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Case Report

Peritoneal and port site seeding of an undiagnosed urothelial carcinoma of the bladder after robot-assisted laparoscopic prostatectomy☆,☆☆

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ABSTRACT

Laparoscopic prostatectomy and robot-assisted laparoscopic prostatectomy are common procedure performed for the treatment of localized prostate cancer. Port site and peritoneal seeding is an exceedingly rare but known complications associated with this procedure. We present a case of a 71-year old male with low-intermediate risk prostate adenocarcinoma who underwent a robot-assisted laparoscopic prostatectomy. Pathology at that time was negative for extraprostatic extension, seminal vesicle invasion, or margins. Seven months later, the patient presented with gross hematuria and was found to have multiple superficial tumors of the bladder urothelium consistent with high-grade papillary urothelial carcinoma. He then began to experience increasing lower abdominal pain and a palpable, right anterior abdominal mass. Computed tomography-guided biopsy revealed high-grade papillary urothelial carcinoma which strongly suggests peritoneal seeding from his recent robot-assisted laparoscopic prostatectomy. Despite its rarity, the morbidity associated with this phenomenon could help justify a recommendation of careful pathologic examination of each prostate specimen for a second urothelial primary with subsequent cystoscopy if one is found.

Background

Laparoscopic prostatectomy and robot-assisted laparoscopic prostatectomy (RALP) are common procedure performed for the treatment of localized prostate cancer and have been shown to have similar oncologic outcomes to open radical prostatectomy [1]. Intraoperative port site and peritoneal seeding are exceedingly rare but known complications of this procedure with reported rates of 1.47% or less [2,3]. Case re-

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ports described port site and peritoneal seeding after laparoscopic and/or RALP with prostate adenocarcinoma and an undiagnosed case of pancreatic adenocarcinoma.[4–9] However, we present a case report of an unusual peritoneal and port site seeding by an undiagnosed urothelial carcinoma of the bladder after RALP for localized prostate cancer.

Case presentation

A 71-year old Caucasian male who was diagnosed with low-intermediate risk prostate cancer with a rising prostate-specific antigen (PSA) in late 2015. Magnetic resonance imaging (MRI) of the pelvis in mid-2015 was done for an unrelated complaint which did not reveal evidence for gross disease or obvious abnormalities in the bladder or abdominal wall. He underwent RALP with bilateral pelvic lymphadenectomy in early 2016. Pathology showed Gleason 7 (3+4) prostate adenocarcinoma (pT2c pN0 cM0) which was negative for extraprostatic extension, seminal vesicle invasion, or margins.

Seven months later, he developed an episode of gross hematuria and was found to have multiple superficial tumors involving the bladder on cystoscopy performed in late 2016. He underwent a transurethral resection of the bladder (TURBT) with pathology showing high-grade papillary urothelial carcinoma with extensive lamina propria invasion but without definitive muscularis propria or lympho-vascular invasion. He underwent additional TURBT due to extensive involvement of the bladder by tumor.

He then developed progressively increasing lower abdominal pain associated with an enlarging right anterior abdominal wall mass over the course of the next few months, which resulted in a hospitalization in early 2017. Computed tomography (CT) scan of the abdomen and pelvis showed a new soft tissue density in the right anterior abdominal wall measuring 7.2 × 5.3 × 3.4 cm overlying the prior trocar sites from the RALP and a perirectal lymph node (Fig. 1A). CT-guided biopsy of the right anterior wall mass showed metastatic urothelial carcinoma. 18F-fluorodeoxyglucose positron emission tomography-computed tomography (18F-FDG PET/CT) showed markedly increased uptake in the right rectus abdominus (Fig. 1B) along with an enlarged left internal iliac lymph node measuring 2.0 cm (Fig. 1C) with increased avidity with a standardized uptake value (SUV) of 4.8 (Fig. 1D). Additional abnormalities were seen in the bladder and in the periprostatic area extending into the right base of the penis. There was no evidence of distant metastatic disease elsewhere. He was treated with nine cycles of carboplatin and gemcitabine with complete response seen on post-therapy 18F-FDG PET/CT. Shortly thereafter, he developed repeat hematuria and was found to have multiple superficial bladder tumors on cystoscopy. He was to undergo a radical cystectomy with ileal conduit formation but cardiac work-up revealed significant coronary artery disease requiring five vessel coronary artery bypass surgery.

