that worsens and that can perpetuate erectile dysfunction.\(^7\)

And therefore, erectile dysfunction after radical prostatectomy is a source of great concern for patients. They recognize that after one year their cancer is cured, but they have not recovered erection.

In our local environment, approximately 133 new cases are diagnosed annually at each of the national referral hospitals and around 38 of those cases have an annual confirmation of prostate cancer, making it the sixth cause of cancer in men. Prostate cancer occupies the twelfth place of the primary fifteen cancers in men, women, or both.\(^3,8\)

The evaluation of sexual function after radical prostatectomy has been the subject of much debate. During the last 10 years, one of the aims of surgical treatment for localized prostate cancer that has clearly been of the utmost importance as part of patient quality of life, is the attempt to maintain sexual function.

In a recent review of various case series on radical prostatectomy, erectile dysfunction rates ranged from 14% to 97.5%.\(^1\) The interval appears to be too large for a single surgical technique. Before the introduction of anatomic radical prostatectomy, the impotency rate was almost 100%. The advent of the nerve-sparing technique by Walsh and Donker\(^2,4\) in 1982 improved the percentage of patients presenting with sexual potency after radical prostatectomy in their case series. Today, the majority of authors agree that the sparing of neurovascular fascicules improves potency.

Prognosis is based on stage at the time of diagnosis, with a maximum survival rate of 64 months with adequate
treatment (prostatectomy plus hormone suppression), and of 34 months with prostatectomy alone.¹

The aim of the present study was to identify the quality of life and erectile function before and after radical prostatectomy through the International Index of Erectile Function (IIEF) questionnaire, along with the associated risk factors and the outcome and mortality rates in those patients.⁵

**Methods**

A retrolective, observational, cross-sectional study was conducted at the Department of Urology of the Hospital de Alta Especialidad in Veracruz on patients that underwent radical prostatectomy within the time frame of January 2003 to January 2013 and whose medical histories and evaluations produced erectile dysfunction data. All patients that received neoadjuvant hormone therapy, adjuvant treatment for positive adenopathies, and patients with primary hypogonadism or diabetic polyneuropathy were excluded. The IIEF questionnaire was applied and the results were used to evaluate quality of life in relation to sexual life. All patients completed the IIEF questionnaire before and after radical prostatectomy.

The case records of all the patients of the Urology Service diagnosed with prostate cancer were reviewed in order to find those that fit the inclusion criteria.

The quality of life surveys were conducted before and after radical prostatectomy, taking into account other variables of interest such as clinical stage, Gleason grade, PSA, and urinary incontinence grade.

Binary logistic regression was used for the risk factors, descriptive statistics for the general population characteristics, and odds ratio with risk factors for the predictive values. The SPSS® version 20.0 program was employed.

**Results**

Sixty-three case records of men diagnosed with prostate cancer that underwent radical prostatectomy within the time frame of January 2003 to January 2013 and met the inclusion and exclusion criteria were analyzed. The mean age of the patients was 63.3 years, with a range of 45 to 77 years, and the mean body mass index (BMI) was 27.03 kg/m².

The 63 patients were diagnosed through transrectal prostate biopsy and classified by the Gleason grading system. Eleven (16.7%) patients presented with well-differentiated tumor, 46 (69.7%) with moderately differentiated tumor, and 6 (9.1%) with poorly differentiated disease.

In relation to the PSA levels determined before surgery, the mean value was 12.9 ng/mL. Of the 63 patients diagnosed with prostate cancer, 30 (45%) had clinical stage I, 25 (37.9%) had stage IIa, and 8 (12.1%) patients presented with stage III disease.

The mean surgery duration was 3.14 hours and mean blood loss was 443 mL. All patients underwent bilateral pelvic lymphadenectomy.

The mean hospital stay was 4.51 days. The paired Student’s t test was used to compare the Gleason grade of the transrectal prostate biopsy and the surgical specimen, resulting in a statistically significant difference (p<0.003).

The following pathologic stages of the prostate cancer cases were determined in the histopathologic study: only one patient (1.6%) presented with stage T1a, 21 (33.3%) patients presented with stage T1b, 25 (39.7%) had stage T2a, 8 (12.7%) patients had stage T2c, and 8 (12.7%) presented with stage T3b. Seminal vesicle invasion was found in 7 (10.6%) patients and they were referred for adjuvant radiotherapy; there was no seminal vesicle invasion in 56 patients. PSA levels were analyzed after radical prostatectomy and the mean value was 0.152 ng/mL (0.01-1.45 ng/mL).

