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## Case Series of the Month

# A New Anatomic Approach for Robot-Assisted Laparoscopic Prostatectomy: A Feasibility Study for Completely Intrafascial Surgery

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### Abstract

Robot-assisted laparoscopic prostatectomy (RALP) has been disseminated widely, changing the knowledge of surgical anatomy of the prostate. The aim of our study is to demonstrate the feasibility of a new, purely intrafascial approach.

The Bocciardi approach for RALP passes through the Douglas space, following a completely intrafascial plane without any dissection of the anterior compartment, which contains neurovascular bundles, Aphrodite's veil, endopelvic fascia, the Santorini plexus, pubourethral ligaments, and all of the structures thought to play a role in maintenance of continence and potency.

In this case series, we present our first five patients undergoing the Bocciardi approach for RALP. We report the results of our technique in three patients following two unsuccessful attempts. No perioperative major complication was recorded. Pathologic stage was pT2c in two patients and pT2a in one patient, with no positive surgical margin. The day after removing the catheter, two of the three patients reported use of a single, small safety pad, and one patient was discharged without any pad. One patient reported an erection the day after removing the catheter.

The anatomic rationale for better results compared with traditional RALP is strong, but well-designed studies are needed to evaluate the advantages of our technique.

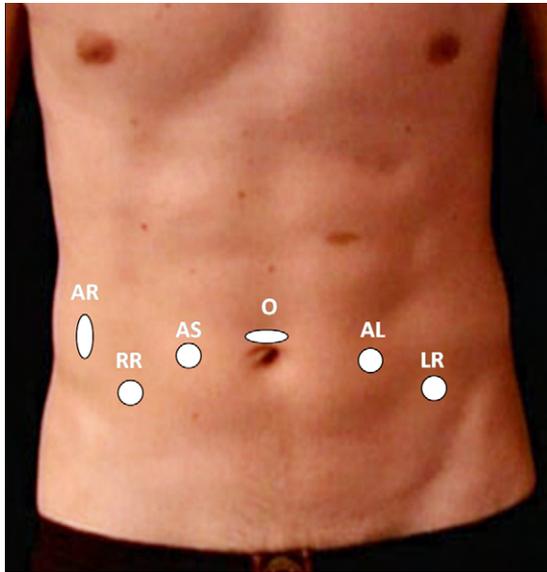
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## 1. Case series

Robot-assisted laparoscopic prostatectomy (RALP) was first performed in 2000 by Binder et al in Frankfurt, Germany [1], and by Abbou et al in Creteil, France [2]. Since then, RALP has been disseminated widely, with continuous improve-

ments in technique, such as Rocco stitch positioning [3]; improvements in anastomotic sutures; and use of suprapubic catheters instead of transurethral catheters [4]. Nevertheless, endopelvic fascia, neurovascular bundles, puboprosthetic ligaments, eventual accessory pudendal arteries, and the Santorini plexus, all advocated to play a



**Fig. 1 – Position of the six laparoscopic trocars.**  
RR = right robotic arm, 8 mm; LR = left robotic arm, 8 mm; O = optic, 12 mm; AR = right assistant port, 10 mm; AS = aspiration, 5 mm; AL = left assistant port, 10 mm.

role in maintenance of potency and continence [5], remain at risk of damage using the robotic approach.

