

Two Unique Cases of Peritoneal Carcinomatosis Following Robotic Assisted Radical Prostatectomy

Robot Yardımlı Radikal Prostatektomi Sonrası İki Nadir Peritoneal Karsinomatoz Olgusu

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Abstract

We present two cases of peritoneal carcinomatosis following robotic assisted laparoscopic radical prostatectomy for prostate cancer. The first case is unique in that the carcinomatosis was found incidentally during a transperitoneal procedure for another malignancy. The patient did not possess high risk, adverse features and he experienced a 3-year period during which the prostate-specific antigen was undetectable. Our second case is unique in that, even though the patient had high risk disease, his margins were negative. It is possible that the transperitoneal nature of the surgeries may have contributed to the development of the metastases seen in these cases.

Keywords: Peritoneal carcinomatosis, Prostate cancer, Robot-assisted, Radical prostatectomy, Prostatectomy

Öz

Bu çalışmada, prostat kanserinde robot yardımcı laparoskopik radikal prostatektomi sonrasında gelişen iki peritoneal karsinomatoz olgusu sunmaktayız. Nadir olan ilk olgudaki karsinomatoz, başka bir malignite için transperitoneal işlem sırasında tesadüfen bulunmuştur. Hastada yüksek risk ve advers özellikler bulunmamaktaydı ve prostat spesifik antijenin saptanmadığı 3 yıllık bir süre deneylemiştir. Nadir olan ikinci olgunun hastalığı yüksek riskli olmasına rağmen, marjları negatifti. Ameliyatların transperitoneal doğası, bu olgularda görülen metastazların gelişimine katkıda bulunabilmektedir.

Anahtar Kelimeler: Peritoneal karsinomatoz, Prostat kanseri, Robot yardımcı, Radikal prostatektomi, Prostatektomi

Introduction

Peritoneal carcinomatosis from prostate cancer, with and without evidence of other metastatic sites, is extremely rare and not well studied. A handful of case reports describe dissemination at the time of cancer diagnosis as well as after treatment (1,2,3,4,5,6). These presentations vary widely, with most patients presenting with new-onset malignant ascites. We report our experience of two cases presenting within a decade with peritoneal carcinomatosis following robotic-assisted laparoscopic radical prostatectomy for prostate cancer. Both offer unique insights into the prostate cancer disease process. This is not a research study. Neither patient underwent any experimental procedures. Patients provided consent for the standard of care treatments described here.

Case Presentation

The first case is a 65-year-old male who presented in 2006 with a prostate-specific antigen (PSA) level of 4.4 ng/mL. He was diagnosed with Gleason 3+4 prostate cancer and underwent a robotic-assisted laparoscopic prostatectomy in July of 2006 with final pathology results indicating Gleason 3+4 disease, T2cN0M0 and negative margins. He developed biochemical recurrence (0.7 ng/mL) in September 2009. Over the next year, repeat PSA measures revealed a rapid doubling time, peaking at 3.3 ng/mL in August 2010. Metastatic evaluation was negative. He was subsequently started on androgen deprivation therapy (ADT) after which his PSA measures remained <0.1 ng/mL for several years. In June 2014, we started him on intermittent ADT. In December 2016, his PSA was 3.05 ng/mL with ADT being held. Repeat metastatic evaluation with computed tomography (CT)

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scan of the abdomen, pelvis and bone revealed an incidental enhancing 2.3 cm right renal mass, which grew to 2.7 cm over the next 10 months. Biopsy of the mass revealed renal cell carcinoma, clear cell type. The patient was scheduled for a robotic-assisted laparoscopic partial nephrectomy in September 2017. After access was gained into the peritoneum and pneumoperitoneum established, the initial laparoscopy revealed several small white lesions throughout the abdomen and pelvis, particularly conjugated around the right hemidiaphragm (Figure 1). The lesions were biopsied and sent to pathology for frozen section analysis. The main concerns at that time were peritoneal seeding from the biopsy of the renal mass and prostate adenocarcinoma. Upon receipt of the pathology report revealing prostate adenocarcinoma, the procedure was aborted. The final pathology revealed peritoneal carcinomatosis of metastatic prostate adenocarcinoma, Gleason 4+4=8. PSA prior to initiation of therapy was 6.6 ng/mL. In October 2017, the patient began therapy with ADT+ abiraterone/prednisone. His PSA as of December 2017 was 0.2 ng/mL.

