

# Robot-assisted laparoscopic radical prostatectomy after heart transplantation

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## Abstract

Prostate cancer (CaP) is the leading visceral malignancy in males. Patients who undergo cardiac transplantation are immune compromised, thus presenting a therapeutic challenge. Immunosuppression could accelerate tumor growth, while medical intervention may be associated with increased treatment mortality or morbidity. Due to paucity of such cases, there are no randomized trials that address the treatment algorithm for cardiac transplant patients with CaP, with only a few scattered reports in the literature. Treatment options range from hormonal manipulation to radiation therapy to radical prostatectomy. To our knowledge, we report the first successful robot-assisted laparoscopic radical prostatectomy in a heart transplant patient with CaP.

**Key Words:** Heart transplant, prostate cancer, robot-assisted radical prostatectomy

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## INTRODUCTION

Prostate cancer (CaP) is one of the most common visceral malignancies diagnosed in males. It is a disease whose incidence increases with advancing age. In general, CaP is considered a slow-growing cancer and treatment options are weighed against a patient's expected longevity and comorbidity. Transplant patients present an interesting case scenario as the use of immunosuppressive medications can potentially accelerate tumor growth,<sup>[1]</sup> implying that longevity may not have such a significant role, and may impair wound healing.<sup>[2]</sup>

The treatment of CaP in the post-renal transplant patient has been well documented in the literature, and radical retropubic

prostatectomy appears to be safe with similar morbidity when done in renal transplant patients versus non-transplant patients.<sup>[3]</sup> The data on CaP therapy post-cardiac transplant are scarce and limited. There may be an increase in the incidence of CaP in men after heart transplantation<sup>[4]</sup> coupled with the increased longevity of heart transplant patients, as more such patients are likely to seek and undergo surgical therapy for localized CaP.

The case being reported here is unique due to the rarity of the occurrence and detection of organ confined CaP, especially in younger patients following heart transplant.<sup>[4,5]</sup> To the best of our knowledge, this may be the sole case report that demonstrates the safety and feasibility of performing robot-assisted laparoscopic radical prostatectomy (RALRP) in patients with a prior heart transplant.

## CASE REPORT

A 54-year-old Caucasian male with a past history of doxorubicin (therapy for neck sarcoma in the 1980s) induced non-ischemic dilated cardiomyopathy diagnosed on endomyocardial biopsy in 1995 was initially seen in the urology clinic for evaluation of an elevated serum prostate

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specific antigen (PSA). Since the time of diagnosis of his cardiomyopathy, the patient had a progressive worsening of his cardiac function, ultimately requiring orthotopic cardiac allograft in 2007. He has had excellent post-transplant graft function with a recent echocardiogram showing an ejection fraction of 50% and a New York Heart Association functional class of I. His maintenance immunosuppression included cyclosporine, mycophenolate mofetil and prednisone.

Routine laboratory assessment revealed that the patient had an elevated PSA of 9.1 ng/ml with a past history of rising PSA (a year before, his PSA was 3 ng/ml). Under appropriate pre-procedure prophylaxis, he underwent an uncomplicated 12-core prostate biopsy that revealed Gleason's 7 (4 + 3) adenocarcinoma of the prostate in 3/12 cores. After a long discussion with his spouse, primary care physician and his cardiologist, the patient decided to undergo RALRP with bilateral lymphadenectomy.

On the morning of his surgery, the patient took all his home medication and withheld aspirin with the permission of his cardiologist for 10 days. Preoperatively, the patient received broad-spectrum antibiotic prophylaxis (ciprofloxacin and cefazolin) and stress doses of steroids. He had an arterial line placed and two peripheral IVs. Anesthesia was induced with fentanyl and maintained with isoflurane. He was placed in the dorsal lithotomy with extreme Trendelenberg position. A bilateral nerve sparing robot-assisted laparoscopic prostatectomy (RALP) with bilateral pelvic lymph node dissection was performed in the manner as previously described.<sup>[6]</sup> A urethral catheter and an anastomotic drain were left in place.

Postoperatively, the patient was monitored on the floor with telemetry and his antibiotic prophylaxis was continued for 24 hours. The stress doses of steroids were continued for 24 hours and then he was weaned back to his preoperative dose. His drain was removed on postoperative day 2 and he was ultimately discharged home on postoperative day 3 without complications and with his urethral catheter. His urethral catheter was removed in clinic on postoperative day 10. The specimen was consistent with bilateral adenocarcinoma of the prostate (Gleason 4 + 3 = 7) with extensive perineural invasion and negative tumor margins and the pathologic tumor stage was pT<sub>2c</sub>N<sub>0</sub>M<sub>0</sub>. The follow-up PSA at 30 months was undetectable. Patient achieved continence in 6 weeks. Patient was very keen to have recovery of sexual functions; in order to achieve that, he was inducted on sexual rehabilitation program using a combination of vacuum constriction device and a phosphodiesterase (PDE-5) inhibitor. He is currently under regular follow-up of cardiology team.

## DISCUSSION

The occurrence of CaP<sup>[3]</sup> in heart transplant patients as well as the development/transmission of donor derived CaP<sup>[7]</sup> in the recipient patient following a heart transplant have both been documented in the literature. The present case was diagnosed with CaP within 6 months of transplantation. Mohammadi and co-workers demonstrated that the median time between the heart transplantation and the diagnosis of CaP is about 73 months.<sup>[4]</sup> They also showed in their series that 14 out of 15 patients with elevated PSA had CaP, with only one patient having chronic prostatitis.<sup>[4]</sup> In a report by Kelerman *et al.*,<sup>[8]</sup> the researchers compared the occurrence of *de novo* solid organ malignancies developing in patients following cardiac transplantation with that in the general population. These authors reported that the three most frequent cancers diagnosed in decreasing order were of the prostate, lung and breast.<sup>[8]</sup>

The treatment options of organ confined CaP are active surveillance, radiation therapy with or without hormonal manipulation, and surgical extraction. There are no randomized controlled trials that address the superiority of any of these treatment arms in heart transplant patients with CaP. To the best of our knowledge, we have reported here the first case of RALRP. There were no intraoperative or postoperative complications. There were no complications during induction or reversal of anesthesia or insufflation. The operative time and anatomy were comparable to the average case of RALRP done at our institution. Postoperatively, the patient was observed on a regular floor bed with cardiac monitoring. He did not show any clinical evidence of cardiac decompensation or failure. He did not have any evidence of urine leak, and his wounds remained intact with no evidence of drainage, redness, or dehiscence at his subsequent clinic visit. The patient did not develop any clinical signs of any major medical postoperative complications such as deep vein thrombosis, pneumonia, urinary tract infection or bacteremia.

With increasing advancements in the science and experience of cardiac transplantation, the survival of such patients with advancing age is likely to improve, thereby placing them at a higher risk of developing CaP. The present case report attests to the technical feasibility of RALRP in post-cardiac transplant patients without the attendant risk of increased complications. Although we did not encounter any intraoperative complication, any alteration in the wound recovery or healing, we believe that postoperative cardiac monitoring is a necessary component. A recent review of the literature on CaP predicts that close to three-fourths of all organ confined CaP detected in the United States will be treated by RALRP.<sup>[9]</sup> The present case demonstrates the feasibility of performing RALRP in patients with a prior heart transplant. Further long-term, larger studies

are definitely needed to better define the precise treatment guidelines for CaP in such patient cohorts.

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