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Oncology

Isolated biopsy-proven recurrence of prostate carcinoma in the spermatic cord after radical prostatectomy detected with 11C-Choline PET/CT

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ABSTRACT

We report an unusual case of a solitary prostatic metastasis in the spermatic cord, following robotic-assisted laparoscopic radical prostatectomy with pelvic lymph node dissection and salvage radiotherapy, detected with the use of ^{11}C-Choline PET/CT, heralded by a progressive rise in PSA. This lesion was biopsy-proven and surgically resected through radical left-sided orchiectomy. Postoperatively his PSA was undetectable and remained undetectable with no evidence of recurrent disease.

Introduction

Prostate cancer recurrences after radical prostatectomy (RP) or radiotherapy (RT) are prevalent and usually heralded with a rise of prostate specific antigen (PSA). When PSA relapse occurs, radiological investigations can often identify the site of recurrence and guide management. In the setting of a low PSA, conventional imaging, such as bone scan and computed tomography (CT) of abdomen and pelvis, has low yield. In recent years, functional imaging, such as ^{11}C-Choline PET/CT and ^{68}Ga-PSMA Ligand PET/CT, has been utilized, due to its higher sensitivity for detecting recurrences at lower PSAs. Functional imaging occasionally facilitates the detection of solitary metastasis in regions previously thought to only occur in the presence of widespread metastases. We describe a case of a solitary prostatic metastasis in the spermatic cord, following robotic-assisted laparoscopic radical prostatectomy (RALRP) with pelvic lymph node dissection (PLND) and salvage radiotherapy (SRT), detected with ^{11}C-Choline PET/CT.

Case presentation

In November 2011, a 65-year-old male was found to have an elevated PSA of 6.2 ng/mL on routine screening. Transrectal ultrasound-guided biopsy revealed adenocarcinoma, Gleason 4 + 3, involving 6 of 6 cores of the left lobe with perineural invasion. In February 2012, he underwent RALRP with PLND. Pathology revealed Gleason 4 + 3 adenocarcinoma, forming a 2.2 × 2.0 × 1.3 cm mass. There was extraprostatic extension in the left posterior superior prostate. The surgical margins were negative. All of nineteen pelvic lymph nodes were negative. His prostate adenocarcinoma was staged pT3aN0.

His postoperative PSAs were undetectable (< 0.10 ng/mL) until September 2012 when his PSA became detectable at 0.10 ng/mL. His subsequent PSA rose to 0.28 ng/mL in October 2012. A bone scan showed no evidence of bony metastases. An MRI pelvis with endorectal coil showed no evidence of local recurrence in the prostatic fossa or suspicious pelvic lymphadenopathy. He was treated with SRT, delivering 7000 cGy in 35 fractions to the prostatic fossa, plus 2 years of androgen deprivation therapy (ADT) between November 2012 and November 2014.

Following SRT, his PSA remained undetectable until August 2016, when it was 0.15 ng/mL. In October 2016, when his PSA rose to 0.24 ng/mL, MRI with endorectal coil and ^{11}C-Choline PET/CT were performed and showed no evidence of locally recurrent or metastatic disease. In August 2017, his PSA further increased to 0.66 ng/mL, which prompted repeat MRI with endorectal coil and ^{11}C-Choline PET/CT. Both tests were again negative for recurrence. By September 2018, his PSA was 1.1 ng/mL, again prompting imaging studies. The MRI with endorectal coil showed no evidence of recurrence, but the ^{11}C-Choline PET/CT showed focal choline uptake in a 7 mm nodule in the left scrotum. Upon review of August 2017 study, this finding was present with much less choline uptake (Fig. 1). A scrotal ultrasound was performed, demonstrating a 0.7 cm solid and cystic lesion posterior to the mid left spermatic cord, corresponding to the region of choline uptake on the PET/CT. In October 2018, an ultrasound-guided fine needle biopsy of this lesion was performed with pathology revealing metastatic adenocarcinoma (Fig. 2). Immunohistochemical studies with antibodies against PSA and prostatic acid phosphatase (PACP) showed positive staining for both markers, supporting a prostatic adenocarcinoma metastasis (Fig. 3).

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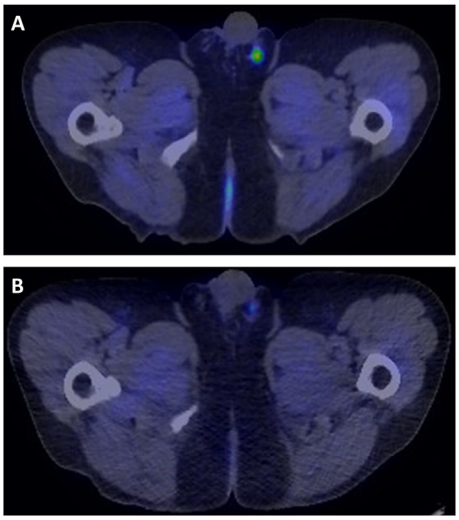

Fig. 1. A: September 2018 ^{11}C-Choline PET/CT showing focal uptake in the left scrotum (Max SUV 4.5).
B: August 2017 ^{11}C-Choline PET/CT showing focal uptake in the left scrotum (Max SUV 3.4).

