Port site metastasis in prostate cancer

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Abstract

Port-site metastasis of prostatic adenocarcinoma is rare and usually associated with poor prognosis. We report a case of a young man with a rising prostate-specific antigen (PSA) 4.5 years after robot-assisted laparoscopic prostatectomy (RALP) and extended pelvic lymphadenectomy (ePLND) for a Gleason 7 (4+3) prostate cancer (pT3b pN0 cM0). Choline positron emission tomography-computed tomography (PET-CT) demonstrated a PET positive subcutaneous recurrence in a previous trocar site accompanied by a PET positive ipsilateral inguinal lymph node. Excision of both lesions was performed, confirming the diagnosis of metastatic prostate cancer. The patient's PSA dropped significantly postoperatively enabling postponement of androgen deprivation treatment up to this date. The etiology of port-site metastasis is multifactorial, including patient and surgery related factors. Such metastases have been scarcely reported following ePLND with or without RALP. Certain surgical precautions can be made to prevent the occurrence. We summarize previously reported mechanisms of development and possible precautionary measures.

Case report

A 46-year-old male presented to our clinic with a rise in prostate-specific antigen (PSA) (32.8 ng/mL). Transrectal biopsies were performed, revealing prostate cancer Gleason 7 (4+3) on the right side. Staging by means of abdominal computed tomography (CT) and bone scintigraphy were negative. He underwent a non-nerve sparing robot-assisted radical prostatectomy along with an extended pelvic lymphadenectomy. The specimen was extracted in an endobag using the supra-umbilical camera port. Anatomopathological examination confirmed prostate cancer pT3b pN0 (0/19) cM0, Gleason 7 (4+3). There was extracapsular extension and seminal vesicle invasion on the right. Surgical margins were negative. Three months after surgery, PSA had dropped to 0.015 ng/mL, but started to rise 3 months later to 0.019 ng/mL.

PSA surveillance continued (Table 1) and by the 25th month postoperative PSA had risen to 0.15 ng/mL. Digital rectal examination revealed nothing suspicious and the patient was referred for adjuvant salvage intensity-modulated radiation therapy (IMRT) on the prostatic bed (total dosage 71.26 Gy) along with 6 months of luteinizing hormone releasing hormone-agonists treatment. PSA dropped to <0.03 ng/mL only to start rising again 1 year later (0.041 ng/mL). PSA continued to rise progressively causing the need for various staging investigations. Finally about 4.5 years after the initial surgery, a repeat choline positron emission tomography-computed tomography (PET-CT) demonstrated opacification of a subcutaneous mass in the left flank along with an ipsilateral inguinal lymph node (Fig. 1, Fig. 2).

PSA was now at 10.15 ng/mL. Clinically, we palpated a mass in the left flank just close to one of our previous lateral trocar incisions, accompanied by an ipsilateral inguinal lymph node. The patient underwent excision of both (Fig. 3). Anatomopathological examination confirmed subcutaneous and lymphatic metastasis of prostate cancer. Both surgical margins were negative. We suspect the inguinal lymph node to be secondary to the port-site metastasis. The PSA value 1 month postoperatively dropped to 0.09 ng/mL. The patient was free of complaints and the next blood work was scheduled for 3 months later. Currently, the patient is free from continuous androgen deprivation therapy (ADT).

Discussion

The incidence of port-site metastasis in urologic laparoscopic surgery is low, with an incidence rate ranging from 0.09% to 0.73%.[1] Port-site metastasis of prostatic adenocarcinoma is even more uncommon, with a very poor prognosis.[2,3] To date only few cases have been published.

Savage and collegues reported multiple port-site metastases after laparoscopic transperitoneal radical prostatec-

Table 1. Postoperative PSA surveillance with according therapeutic/diagnostic actions

Time post RALP (months)	PSA (ng/mlL)	Therapeutic/diagnostic action
3	0.015	
6	0.019	
12	0.02	
18	0.048	
22	0.09	
25	0.15	Adjuvant salvage IMRT prostatic bed + ADT 6 months
32	<0.03	
39	0.041	
44	0.21	Axial MRI negative
47	0.47	
51	0.99	Axial MRI negative
53	2.23	Choline PET-CT negative
54	4.29	
56	10.15	Choline PET-CT positive

PSA: prostate-specific antigen; RALP: robot-assisted laparoscopic prostatectomy; IMRT: intensity-modulated radiation therapy; ADT: androgren deprivation therapy; MRI: magnetic resonance imaging; PET-CT: positron emission tomography-computed tomography.