In early 2018, he underwent re-evaluation with another cystoscopy and TURBT with only partial resection due to extensiveness of disease. Pathology showed high-grade urothelial carcinoma without invasion of the muscularis propria. Diagnostic laparoscopy showed no evidence of metastatic disease within the peritoneum. He was started on nivolumab as neoadjuvant systemic therapy and received a total of seven cycles. Repeat cystoscopy showed evidence of residual tumor in mid-2018. CT of the abdomen and pelvis showed disease within the bladder along with pelvic lymphadenopathy. His chemotherapy was then changed to carboplatin and gemcitabine and completed a total of 12 cycles in late 2018.

In early 2019, 18F-FDG PET/CT showed no significant metabolic activity within the abdomen or pelvis except for one small right iliac lymph node which had an SUV of 4.9 and measured 1.0 cm in size (Fig. 2). Cystoscopy following his 18F-FDG PET/CT showed no obvious sign of bladder tumor recurrence. He was then evaluated for consideration of radiation therapy. However, it was felt that radiation therapy should be held until the patient receives a bladder resection to evaluate for muscular invasive disease. The patient opted not to pursue further surgical management or radiation therapy. The patient died of progression of his disease several months later.

Discussion

In our case, the patient was originally diagnosed with prostate adenocarcinoma but at the time of RALP, the patient also had an unrelated urothelial carcinoma of the bladder. During the procedure, the robotic devices inadvertently seeded the port site during the surgery or as the device was extracted from the abdomen. We feel that the avid lymph nodes seen on 18F-FDG PET/CT were from lymph drainage rather than an additional seeding event. While this is a rarely occurring incident, it has been reported in varying surgical techniques and primary malignancies.

Tyson et al showed that laparoscopic and robot-assisted prostatectomy is now the most common form of radical prostatectomy performed for treatment of localized prostate cancer [10]. Port site and peritoneal metastasis or seeding are rare but known complications associated with this procedure [11]. Hypothesized mechanisms for port site and peritoneal metastasis and seeding include aerosolization of tumor cells and periport gas leak, local tumor inoculation and spillage, wound-related factors (local immune response), procedure-related factors (morcellation and absence of retrieval bag), host factors (immunocompromised state), and hematogenous spread [3–5,11].

The first known reported case of port site metastasis and seeding in the literature was published in 1978 which involved a 52-year-old female undergoing a diagnostic laparoscopy revealing ovarian carcinoma [12]. A systematic review of port site metastases after robot-assisted surgery revealed histological variance in cases involving surgical device seeding, such as cervical squamous cell carcinoma and adenocarcinomas, gallbladder carcinoma, and urothelial cell carcinoma [11]. Additional primaries associated with port site metastases and seeding events after robot-assisted surgery have been described for renal cell carcinoma, prostate adenocarcinoma, and endometrial carcinoma [4–9,13–14].