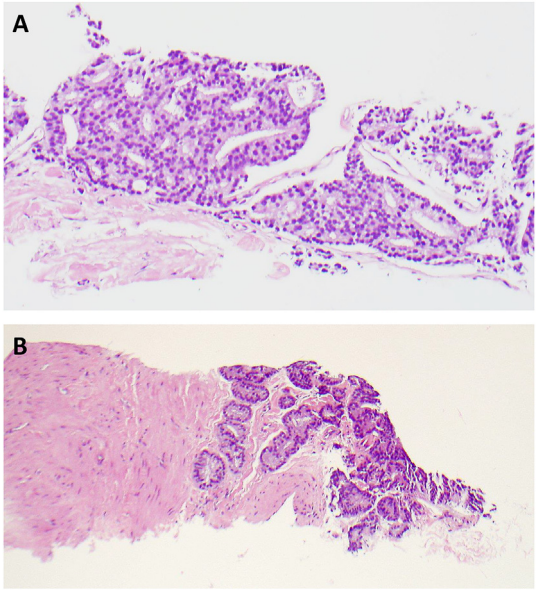

Fig. 2. A & 2B: Pathology shows involvement by adenocarcinoma with a predominant cribriform architecture and focal well-formed glandular structures. The tumor cells show minimal pleomorphism and rare nucleoli.

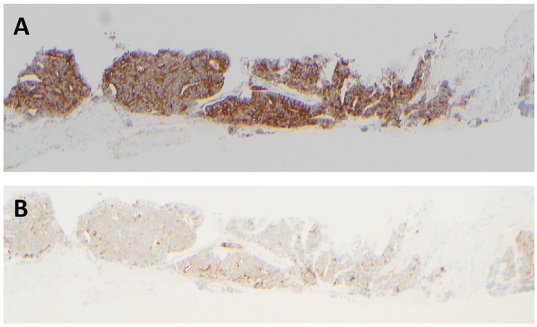

Fig. 3. A: Spermatic cord biopsy with positive PSA staining. B: Spermatic cord biopsy with positive PACP staining.

He underwent radical left-sided orchiectomy through an inguinal approach in November 2018. His follow-up PSA was undetectable (< 0.10 ng/mL) in January 2019 and has remained undetectable to date.

Discussion

The patient in this case presented with a biochemical recurrence of prostate carcinoma status post RALRP followed by SRT to the prostatic fossa with two years of ADT. MRI pelvis with endorectal coil and ^{11}C-Choline PET/CT were persistently negative for recurrence until his PSA reached 1.1 ng/mL, at which time a focal metastasis was identified in the left spermatic cord.

Isolated spermatic cord metastases from prostate cancer are rare with only two cases reported in the literature.[1,2] Johansson and colleagues reported five cases of metastases to the spermatic cord, epididymis, and testicles found during orchiectomy because of intolerance to ADT. One of these reported cases had an isolated distant metastasis in the right spermatic cord with no other evidence of metastases. Talbot and colleagues reported a case of an isolated distant metastasis in the right spermatic cord, extending to the epididymis, five years after prostatectomy and vasectomy for benign prostatic hypertrophy. These two cases of isolated recurrences to the spermatic cord were reported before the era of PSA monitoring, MRI, and functional imaging, which have allowed earlier detection and better localization of prostate cancer recurrence. The patients described in these cases may have had other occult metastases, which were not detected based on limited technology in that era.

Pelvic MRI with endorectal coil has a sensitivity and specificity exceeding 95% for identifying local recurrence at PSA levels between 0.5 and 1.7 ng/mL.[3] Functional imaging has been increasingly utilized in recent years to earlier identify sites of recurrence. ^{11}C-Choline PET/CT can identify recurrences at a median PSA of 2.3 ng/mL.[4] ^{68}Ga-PSMA Ligand PET/CT detects recurrences in 60%–97% of patients with PSA values ranging from 0.2 to > 2 ng/mL, respectively.[5] Without the use of ^{11}C-Choline PET/CT, this patient's spermatic cord metastasis may not have been identified for years, thus missing a window to possibly interrupt the progression of recurrent prostate cancer and losing the opportunity to avoid ADT.

The route of metastasis to the spermatic cord is unclear. Spread via hematogenous, lymphatic, intraluminal, or tumor emboli routes are possible. It is possible there was microscopic disease in the vas deferens after RP that retracted to the spermatic cord. Remote conjecture can also be made that the intrapelvic pressure from insufflation at the time of RALRP led to seeding of tumor cells into the spermatic cord.

Conclusion

Prostate cancer recurrences can be local, regional, or distant. The utilization of MRI with endorectal coil and functional imaging, such as ^{11}C-Choline PET/CT or ^{68}Ga-PSMA Ligand PET/CT, have enabled the localization of recurrences at low PSAs and may help detect oligometastases in unusual sites, which were thought to only occur in the setting of widespread metastases.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.eucr.2019.100985.

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