

Recurrent Renal Cell Carcinoma Presenting as Port-Site Metastases, Detected on ¹⁸F-Fluorodeoxyglucose Positron Emission Tomography-Computed Tomography

Abstract

The incidence of port-site metastases (PSMs) varies with the tumor type with adenocarcinoma having a high incidence. However, it is rarely seen in urological malignancies and more so in renal cell carcinoma (RCC). We hereby describe one such case of PSM after laparoscopic radical nephrectomy for RCC, which was detected on ¹⁸F-fluorodeoxyglucose positron emission tomography-computed tomography.

Keywords: ¹⁸F-fluorodeoxyglucose positron emission tomography-computed tomography, port-site metastases, renal cell carcinoma

Introduction

Since the introduction of laparoscopic surgery in humans in 1901 by Hans Christian Jacobaeus, there has been a paradigm shift toward minimally invasive procedures.^[1] Laparoscopy in uro-oncology was first introduced in 1991 when Clayman *et al.* performed the first laparoscopic nephrectomy.^[2] Today, minimally invasive procedures have been increasingly used for urologic tumor resection and lymph node dissection. However, these minimally invasive techniques are associated with complications of their own. One rare complication of laparoscopic procedures for oncologic applications is port-site metastasis (PSM). The first case of PSM was described by Döbrönte Z *et al.*^[3] in 1978 in ovarian carcinoma. Since then, PSM has been described in a wide variety of cancers. The occurrence of PSM in renal cell carcinoma (RCC) was first described by Fentie *et al.* in 2000.^[4] The incidence of PSM varies with the tumor type with gall bladder (GB) carcinoma having an incidence as high as 14% to 30%.^[3] However, it is rarely seen in urological malignancies and more so in RCC. We hereby describe one such case of PSM after a laparoscopic nephrectomy of RCC.

Case Report

A 50-year-old male presented with obstructive lower urinary tract symptoms 4 years back. On evaluation, heterogeneously enhancing, mass measuring 7 cm × 6 cm × 6 cm was detected in the upper pole of the left kidney which was suspicious for RCC. Subsequently the patient underwent laparoscopic left radical nephrectomy. The postoperative histopathology revealed clear-cell carcinoma, Fuhrman grade 1, T3aNoMo. The patient was disease-free and doing well. The patient relapsed after 4 years and presented with an abdominal lump associated with occasional hematuria and left flank discomfort. On evaluation, ultrasonography abdomen revealed a lobulated hypoechoic intramuscular lesion at the port site. Subsequently, ¹⁸F-fluorodeoxyglucose positron emission tomography-computed tomography scan [Figure 1d – maximum intensity projection] was performed, which revealed multiple hypermetabolic lesions involving port site [Figure 1b], omental nodules [Figure 1a], mesenteric deposits, left adrenal gland, and rectovesical pouch lesion [Figure 1c] – indicative of recurrence which was confirmed on biopsy. The patient was then started on systemic therapy oral sunitinib 40 mg and is under regular follow-up.