Larrouse et al reported the first case of a port site metastasis after a laparoscopic prostatectomy in a 52-year-old male who underwent the procedure for mucinous adenocarcinoma

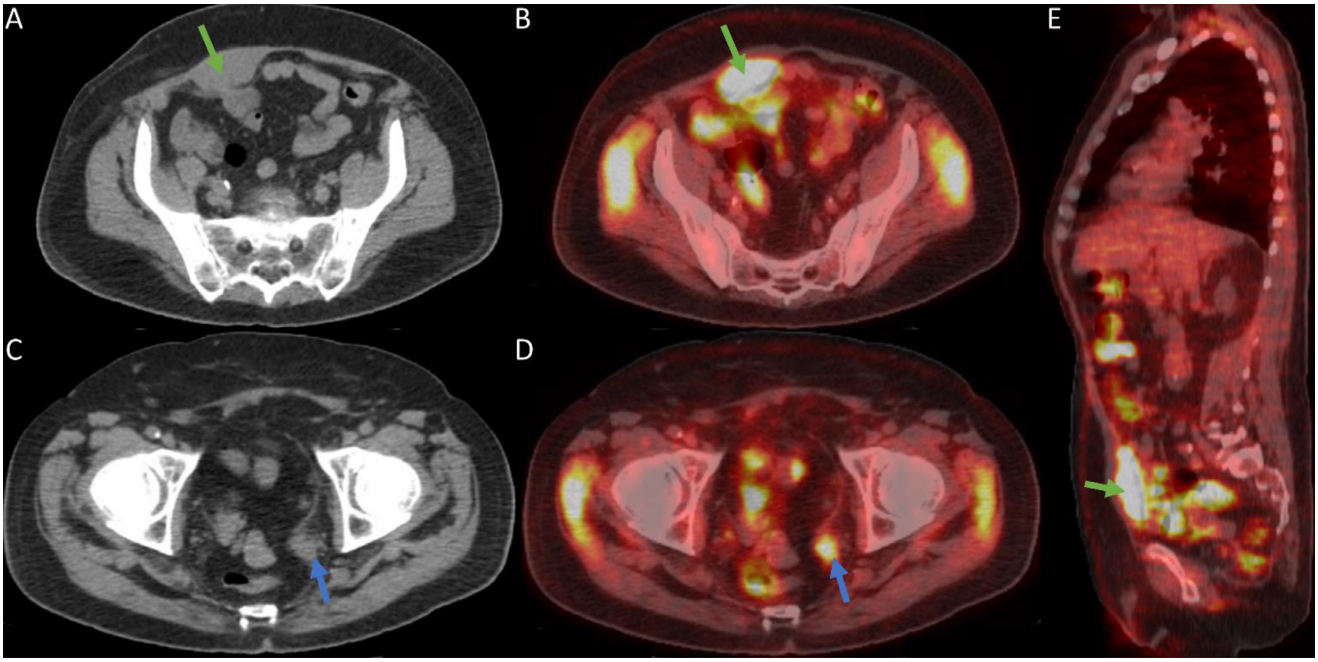

Fig. 1 – Axial and sagittal 18F-FDG PET/CT fusion images demonstrate significant avid uptake in an anterior abdominal mass (green arrow) in addition to FDG-avid lymph nodes (blue arrow) in the left internal iliac station (SUV = 4.8).