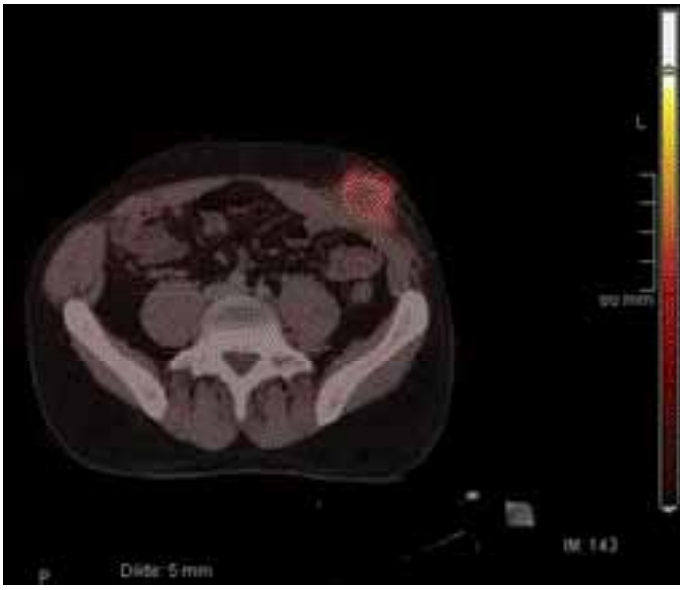

Fig. 1. Choline-positron emission tomography–computed tomography image of subcutaneous port site metastasis of prostatic adenocarcinoma in the left flank.

tomy. The original prostatic adenocarcinoma was a pT3b Gleason 4+3 with extraprostatic extension, seminal vesicle invasion and negative surgical margins. The patient developed subcutaneous recurrence 3.5 years after initial surgery. The locations corresponded to the extraction site and right-hand port site.[4]

Another cutaneous metastasis was reported by Bangma and colleagues. The patient suffered from cT3 prostate cancer and was eligible for local radiotherapy prior to which pelvic lymphadenectomy was performed for staging purposes (pN1). The authors reported that spillage of tumour cells might have occurred during dissection of a firm necrotic mass around the left obturator nerve. The cutaneous nodular recurrence was palpated only 6 months post-procedure.[3] A French group from Paris reported port-site metastasis only 8 months after a retroperitoneal laparoscopic radical prostatectomy for a mucinous adenocarcinoma without extracapsular extension. The mucinous aspect might have been the main culprit here as suggested Larousse and colleagues, considering the mucin vesicles are very fragile and ruptures easily thus promoting tumour cell spillage and instrument contamination while manipulating the specimen.[5]

A recent publication by Acar and colleagues describes port-site and peritoneal metastases after RALP and extended pelvic lymphadenectomy (ePLND) for a pT3a Gleason 9

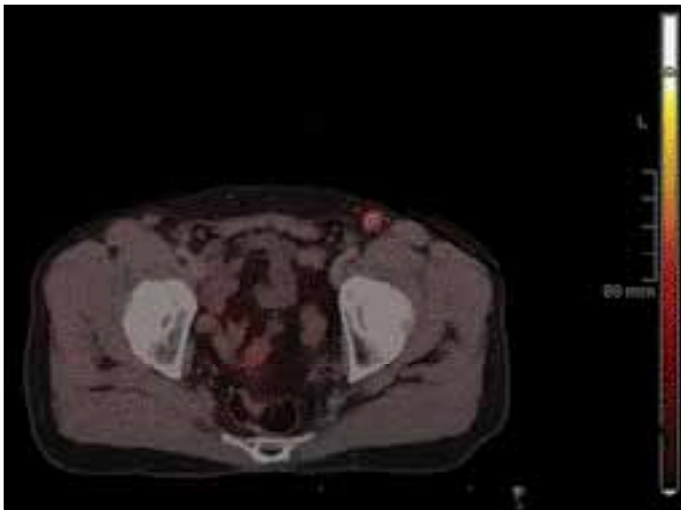

Fig. 2. Choline-positron emission tomography–computed tomography image of prostate cancer metastasis in left inguinal lymph node.