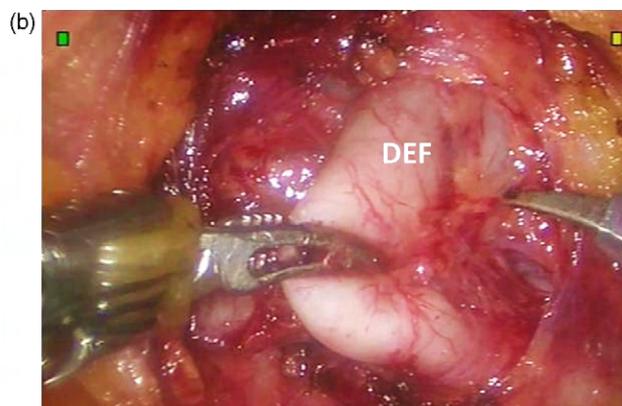
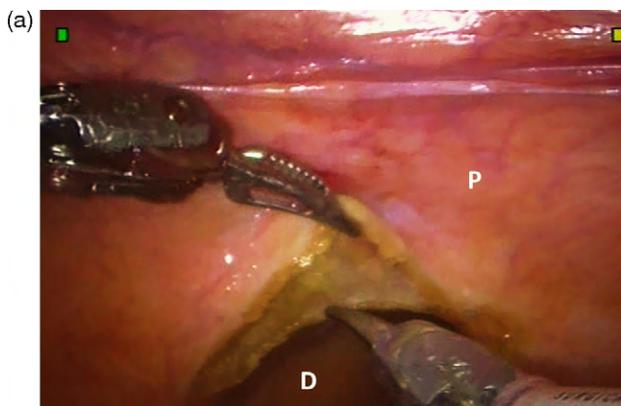
During our learning curve for RALP (seven cases before the current study), we developed the idea of avoiding all of these anatomic structures by passing through a posterior plane, the Douglas space, previously explored only through the transcoccygeal approach [6].

In this case series, we report our very early experience with this new approach for RALP in our first five patients.

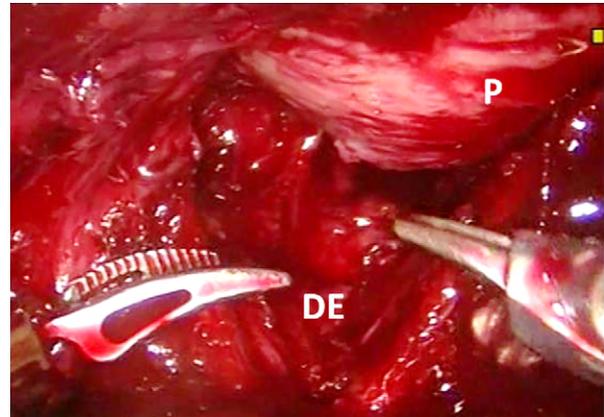
### 1.1. Surgery

A three-arm da Vinci robot (Intuitive Surgical, Sunnyvale, CA, USA) was used. No institutional review board approval is required to perform these kinds of studies in our country.

The Bocciardi approach for RALP uses the following structure:

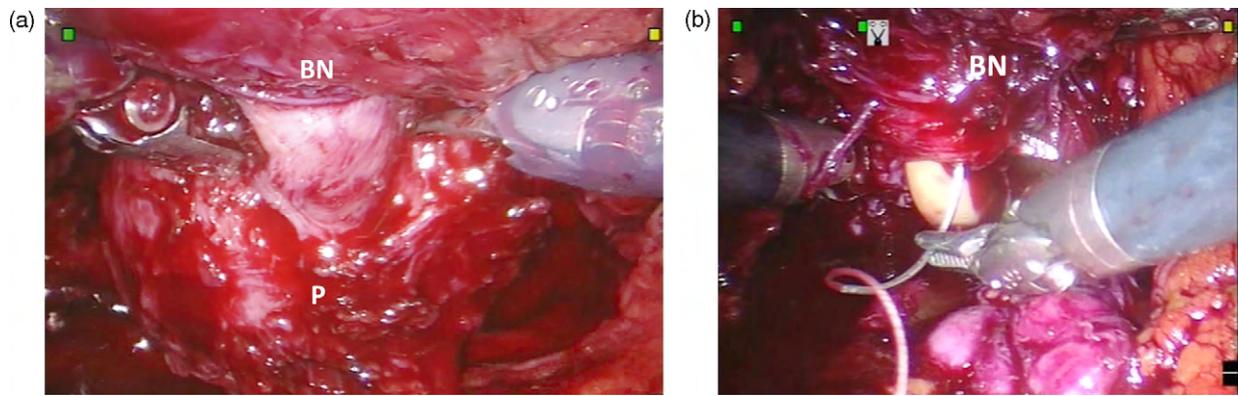


**Fig. 2 – (a) The parietal peritoneum is incised at the anterior surface of the Douglas space; (b) deferens vasa and seminal vesicles are isolated.**  
P = peritoneum; D = Douglas space; DEF = deferens.