The 63 patients filled out the 15-item questionnaire before and after radical prostatectomy that analyzed erectile function, orgasm quality, sexual desire, intercourse quality, and overall quality.

**Before surgery**

Eight patients presented with mild erectile dysfunction (12.7%) and 55 patients did not present with dysfunction (87.3%). Two (3.2%) patients were classified with mild-to-moderate orgasmic dysfunction, 25 (39.7%) with mild dysfunction, and 36 (57.1%) that did not present with dysfunction. In regard to sexual desire, 26 (41.3%) presented with mild dysfunction and 37 (58.7%) did not present with dysfunction. Twenty-two (34.9%) patients had mild dysfunction in relation to the quality of intercourse and 41 had no dysfunction (64.1%). With respect to overall quality, 30 (47.6%) patients presented with mild dysfunction and 33 (52.4%) had no dysfunction.

**After surgery**

One (1.6%) patient had severe erectile dysfunction, 61 (96.8%) patients presented with moderate dysfunction, and one (1.6%) patient with mild-to-moderate dysfunction. Four (6.3%) patients presented with severe orgasmic dysfunction, 57 (90.5%) with moderate, and 2 (3.2%) patients with mild-to-moderate dysfunction. In relation to sexual desire, one (1.6%) patient had severe dysfunction, 43 (65.2%) had moderate dysfunction, and 19 (28.8%) had mild-to-moderate dysfunction. Intercourse quality was affected in 14 (22.2%) patients that presented with severe dysfunction, 46 (69.7%) with moderate dysfunction, and 3 (4.8%) patients with mild-to-moderate dysfunction. With respect to general satisfaction, 2 (3.2%) patients had severe dysfunction, 51 (81%) had moderate dysfunction, and 10 (15.9%) patients presented with mild-to-moderate dysfunction.

Twenty-nine (46.0%) patients presented with grade 1 urinary incontinence, 25 (39.7%) with grade 2, and 9 (14.3%) patients presented with grade 3. Thirty-three (52.4%) of the patients that developed urinary incontinence were treated with tolterodine and 30 (47.6%) with oxybutynin. The patients recovered from incontinence in a mean of 9.30 days (table 1).

The data analysis showed that none of the patients that underwent bilateral sparing of the neurovascular bundles presented with severe erectile dysfunction; 39 of them presented with moderate erectile dysfunction, and one patient presented with mild-to-moderate erectile
dysfunction; no patients presented with severe organic dysfunction, 38 presented with moderate organic dysfunction, and 2 patients with mild-to-moderate organic dysfunction. In the group that underwent unilateral sparing, one patient had severe erectile dysfunction, 22 had moderate dysfunction, and 0 patients had mild-to-moderate dysfunction; organic dysfunction was severe in 4 patients, moderate in 19, and 0 patients presented with mild-to-moderate dysfunction. The chi-square test produced a p of 0.314 for erectile dysfunction and 0.015 for severe organic dysfunction in favor of bilateral sparing of the neurovascular bundles (figs. 1 and 2).

Discussion

Despite the emergence of new therapeutic modalities for organ-confined prostate cancer, radical prostatectomy is still the only curative surgical procedure. Although the technique has been perfected over time, this procedure continues to be associated with morbidity and mortality.10 -12 Adequate cancer staging, the general conditions of the patient, the surgical technique, and the experience of the surgeon or surgeons are factors that have a direct influence on radical prostatectomy; it is the standard treatment for patients with organ-confined prostate cancer and a life expectancy of more than 10 years that accept the treatment-related complications.13 Nevertheless, radical prostatectomy is associated with reduced sexual potency in the majority of cases, due to a lesion at the level of the cavernous nerves. Since the introduction of the technique as described by Walsh and Donker,14,15 nerve-sparing radical prostatectomy has become the operation of choice in men with well-limited organ-defined disease and adequate sexual life quality. Many studies have reported the recovery of sexual life quality after nerve-sparing radical prostatectomy because it has demonstrated rapid improvement and lower erectile dysfunction rates.16

According to our treated study population, the mean age was 63 years and the mean PSA value was 12.9 ± 6.2. The Gleason grade of the prostate cancer obtained from the transrectal prostate biopsy was well differentiated tumor in 11 (16.7%) patients, moderately differentiated in 46 (69.7%) patients, and poorly differentiated in 11 (9.1%); tumors were stage T1a in 1.6%, T1b in 33.3%, T2a in 39.7%, T2c in 12.7%, and T3b in 12.7% of the patients. Upon comparing our data with those of other studies, our results were similar to our data with those of other studies, our results were similar.

