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ORIGINAL

## Erectile function rehabilitation after laparoscopic radical prostatectomy



Sergio Alonso Gregorio\*, Juan Gómez Rivas, Leslie Cuello Sánchez, Ángel Tabernero Gómez, Jesús Cisneros Ledo, Jesús Javier de la Peña Barthel

Hospital Universitario La Paz, Department of Urology, Madrid, Spain

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### KEYWORDS

Radical prostatectomy;  
Erectile dysfunction;  
Phosphodiesterase-5 inhibitors

### Abstract

**Objectives:** To evaluate the results of erectile function rehabilitation with sildenafil after laparoscopic radical prostatectomy (LRP).

**Materials and methods:** We have evaluated on a retrospective way a subgroup of LRP with neurovascular bundles sparing that have followed a treatment schedule for erectile function rehabilitation based on sildenafil citrate. We defined the initial erectile function state as penetrate without drugs, with drugs and do not penetrate. A comparison with the erectile function after the treatment was performed. Data were analyzed at our biostatistics section.

**Results:** We selected a total of 33 patients, 7 with unilateral neurovascular bundles sparing and 26 with bilateral neurovascular bundles sparing treated with sildenafil citrate after surgery. The recuperation rate of erectile function with bilateral sparing was 80.7%. This success rate reaches 87.5% in patients <70 years old. In the unilateral sparing group the success rate was 85.7%. Two patients abandoned the treatment schedule.

**Conclusions:** Laparoscopic radical prostatectomy with neurovascular bundles sparing offers a high preservation rate of erectile function on expert surgeons. The maintenance treatment with phosphodiesterase-5 inhibitors may offer benefits for the erectile function rehabilitation and it has to be initiated as soon as possible.

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### PALABRAS CLAVE

Prostatectomía radical;

### Rehabilitación de la función erectil tras prostatectomía radical laparoscópica

### Resumen

**Objetivos:** Evaluar los resultados de la rehabilitación de la función eréctil con sildenafil tras prostatectomía radical laparoscópica (PRL).

\* Corresponding author.

E-mail address: [sergioalonsogregorio@gmail.com](mailto:sergioalonsogregorio@gmail.com) (S. Alonso Gregorio).

## Disfunción eréctil; iPDE5

**Material y Metodos:** Hemos evaluado de forma retrospectiva un subgrupo de PRL con preservación de haces neurovasculares que han seguido una pauta de tratamiento para la rehabilitación de la función sexual con citrato de sildenafil. Se ha definido el estado basal de la función eréctil como "penetra sin fármacos", "penetra con fármacos" y "no penetra". Se compararon los resultados antes y después del tratamiento. Los datos fueron analizados en nuestra sección de bioestadística.

**Resultados:** Se han seleccionado un total de 33 pacientes, 7 con preservación unilateral de haces neurovasculares y 26 con preservación bilateral. La tasa de recuperación de la función eréctil con preservación bilateral es del 80.7%. Esta tasa alcanza el 87.5% en pacientes < de 70 años. Para el grupo de preservación unilateral la tasa es de 85.7%. Dos pacientes han abandonado la terapia.

**Conclusiones:** La PRL con preservación de erectores ofrece una elevada tasa de conservación de la función eréctil cuando es llevada a cabo por cirujanos expertos. La terapia mantenida con iPDE5 puede ofrecer beneficios para la rehabilitación de la función eréctil y debe administrarse lo antes posible.

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## Introduction

Since the development of radical prostatectomy there is significant interest from the urologist to indemnify and solve the deleterious effects of radical surgery in the treatment of prostate cancer: urinary incontinence and erectile dysfunction (ED).

With refinement of the surgical technique described by Walsh and Mostwin, the results in terms of potency markedly improved.<sup>1</sup> However, the more demanding surgical procedures that improve the functional outcomes achieved a limited popularization in urologic community. Some single surgeon series reaches preservation of potency after radical prostate surgery in 70–86% of cases, but the average rates of erectile function preservation in the global urological community are 21–50%.<sup>2–4</sup> Nowadays this situation continues despite the renewed interest in erectile function after radical prostatectomy with the advent of laparoscopic surgery.

Only a refined approach of neurovascular bundles sparing, and therefore the surgeon experience, allows greater preservation of sexual potency.

The last example of the interest to treat ED after radical prostatectomy surgery is defined by what is now known as post-surgical rehabilitation of erectile function. There are two lines of thoughts or schools on the beneficial effects of phosphodiesterase-5 (PDE5) inhibitors in this group of patients: the first is that PDE5 inhibitors produce an increase in penile tissue oxygenation, and the second is that PDE5 inhibitors are antifibrotic substances whose the main mechanism of action is to inhibit oxidative stress in cavernous tissue secondary to neurotomy.

The fundamental cause of ED is the damage to the neurovascular bundles during the surgical procedure which involves the disruption of normal neurotransmission during the erection. As consequence, several changes occurs in the corpus cavernosum: increased collagen content, decreased smooth muscle cells, decreased blood flow, hypoxia, fibrosis and finally cell apoptosis.

The cascade of events produced by penile denervation includes an increase of free radicals that induce apoptosis

of vascular endothelium, a dramatic decrease in the activity of endothelial and neural NO synthetases, a decrease in the content of smooth muscle cells and their proliferation index (which explains the loss of weight of the corpus cavernosum), increased profibrotic factors (TGF $\beta$ 1), and finally, a veno-occlusive ED is establish. All these changes are immediately started since cavernous nerve injury occurs, and therefore, time is a critical variable to be considered in terms of etiology and also in terms of treatment.

The goal of erectile function rehabilitation is to reverse the described cascade of events. There is sufficient pathophysiological basis for the rehabilitation of erectile function in an early stage: (1) in muscle cell cultures, cavernous hypoxia induces TGF –  $\beta$ 1 and subsequent penile fibrosis, (2) The synthesis of phosphodiesterase-1 (which inhibits collagen synthesis dependent of TGF –  $\beta$ 1) in the cavernous muscle is oxygen dependent, (3) in rats animal model is evidenced the overexpression of TGF –  $\beta$ 1 and collagen after cavernous nerve injury by penile biopsy, (4) nocturnal erections have a protective role of hypoxia in penile flaccidity, so the absence of erections during the neuroparaxia induce persistent penile hypoxia, (5) User et al. in the animal model demonstrates an important apoptotic index in the smooth muscle cell and a major replacement of erectile tissue by collagen and Iacono et al. obtained similar results in humans,<sup>5,6</sup> and (6) Mulhall et al. and Montorsi et al. show that the veno-occlusive dysfunction increases with time after surgery and that early treatment could significantly reduce the incidence of venous leak<sup>7,8</sup>.

The aim of our study is to evaluate the results of erectile function rehabilitation with sildenafil after laparoscopic radical prostatectomy (LRP).

## Materials and methods

We retrospectively reviewed a subgroup of LRP with neurovascular bundles sparing performed in our institution in the period 2008–2012 which have followed a schedule of erectile function rehabilitation based on sildenafil citrate, a PDE5 inhibitor.

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