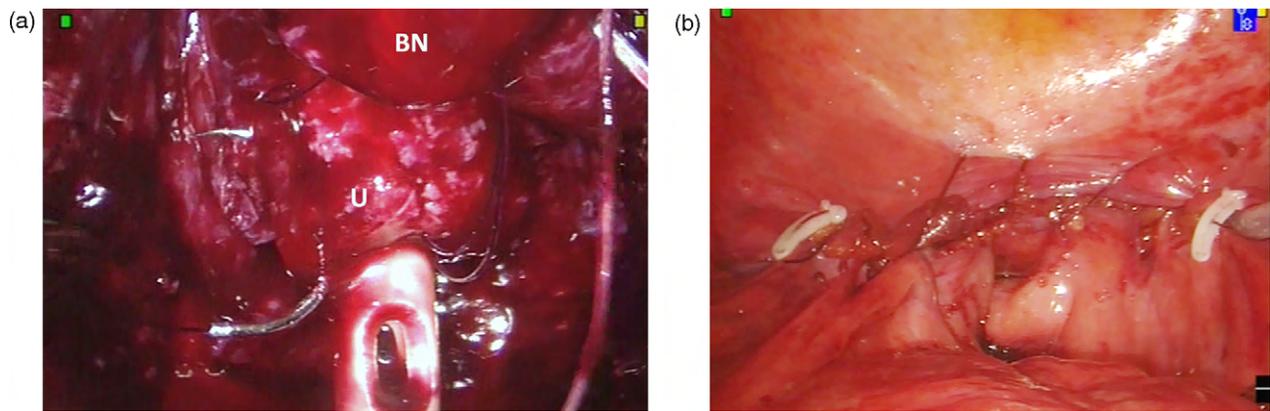


**Fig. 3 – The posterolateral surface of the prostate is isolated, maintaining a totally intrafascial plane.**  
P = prostate; DE = Denonvillier's fascia.

- The patient is put in the standard 30° Trendelenburg position. Six laparoscopic trocars are inserted, as described in Fig. 1. The three-arm da Vinci robot is set up with a 0° lens.
- The parietal peritoneum is incised at the anterior surface of the Douglas space. Seminal vesicles and deferens vasa are isolated and incised (Fig. 2).
- Denonvillier's fascia is separated by the posterolateral surface of the prostate in an antegrade direction, reaching the prostatic apex, maintaining a completely intrafascial plane (Fig. 3).
- The bladder neck is isolated and sectioned. To evert the mucosa and to easily identify the bladder neck orifice for performing the anastomosis, four short cardinal stitches are positioned (Fig. 4).
- The anterior surface of the prostate is bluntly isolated from the Santorini plexus without any incision. The apex isolation is completed, and the urethra is incised. The prostate is positioned into an Endobag.
- The anastomosis is performed using a continuous suture starting from the 3 o'clock position. After passing the anterior stitches into the bladder neck, the catheter



**Fig. 4 – (a) The bladder neck is isolated and sectioned; (b) to easily find the bladder neck orifice during the suture of the anastomosis, the first of four short cardinal stitches is positioned. P = prostate; BN = bladder neck.**



**Fig. 5 – (a) The anastomosis is performed using a continuous suture starting from the 3 o'clock position. After passing the first stitches into the bladder neck, the catheter is passed and the anastomosis is completed. (b) A tubular drain is positioned and the parietal peritoneum is closed. U = urethra; BN = bladder neck.**

is passed into the bladder and the anastomosis is completed. The parietal peritoneum at the Douglas space level is finally closed (Fig. 5).