Our second case involves a 65-year-old man diagnosed in 2007 with Gleason 4+4 (grade group 4) prostate cancer in 3/12 cores with a PSA of 2.7 ng/mL. He underwent a robotic-assisted laparoscopic prostatectomy with pelvic lymph node dissection

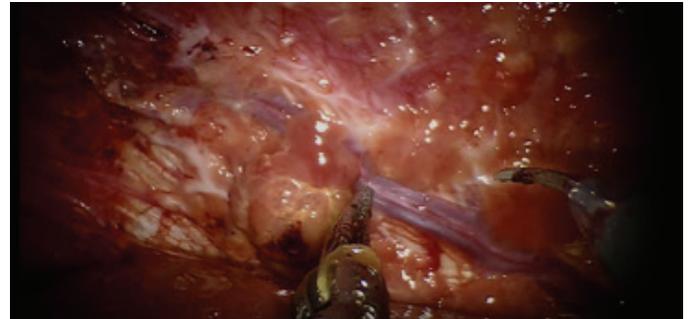


Figure 1. Peritoneal implants located underneath the diaphragm (case 1) Initial laparoscopy as part of planned robotic assisted laparoscopic partial nephrectomy revealed the several small white lesions pictured here, seen throughout the abdomen and pelvis, particularly conjugated around the right hemidiaphragm.

Table 1. Summary of reported cases of peritoneal metastasis of prostate cancer

Authors	Age at diagnosis	Gleason score (grade group)	Initial PSA (ng/mL)	PSA at time of recurrence	Initial TNM	Treatment before detection of metastasis	Treatment after detection of metastasis
Kehinde et al. (4) 2002	76	4+4 (group 4)	365	365	T3N0M1	-	Bilateral orchiectomy
Brehmer et al. (7) 2007	75	4+5 (group 5)	42	42	T3N0M1	-	ADT
Zagouri et al. (8) 2009	75	4+5 (group 5)	33	74	TxN0M0	ADT	Docetaxol
Benedict et al. (2) 2010	67	4+4 (group 4)	36.4	82	pT1a/bN0M0	TURP, ADT	Docetaxol
Hiyama et al. (3) 2011	69	4+4 (group 4)	9.5	168	T3aN0M0, +margin	LRP, Salvage XRT, ADT	Palliation
Shin et al. (5) 2012	75	4+3 (group 3)	10.5	12.37	pT3aN0M0, +margin	RALP + PLND	Surgical resection of peritoneal/liver lesion
Talwar, et al. (9) 2012	59	3+4 (group 2)	54.6	54.6	TxN0M1	-	ADT
Labanaris et al. (10) 2013	62	5+4 (group 5)	13.3	13.3	cT2cN0M0	- (aborted RALP due to discovery of implants)	ADT
Acar et al. (1) 2014	77	5+4 (group 5)	6.8	1.2 (on ADT)	pT3aN0M0, +margin	RALP + PLND, ADT	Continued on ADT, Excision of port site recurrence, abiraterone, scheduled for chemotherapy
Petrakis et al. (11) 2015	76	Unknown	Unknown	286.4	Unknown	TURP, ADT	Docetaxol
Sheng et al. (6) 2017	61	3+4 (group 2)	9.5	11.4	Unknown	RALP (unknown PLND), salvage XRT + ADT	ADT, omentectomy, abiraterone
Case 1	65	3+4 (group 2)	4.4	6.6	pT2cN0M0, -margin	RALP + PLND, iADT for BCR	ADT + abiraterone
Case 2	65	4+5 (group 5)	2.7	93.9 (on ADT)	pT3bN0M0, -margin	RALP + PLND, salvage XRT for BCR, ADT	Therapeutic paracentesis, docetaxel, mitoxantrone, cabazitaxel

