

# Robotic-assisted Radical Prostatectomy in a $\geq 350$ grams Prostate: A Case Report from an High-Volume Robotic Center

Kobe Van Hove<sup>1\*</sup>, Louise Callens<sup>1</sup>, Floor Vanelderen<sup>1</sup>, Iraj Ahmadzai<sup>1</sup>, Louis-Philippe Boret<sup>1</sup>, Luca Sarchi<sup>1,2</sup>, Marco Paciotti<sup>1,2,3</sup>, Angelo Mottaran<sup>1,2,4</sup>, Adele Piro<sup>1,2,5</sup>, Luigi Nocera<sup>1,2,6</sup>, Pieter De Backer<sup>1</sup>, Fernando Gonzales-Meza<sup>1,2</sup>, Ruben De Groote<sup>2</sup>, Alexandre Mottrie<sup>1,2</sup> and Carlo Andrea Bravi<sup>1,2</sup>

<sup>1</sup>ORSI Academy, Ghent, Belgium

<sup>2</sup>Department of Department of Urology, Onze-Lieve-Vrouweziekenhuis Hospital, Aalst, Belgium

<sup>3</sup>Department of Urology, Humanitas Research Hospital, IRCCS, Rozzano, Milan, Italy

<sup>4</sup>Division of Urology, IRCCS Azienda Ospedaliero-Universitaria di Bologna, Bologna, Italy

<sup>5</sup>Department of Urology, University of Modena and Reggio Emilia, Modena, Italy

<sup>6</sup>Division of Oncology/Unit of Urology; URI; IRCCS Ospedale San Raffaele, Milan, Italy

## Abstract

**Background:** Radical prostatectomy is among gold standard treatments for prostate cancer (PCa). As compared to other surgical approaches, robot-assisted radical prostatectomy (RARP) offers several advantages such as better intra-operative manipulation and lower peri-operative morbidity and as such, it is currently the preferred surgical option whenever available. In candidates to RARP, a large prostate is often a challenge as it may affect operative and functional outcomes, but can be safely performed according to current literature. However, studies of RARP involving a large prostate were often limited to a weight ranging from 50 to 150 grams, with only few cases of RARP performed on bigger prostate glands. For this reason, we want to describe a case of a patient with a prostate larger than 350 grams treated with RARP at our institution.

**Case report:** We presented a case of a 68-year-old patient that came for a second opinion following a diagnosis of prostate carcinoma after an elevated PSA of 21 ng/ml without the presence of lower urinary tract symptoms. Magnetic resonance imaging showed a PIRADS 5 lesion in the left apex with an estimated weight of 450 grams. Biopsy showed an International Society of Urological Pathology (ISUP) group-3 adenocarcinoma. RARP was performed using an anterior, trans-peritoneal approach. The operative time was 210 minutes, and the estimated blood loss was 1400 ml. Pathological examination showed a pT3b, ISUP group 3 invasive PCa, with negative surgical margins. After surgery, the patient was discharged after two days without postoperative complications, and the urethral catheter was removed after 5 days. At a follow-up visit 30 days after surgery, the patient had neither voiding problems nor urinary incontinence.

**Conclusion:** We described a case of a patient with an extremely large prostate who underwent robot-assisted radical prostatectomy for prostate cancer. Our findings suggest that a large prostate size is not an absolute contraindication for RARP, with optimal recovery of urinary continence early after surgery. Further research, especially larger studies with longer follow-up, is awaited in order to accurately evaluate outcomes of RARP in patients with large prostates.

**Keywords:** Prostate cancer • Robotic surgery • Urological procedures • Robotic-assisted radical prostatectomy • Large prostate

## Introduction

Radical prostatectomy is one of the gold standard treatment options for prostate cancer (PCa). Among different surgical approaches, Robotic-assisted Radical Prostatectomy (RARP) is being used more and more thanks to its many advantages [1]. The use of a high-resolution camera with three-dimensional visualization, equipped with robotic arms with 7-degree of freedom, makes the surgeons more capable of performing high precise dissections of the anatomic structures. Moreover, RARP helps decrease hospital stay and complications during surgery compared to laparoscopic or open radical prostatectomy [2].