Table 1  General patient characteristics

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<thead>
<tr>
<th>Age</th>
<th>63.3 (45-77 años)</th>
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<tbody>
<tr>
<td>BMI</td>
<td>27.03 (19.35 Kg/m²)</td>
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<tr>
<td>Initial PSA</td>
<td>12.9 (5-30 ng/mL)</td>
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<tr>
<td>Final PSA</td>
<td>0.152 (0.01-0.45 ng/mL)</td>
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<tr>
<td>Transrectal prostate biopsy Gleason grade</td>
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<tr>
<td>Well differentiated</td>
<td>11 (16.7%)</td>
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<tr>
<td>Moderately differentiated</td>
<td>46 (69.7%)</td>
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<tr>
<td>Poorly differentiated</td>
<td>6 (9.1%)</td>
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<tr>
<td>Surgery duration</td>
<td>3.14 (2-6 horas)</td>
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<tr>
<td>Blood loss</td>
<td>443 (200-1,110 mL)</td>
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<tr>
<td>Seminal vesicle</td>
<td>infiltration 7</td>
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<tr>
<td>Hospital stay</td>
<td>4.51 (3-11 días)</td>
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<th>Urinary incontinence</th>
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<td>Grade 1</td>
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<td>Grade 2</td>
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<td>Grade 3</td>
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<th>Treatment for incontinence</th>
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<tbody>
<tr>
<td>Tolerodine</td>
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<td>Oxybutynin</td>
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Bilateral nerve-sparing prostatectomy

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<th>Erectile dysfunction</th>
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<tr>
<td>Severe</td>
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<th>Orgasmic dysfunction</th>
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<td>Severe</td>
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Unilateral nerve-sparing prostatectomy

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BMI: body mass index; PSA: prostate-specific antigen; *p<0.05.

Urinary incontinence following radical prostate surgery is defined as the involuntary loss of urine, with or without a previous sensation. It is generally of the stress incontinence type and the sphincteric function can be recovered up to 24 months after surgery. Incontinence grade is difficult to determine, but a generally adequate manner of establishing it is to ask the patients about their use of protectors during the day or to have them fill out validated questionnaires. Our results showed that 29 (46.0%) patients had grade 1 urinary incontinence, 25 (39.7%) had grade 2, and 9 (14.3%) had grade 3. Thirty-three (52.4%) of the patients that developed urinary incontinence were treated with tolterodine and 30 (47.6%) with oxybutynin. The patients recovered in a maximum of 21 days and a minimum of 1 day, with a 20-day range (mean 9.30; median 7.0; mode 7;
Erectile dysfunction is defined as the inability to achieve or maintain a penile erection to carry out penetration, due to the manipulation and excision of nerve fibers that innervate the corpora cavernosa. Erectile dysfunction can present or worsen after radical retropubic surgery. Different studies have reported that the percentage of eD following surgery varies from 25% to 75%. Since the introduction of the nerve-sparing technique, potency rates after radical prostatectomy have increased substantially. However, despite the neurovascular bundle-sparing techniques and the different surgical options, there continues to be a decrease in quality of sexual life after nerve-sparing prostatectomy. Numerous factors may contribute to potency recovery and the most important ones for remaining sexually potent after the operation are: age, whether the nerve preservation was unilateral or bilateral, and potency status before the operation. In our study, erectile dysfunction prevailed in 47% of the patients after surgery. Some studies mention that the presence of incontinence, stricture, pathologic stage, prostatic volume, and the patient’s educational level are risk factors; these observations, however, have not been confirmed in other studies.

A correlation was found between the number of spared neurovascular bundles and potency recovery in the majority of case series. A study by Kundu et al. conducted on 1,843 patients operated on within the time frame of 1983 and 2003 found potency recovery in 78% of men that underwent bilateral nerve-sparing surgery and in 53% of the men whose surgery was unilateral. Noldus et al. reported less favorable results. Their study was carried out on 289 patients operated on between 1992 and 1999 and the potency rate was 51.7% for bilateral nerve preservation and 16.1% for unilateral nerve preservation. Walsh et al. reported an improvement in potency after radical prostatectomy with bilateral conservation of 86%, 18 months after the operation. In our study, there were no cases of severe erectile dysfunction after bilateral neurovascular bundle-sparing surgery, compared with one case after unilateral bundle preservation; the difference was not statistically significant, possibly due to the small number of study patients. Contrastingly, in relation to orgasmic dysfunction, there were 4 cases of severe dysfunction after unilateral neurovascular bundle-sparing surgery and no cases of severe dysfunction after the bilateral surgery; these results were statistically significant.