PSA: Prostate-specific antigen, ADT: Androgen deprivation therapy, BCR: Biochemical recurrence, iADT: Intermittent androgen deprivation therapy; LRP: Laparoscopic radical prostatectomy, PLND: Pelvic lymph node dissection, RALP: Robot assisted laparoscopic prostatectomy, TURP: Transurethral resection of the prostate, XRT: Radiotherapy

in June 2007. Results of pathology indicated Gleason 4+5, T3bNOMO, with negative margins. In January 2008, the patient experienced a biochemical recurrence of 0.2 ng/mL, for which he received external beam radiation and ADT after which the PSA became undetectable. In 2009, the PSA began to rise again to 1.8 ng/mL in August and 2.4 ng/mL in September. Metastatic evaluation was negative. Six months later, his PSA had risen to 93.9 ng/mL and he was complaining of significant increase in his abdominal girth. He was admitted and underwent a staging work-up including CT of the chest, abdomen, and pelvis, which revealed pulmonary and mesenteric nodules. Therapeutic paracentesis of the ascitic fluid revealed adenocarcinoma consistent with prostate cancer. ADT was initiated. In April, 2010, he started to receive docetaxel, but repeat scans showed disease progression in the mesentery and he was transitioned to mitoxantrone in July of that year. Once again, repeat scans showed radiographic progression and the patient was started on cabazitaxel in September. Unfortunately, the metastatic disease burden continued to progress despite chemotherapy, and the patient was transitioned to hospice care in December, 2010.

Discussion

We are the first to report two cases of metastatic peritoneal carcinomatosis of prostate cancer from a high-volume single institution. Table 1 compares our cases to previous cases from the literature (1,2,3,4,5,6,7,8,9,10,11). Our cases are unique in several ways. Our first case did not possess high risk, adverse features. His PSA was <10 with pathology indicating grade group 2, <pT3, and negative margins. In addition, the carcinomatosis was found incidentally during a transperitoneal procedure for another malignancy. Standard imaging algorithms failed to detect these implants, and it is not known how often this occurs. However, with the advent of improved imaging technology, such as F-18 fluciclovine or prostate-specific membrane antigen positron emission tomography/computed tomography scans, it is possible that these occurrences will be better detected in the future. Our second case is unique relative to prior case reports in that, even though the patient had high risk disease, his margins were negative.

Both of our cases demonstrate the heterogeneity of the disease process in terms of metastatic presentation and disease progression. The reasons underlying the metastasis are likely multifactorial and include tumor-related factors, such as high-risk, high-grade cancer. While transperitoneal surgery may be a factor in the development of peritoneal metastasis, it can occur as a presenting symptom or after non-transperitoneal procedures such as transurethral resection of the prostate (4,11,12). Nonetheless, both of our cases had negative margins,

and even one of our patients had <T3 disease, suggesting that the transperitoneal nature of the surgery may have contributed to the development of the metastasis.

Conclusion

Isolated peritoneal metastasis is a rare presentation of metastatic prostate cancer. These two cases represent unique contributions to the literature: one had low-risk pathologic features with negative margins while the other had high-risk features, again with negative margins. The transperitoneal approach for prostate surgery may be a significant factor contributing to peritoneal metastasis as well as to the underlying tumor biology. Peritoneal carcinomatosis is known to be associated with several intra-abdominal malignancies and now needs to be considered in patients with advanced prostate cancer.

Ethics

Informed Consent: Patients provided consent for the standard of care treatments described here.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: J.B., J.W., A.M., Concept: J.B., J.W., A.M., Design: J.B., J.W., A.M., Data Collection and/or Processing: J.B., J.W., A.M., Analysis and/or Interpretation: J.B., J.W., A.M., T.M., Literature Search: J.B., J.W., A.M., T.M., Writing: J.B., J.W., A.M., T.M.

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