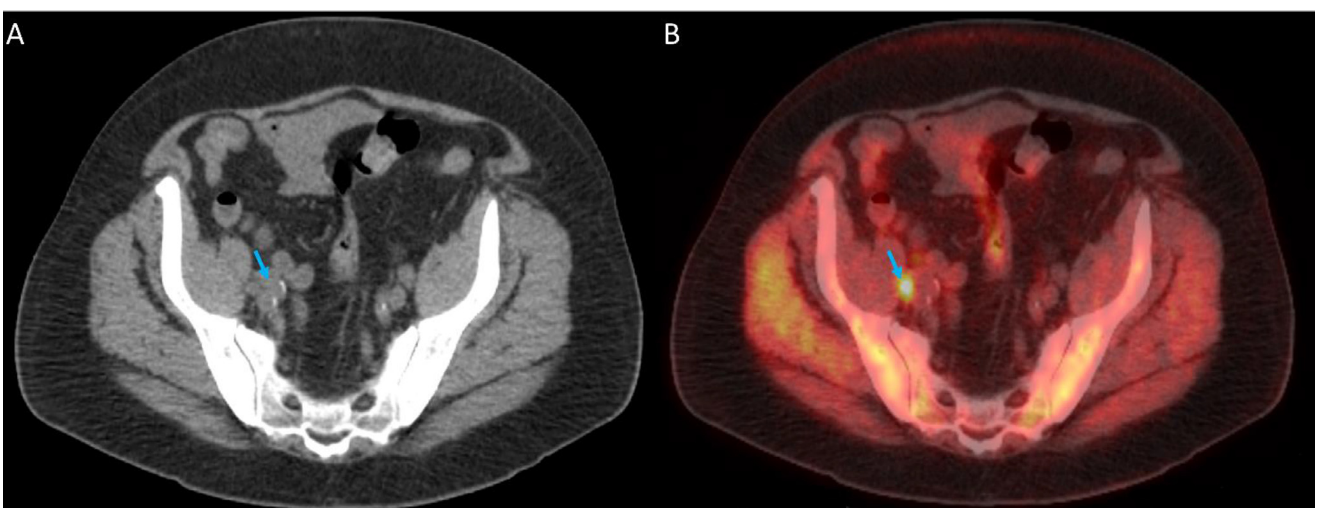

Fig. 2 – Axial 18F-FDG PET/CT fusion images demonstrating FDG-avid recurrent disease (blue arrow) in the right internal iliac station (SUV = 4.9).

[15]. The first case of port site recurrence after RALP was reported by Acar et al in a 77-year-old with Gleason 9 (4+5) prostate adenocarcinoma (pT3a) who developed PSA recurrence 9 months after the procedure. This patient was found to have a palpable anterior abdominal wall mass and multiple peritoneal implants [4]. Following this, De Bruyne et al reported on a 46-year-old male port site recurrence 4.5 years after RALP for a Gleason 7 (4+3) prostate adenocarcinoma (pT3b) with a rising PSA and a choline PET/CT with carbon 11 choline (11C-choline PET/CT) showing subcutaneous avidity in area of prior trocar site associated with a positive ipsilateral inguinal lymph node [5]. Ikeuchi et al reported on a 65-year-old male with Gleason 9 (5+4) prostate adenocarcinoma who underwent RALP and found to be pT3bN0 with positive margins who developed local recurrence and port site and lymph node metastases 18-weeks postoperatively [6]. Pinho et al reported on a 65-year-old male with Gleason 8 (4+4) prostate adenocarcinoma (pT2c) with positive lateral margin after RALP and elevated postoperative PSA of 0.3 ng/mL 6 weeks postoperatively who underwent adjuvant radiation therapy who developed an elevated PSA associated with a right anterolateral abdominal wall lesion [8]. Lastly, Jundt et al reported on a 62-year-old male with Gleason 7 (4+3) prostate adenocarcinoma (pT2a) who developed PSA recurrence five years after undergoing RALP with

11C-choline PET/CT demonstrating avidity in the soft tissue associated with a prior laparoscopic site [9].

This is the sixth case of a port site and peritoneal seeding after undergoing RALP for localized low-intermediate risk prostate adenocarcinoma and the first involving an undiagnosed urothelial carcinoma of the bladder. To the best of our knowledge, no other cases of port site and peritoneal seeding with an undiagnosed synchronous primary after laparoscopic and/or robot-assisted radical prostatectomy for localized prostate cancer have been reported in the literature. Given the morbidity associated with this phenomenon, we present the notion of carefully examining each prostate pathologic specimen for a second urothelial primary with subsequent cystoscopy if one were to be found.

Conclusion

Port site and peritoneal seeding after robotic-assisted laparoscopic prostatectomy is a rare but documented phenomenon. We report the first known case of port site and peritoneal seeding of an undiagnosed urothelial carcinoma of the bladder in a then 69-year old male undergoing a RALP for localized prostate cancer.

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