*\*Address for Correspondence:* Kobe Van Hove, ORSI Academy, Ghent, Belgium, E-mail: kobe.vanhove@ugent.be

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Among determinants of successful surgery, prostate size may affect operative time, bleeding, and urinary continence recovery after surgery [2]. The median prostate weight of radical prostatectomy specimens is 34 grams [3], and most literature uses 50 cc as a cutoff for a large prostate volume(1). In this context, although retrospective studies have demonstrated that RARP is safe in men with large prostates, there is limited evidence on prostates that weighing more than 150 grams [4,5].

For this reason, we aimed at describing the feasibility of RARP in terms of operative outcomes and urinary continence recovery in a patient with a prostate weighing more than 350 grams.

## Case Presentation

We present a case of a man who received a diagnosis of prostate cancer in a gland of exceptional size, treated with a robotic-assisted radical prostatectomy. To our knowledge, this is one of the largest prostate treated with RARP described in the literature.

In October 2021, a 68-year-old patient presented to Onze-Lieve-Vrouw Hospital (Aalst, Belgium) for a second opinion of prostate cancer diagnosed elsewhere. He had no relevant medical history. Bloodwork showed a PSA

level of 21 ng/ml on admission laboratory examinations; on digital rectal examination, there were no palpable lesions. Magnetic resonance imaging showed a prostate of 450 grams (Figures 1 and 2), with a PIRADS 5 lesion at the left apex. Bone density scan showed no evidence of metastases. Random prostate biopsies performed at a different hospital showed an International Society of Urological Pathology (ISUP) group 3 adenocarcinoma.

RARP was performed with the Intuitive da Vinci Xi System with an anterior, trans-peritoneal approach [6]. Total operative (console) time was 210 (190) minutes, with an estimated blood loss of 1400 ml. No lymph node dissection was performed. No intra-operative complication occurred.

On final pathology, the prostate measured 9 × 10 × 7 cm and weighed 352 grams (Figure 3). The tumour was an invasive acinar adenocarcinoma of the prostate, ISUP group 3. While there was evidence of bilateral invasion of seminal vessels, extra-prostatic extension was absent. Perineural infiltration was present, whereas lympho-vascular invasion was suspicious but not seen with additional immune-histochemical staining. Surgical margins were tumour-free. Final pathological stage was pT3b pN1 R0.

The patient was discharged two days after surgery. No postoperative complications were recorded. After five days, the urethral catheter was successfully removed without residue. At a follow-up visit 30 days after surgery,



Figure 3. Image of the resected prostate, weighing 368 grams.

the patient had neither voiding problems nor urinary incontinence. In addition, he experienced no post-operational bleeding or infection. He experienced erectile dysfunction for which Sildenafil was prescribed. Thereafter, the patient was referred to his local urologist for further follow-up.

## Discussion and Literature Review

In this study, we described one of the largest prostate gland treated with robot-assisted radical prostatectomy for prostate cancer available in the literature.

Large prostates represent a challenge for prostate surgery, with also potentially severe consequences. For instance, prior investigators showed that some patients receiving surgical treatment for prostates exceeding 700 grams died because of haemorrhage [7]. With respect to RARP, we have shown that this operation is technically feasible in this patient population and can be safely performed in terms of intra-operative complications. Only few other examples of RARP performed in large prostates are available in the literature. For example, another group described a patient treated robotically for a prostate cancer diagnosed in a gland of 560 grams [8]. The authors were able to complete the operation in slightly more than four hours, with an estimated blood loss of 500 ml. After two weeks from surgery, the catheter was successfully removed. This is consistent with our findings, and also in line with other retrospective studies showing that RARP in large prostates is associated with a longer console time and higher volume of blood loss [4,5]. In this regard, it is possible that future developments in robotic surgery – such as the introduction of new robotic platforms [9-11] – might mitigate these limitations, expanding the indications for RARP also in large prostate glands.