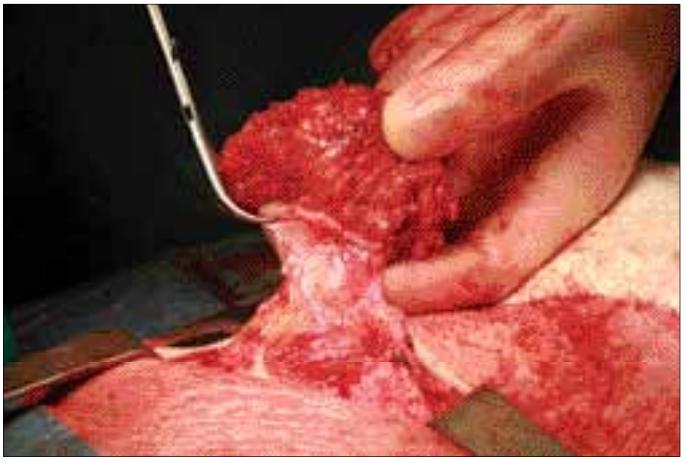

Fig. 3. Resection of the subcutaneous port site metastasis en bloc with part of the external oblique abdominal muscle.

(4+5) pN0 R1 prostatic adenocarcinoma. In their case however, the patient was treated with ADT due to rising PSA 9 months post-surgery. A port-site metastasis appeared at month 21 despite this treatment, followed by the appearance of multiple peritoneal metastases.[6]

For port-site metastasis to occur, a tumour cell must detach from the primary lesion, migrate, re-adhere elsewhere, avoid immune response mechanisms, and grow.[1] Cell spillage can occur from inadvertent sectioning through the tumour, trauma from grasping instruments, tumour contamination of closure devices, or other surgical instruments contaminating a unprotected wound.[4] It is also facilitated by poor host immune status, advanced tumour stages, and the presence of ascites.[1] However, there is a case describing port-site metastasis in a woman with a previous renal transplant who underwent laparoscopic cholecystectomy. Three months postoperatively, adenocarcinoma of the colon with metastases at the port site of previous cholecystectomy was detected without evidence of local spread or liver metastases. The patient was immunosuppressed at the time of surgery and the unsuspected tumour was not manipulated, emphasizing the important contribution of host immune status to the multifactorial occurrence of port-site metastasis.[7] Direct inoculation may occur if the surgical specimen is removed without an entrapment sack, in case of instrument contamination and trocar dislodgement. High pressure CO_2 insufflation may result in increased exfoliation, while the pneumoperitoneum facilitates spread of cancer cells through aerolization and a chimney effect. However, results are contradictory.[1,7]

Port-site metastases can be partially prevented by the surgical team. Schneider and colleagues have shown that certain specific measures can reduce port-site recurrence by a factor of 7.7.[8] A standardized meticulous surgical technique is mandatory, along with appropriate trocar incision and fixation to avoid excessive trocar movement or dislodgement. Prevention of gas leak must be kept in mind at all times and exsufflation through the trocar valve before removing the trocars are essential. Disinfection of trocars, port-site wounds and instruments with povidone-iodine solution and suture closing of peritoneal incisions may help. In case of spillage, irrigation with sterile water, to which heparin may be added, to lyse any residual tumour cells is advised. Extraction of the surgical specimen using appropriate sacks or the usage of wound protection devices in case of minilaparotomy is preferred.[1,7-9]

Conclusion

Port-site metastasis in laparoscopic urology is uncommon. In case of prostatic adenocarcinoma, it is rarer, but unfortunately usually associated with poor prognosis. In our patient, however, resection of the metastasis signified a proper biochemical response enabling postponement of ADT up to this date. The etiology of port-site metastasis is multifactorial, including patient- and surgery-related factors. Such metastases are rarely reported following ePLND with or without RALP. Certain surgical precautions can be made to prevent occurrence.

Competing interests: The authors declare no competing financial or personal interests.

This paper has been peer-reviewed.

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