Fig. 6 provides more anatomic detail of our technique from transverse and sagittal perspectives.

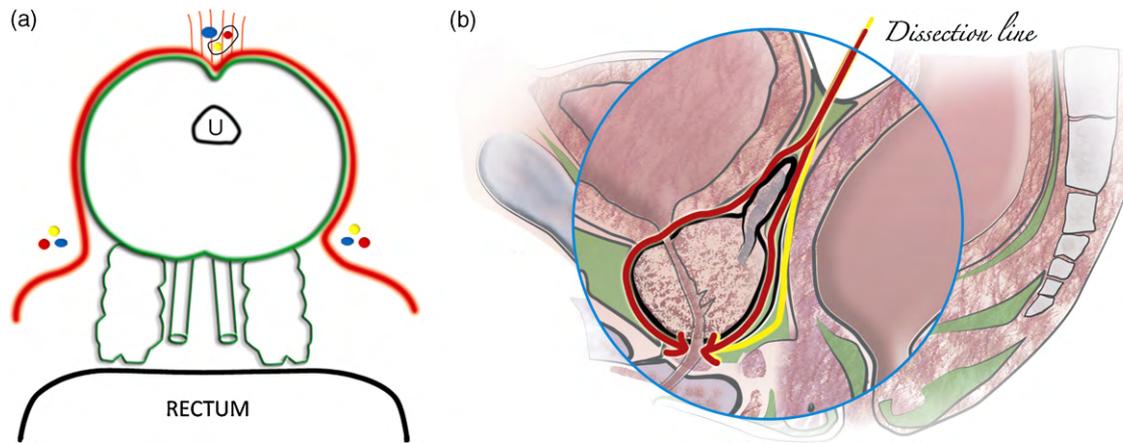
**1.2. Outcomes**

In January and February 2010, five patients were operated with the intention of using the new approach. The demographic, surgical, and oncologic features of the five patients are summarized in Table 1.

**Table 1 – Demographic, surgical, and oncologic features of the five patients**

Feature	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
Age, yr	47	68	58	51	66
Preoperative PSA, ng/ml	4.3	3.7	5.9	9.8	4.5
Biopsy Gleason score	3 + 4	2 + 2	3 + 3	3 + 3	3 + 4
Operative time, min	300	345	330	350	320
Console time, min	250	290	270	300	270
Estimated blood loss, ml	300	400	700	300	400
Complications	Bladder perforation	Bladder perforation	–	–	–
Catheterization time, d	14	14	14	5	6
In-hospital stay	6	7	6	6	7
Pathologic TNM category	pT2c	pT2c	pT2c	pT2c	pT2a
Positive margins	No	No	No	No	No
Pathologic Gleason score	4 + 3	3 + 3	3 + 4	3 + 3	3 + 4

PSA = prostate-specific antigen.



**Fig. 6 – (a) Transverse section of the anatomic spaces crossed during the Bocciardi approach for robot-assisted laparoscopic prostatectomy (RALP): Beyond the red line, the anterior compartment, containing all the anatomical structures advocated to be responsible for continence and potency preservation (eg, neurovascular bundles, pubourethral or puboprostatic ligaments, Aphrodite's veil, accessory pudendal arteries), remains untouched during surgery; the green line mimics the dissection planes; U: Urethra. (b) Sagittal section of the anatomic spaces crossed during the Bocciardi approach for RALP. The red line shows the intrafascial plane and the yellow line shows the extrafascial plane, with the Denonvillier's fascia in the middle (black).**

In the first two patients, the procedure was not completed with the Bocciardi approach because of difficulties finding the posterior plane in one case (previous history of prostatitis) and performing the anastomosis in the second case. In both cases, a little posterior bladder wall perforation occurred. The perforations were sutured, and the procedure was converted to the traditional anterior approach without further difficulty. The postoperative course was uneventful, and the catheter was left for 14 d in both cases. In the following three cases, the operation was completed without complications. In the first of the three cases, the catheter was removed after 14 d because of the previous negative experiences, even though no contrast extravasation had been found during cystogram performed on the fifth postoperative day.