Advanced tumor stage tends to coincide with extensive extirpation of one or both neurovascular bundles, and the potency rates are limited in these cases. Nerve-sparing surgery cannot be performed on many patients and potency is normally lost. Non nerve-sparing radical prostatectomy has a reported postoperative potency rate of 0-17%. Potency rates vary between 61% and 100% after the operation, and they are reduced to 70%-85% in men between 50 and 70 years of age.

A complete absence of orgasm, reduced orgasmic intensity, or painful orgasm may result from radical prostatectomy. Steineck et al. reported absence of orgasm in 34% of men after the operation, reduced intensity in 30%, and painful orgasm in 9% of men. Noldus et al. found that 80% of men experienced no changes in their orgasm, 9% said their orgasm improved, and 11% had reduced orgasmic intensity. None of the studies mentioned made a correlation between orgasmic function and the number of spared neurovascular bundles. Severe sexual dysfunction from 2% to 72% of cases is reported in the literature. Many men apparently present with persistent sexual dysfunction.

A review of the literature was carried out to search for the etiology of erection dysfunction after radical prostatectomy. Neurogenic factors seem to be the most common explanation for this function. The arguments in favor of a neurogenic cause were: relation to the number of
neurovascular bundles and the absence of a history of vascular disease. It is possible that, in general, fewer nerve bundles need be spared in younger patients in order to remain potent, compared with older patients. The neurogenic factor is the most important factor for developing erectile dysfunction after radical prostatectomy. Surgical technique and patient selection are very important. In a recent systematic review, Montorsi et al. concluded that erections after nerve-sparing prostatectomy should be achieved, with or without medical assistance, when the operation is performed by experienced surgeons on well selected patients.36,37

Vascular factors can be of importance in selective cases. Some researchers found that preservation of the accessory pudendal arteries can have a favorable influence on the recovery of sexual health. Arterial insufficiency and venous occlusion dysfunction can be found in 32%-59% and 26%-52% of the patients after radical prostatectomy, respectively. Nevertheless, further studies on the vascular factor are needed in order to fully understand its post-radical prostatectomy role and a preoperative analysis of vascular status should also be included. Color Doppler imaging has been identified as the most reliable noninvasive diagnostic test for evaluating dysfunction in those patients that do not respond to drug therapy.

Conclusions
The results of our study and those reported in the literature show that there is a higher preservation of orgasmic function than of erectile function following radical prostatectomy. The majority of our patients maintained orgasm and sexual desire due to the stimuli originating from the genital area and the pelvic floor that reach the brain through the sensory fibers of the somatic pudendal nerve that is protected by the fascia near the pelvic wall.

Thus, orgasmic function is probably not as vulnerable as erectile function in relation to this procedure. Likewise, the preoperative and postoperative questionnaires showed similar orgasmic function with regard to quality and intensity. However, erectile dysfunction and the absence of the prostate were observed as independent factors for orgasm quality.

Taking into account that the surgical aim is complete extirpation of the primary tumor, the quality of life and satisfaction of the patient after surgery can be reduced due to the presence of postoperative urinary incontinence, erectile dysfunction, or both. Therefore there should be 2 goals after prostatectomy: the oncologic result and the general results.

The present study attempted to draw attention to those studies that analyze quality of life and the surgical consequences following radical prostatectomy through the inclusion of orgasmic function evaluation in their studies; such a focus could contribute to shedding more light on this little-discussed theme, offering new work elements for improving the quality of life of our patients and providing them with more accurate and detailed information before their surgery.

Drug-assisted rehabilitation programs with low doses of phosphodiesterase type 5 (PDE5) inhibitors or intra-cavernosa therapy are a standard development that undoubtedly will have an influence on patients in the future, as well as on treatment guidelines, clinical guidelines, and quality management protocols.

The preservation and rehabilitation of sexual function after prostate cancer treatment remains a challenge.

Conflict of interest
The authors declare that there is no conflict of interest.

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References