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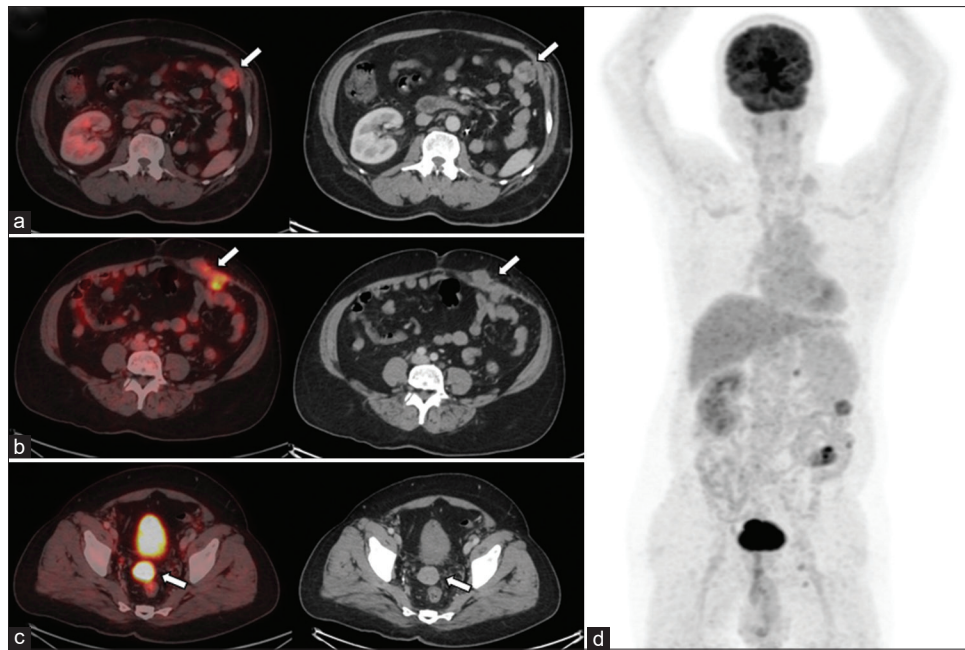


Figure 1: FDG PET-CT study shows hyper-metabolic lesions in the omentum [white arrows in a], at the port site [white arrows in b], and rectovesical pouch [white arrows in c]. (d) represents the MIP image.

Discussion

PSM involves the growth of tumor cells at the site of port insertion. Thus, PSM requires the release of viable cancer cells from tumor, transport of tumor cells to the port site, implantation, and finally, growth of tumor cells at the port site. In literature, the incidence of PSM varies widely ranging from 0.6% to 21%.^[5] However, in uro-oncology, the incidence is lower varying from 0.09% to 0.73%.^[6] A large international survey by Micali *et al.*^[7] included a total of 18,750 laparoscopic procedures for urologic malignancies from 19 centers and found tumor seeding in 13 (0.1%) cases. The incidence is even lower for RCC with no case of PSM among 2604 radical nephrectomies and 555 laparoscopic partial nephrectomies performed. To the best of our knowledge, only 22 cases of PSM in RCC have been reported to date. Factors affecting PSM have not been clearly defined in the existing literature. However, it has been associated with aggressive tumor behavior, local wound factors, immune and stress response of an individual, and laparoscopy-related factors such as the use of carbon dioxide pneumoperitoneum, trocar site contamination, and the method of specimen retrieval.^[5,8,9] Many theories have been postulated to explain the mechanism of the development of PSM including contamination of organ or port sites, direct wound implantation, excessive or incomplete manipulation of tumor, hematogenous spread, chimney phenomenon, and contamination during tumor morcellation.^[5,8,9] However, no single theory explains all the cases and etiology has been considered multifactorial. PSM when present is associated with poor prognosis, with 1-year survival remaining invariably <50% among the limited literature available.^[6] In most of these series, PSM

was followed by the detection of multifocal metastatic disease as seen in the case described, thus making the timely diagnosis of PSM important. While some authors consider PSM a harbinger of progressive disease, others consider it to be a local presentation of systemic disease rather than isolated metastasis.

Only limited treatment options are available for PSM, including local resection, chemotherapy, and radiotherapy. Extended surgical resection of the abdominal wall with the introduction of chemotherapy has been shown to prolong survival.^[10]

Conclusion

With the advent of minimally invasive procedures, there has been a paradigm shift from open laparotomies to laparoscopic procedures. Laparoscopic procedures are generally safe, however, are associated with complications of their own. PSM represents one such rare complication of laparoscopic resection of tumors and is even more rare in cases of RCC. The exact pathogenesis remains unclear and can be attributed to a combination of holistic and local factors. It carries a poor prognosis with limited treatment options. Preventive measures should be taken whenever feasible to avoid the development of PSM. Postoperative examination and investigations should include measures to detect PSM, especially in cases with aggressive histology since the timely introduction of systemic chemotherapy and wide local excision has shown to improve life expectancy.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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