Functional outcomes are similarly important in terms of quality of life. In this regard, Kim MS, et al. [5] described that RARP in large prostates had no effect on the continence rate, whereas the group with a higher prostate volume had lower potency rates [4]. At first sight, these findings are in line with our functional findings. However, given the short follow-up after surgery, we cannot draw definitive conclusions on the potency status of our patient. That said, our results are consistent with those described in other studies [4,5]. We also have to acknowledge that follow-up information was not available after surgery as our patient was followed up by his local urologist. Still, despite these limitations, we here described one of the largest prostate gland removed with robot-assisted radical prostatectomy for prostate cancer.

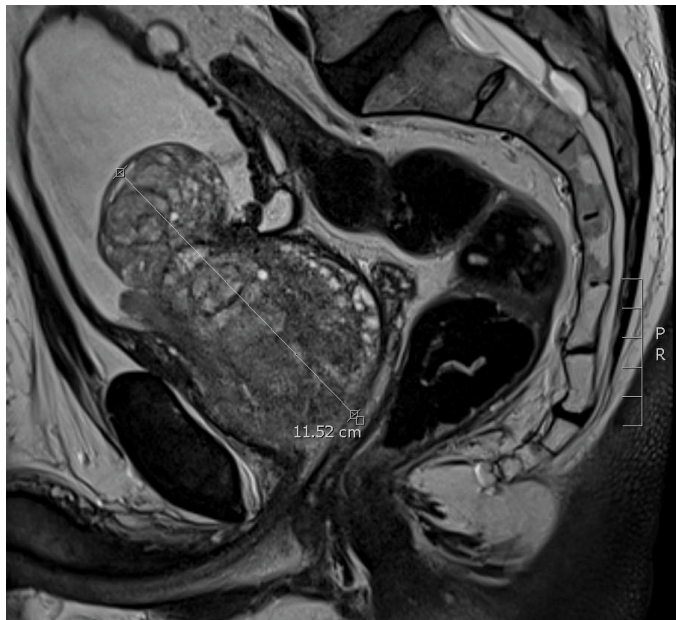


Figure 1. MRI of the prostate, sagittal section.

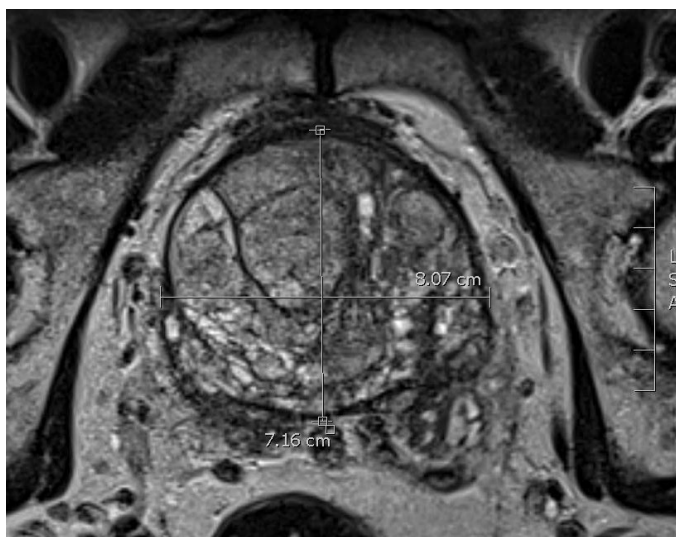


Figure 2. MRI of the prostate, axial section.

## Conclusion

We described a case of a patient with an extremely large prostate who underwent robot-assisted radical prostatectomy for prostate cancer. Our findings suggest that a large prostate size is not an absolute contraindication for RARP, with optimal recovery of urinary continence early after surgery. Further research, especially larger studies with longer follow-up, is awaited in order to accurately evaluate outcomes of RARP in patients with large prostates.

## Competing Interests

None.

## Ethical Approval and Consent of Participants

All authors have declared that no conflict of interest exists.

All procedures in studies involving human participants were in accordance with the ethical standards of the institutional research committee at which the studies were conducted (IRB approval number 93/2012/U/Oss) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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