Twenty-four hours after catheter removal, the first two patients reported using a single safety pad, and the third reported not needing any pad for continence control. Finally, the second patient reported experiencing a valid erection the morning after catheter removal.

## 2. Discussion

In this case series, we developed a new approach for RALP because of anatomic considerations and greater respect for the structures involved in the mechanisms of potency and continence.

The reported new approach presents several theoretical advantages over the traditional technique.

First, this approach allows for the possibility of performing completely intrafascial prostatectomies. In fact, our technique preserves complete anatomic integrity of Aphrodite's veil, containing the neurovascular bundles. Several studies report the presence of nerves within the higher aspects of Aphrodite's veil and the endopelvic fascia [7]; thus, better functional results can be expected for patients in whom a high intrafascial procedure has been performed [8]. With the standard RALP procedure as well as

with intrafascial approaches preserving Aphrodite's veil, the higher aspect of the veil has to be opened. In contrast, with the Bocciardi approach, the veil does not have to be opened at any point, providing a strong rationale for obtaining better results.

Second, this approach enables the surgeon to avoid the Santorini plexus, ensuring less blood loss. It is common to find small arteries during the Santorini dissection, and the role of these vasa is currently unknown. Given that a possible role in the accessory blood supply of the striated sphincter or the corpora cavernosa cannot be excluded, preservation of the plexus could further aid better functional results.

Third, pubourethral ligaments and eventual accessory pudendal arteries are avoided completely. The importance of such structures is still debated [5], but some role in preservation of continence and potency has been postulated by several authors [9].

Finally, the procedure is carried out using a smaller surgical dissection. In fact, the entire operation is performed through a Douglas incision of no more than 4 cm (Fig. 5b). In contrast, the traditional RALP approach requires a large dissection of the entire anterior surface of the bladder, using an incision approximately 15 cm long, shaped like an inverted U from an umbilical ligament to the contralateral, passing through the urachal ligament.

Most of the studies analyzing the impact of surgical trauma on patient recovery focus on external skin incisions [10]. Where skin incisions are already reduced to a minimum through a laparoscopic approach, the impact of surgical trauma should be evaluated according to the wideness of internal dissection. Well-designed studies are needed to demonstrate that lower internal dissection is related to quicker recovery.

Several aspects prevented us from performing this technique in the initial cases. We initially found many difficulties with the classical RALP port positioning because of intra-abdominal conflicts. Changing the left assistant port

position resulted in easier collaboration during surgery (Fig. 1). The working space is very limited compared with the classical approach. The posterior wall of the bladder falls in the surgical field if the bladder is not completely empty. Consequently, traction maneuvers can result in damage to the bladder wall, and this occurred in our first two cases. Moreover, the ureters run laterally in the posterior bladder wall, so attention has to be paid during isolation maneuvers. Finally, the angle of vision is very unfavorable, especially when performing the anastomosis, because the sectioned bladder neck tends to retract and become invisible with the 0° operating lens. In our experience, changing to a 30°-up lens during this step did not prove to be useful. Adding four cardinal stitches, everting the mucosa, helped us to solve the problem.

The favorable preliminary results obtained in our first three cases (ie., no positive margins, no patient used more than one safety pad at catheter removal, one erection experienced during the sixth postoperative day) push us toward continuing this new approach, even though we are aware that short- and long-term follow-up are needed to confirm our data. Obviously, further well-designed studies are needed to compare the Bocciardi approach with the traditional approach for RALP.

**Conflicts of interest:** The authors have nothing to disclose.

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Question:

According to the Bocciardi approach for robot-assisted laparoscopic prostatectomy, which procedure is the correct way to manage the Santorini plexus?

- A. Isolate, section, and suture
- B. Section without suturing
- C. Do not isolate, section, or suture
- D. Suture without sectioning

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