Primary Retroperitoneal Transitional Cell Carcinoma Identified on 18F-Fludeoxyglucose Positron Emission Tomography/Computed Tomography: An Exceedingly Rare Radio-Pathological Entity

Abstract

We report here initial staging and follow-up imaging findings of a case of primary retroperitoneal transitional cell carcinoma, one of the rarest nonurological tumors of the retroperitoneal space, to highlight the importance of ^{18}F-fludeoxyglucose positron emission tomography/computed tomography in this infrequently encountered pathology.

Keywords: *Carcinoma, fludeoxyglucose, positron emission tomography/computed tomography, retroperitoneal, transitional cell*

Piyush Chandra, Satish Nath, Deepti Jain[1]

Departments of Nuclear Medicine and [1]Pathology, MIOT International Hospital, Chennai, Tamil Nadu, India

A 65-year-old woman presented with right lower abdominal pain and right lower limb swelling. ^{18}F-fludeoxyglucose positron emission tomography/computed tomography (^{18}F-FDG PET/CT) was done for the evaluation of suspected malignant pelvic soft-tissue mass noted on ultrasonography. ^{18}F-FDG PET/CT scan showed increased FDG uptake in the solid enhancing component of the large dumbbell-shaped solid-cystic mass in the right iliac fossa measuring 12 cm in the largest dimension with maximum standardized uptake value approximately 14.18, encasing the right iliac vessels [Figure 1a-c], infiltrating the iliopsoas muscle with cystic component extending extra-abdominally into the right superficial groin [Figure 1d and e]. There was evidence of mild right-sided hydro-uretero-nephrosis and no evidence of any significant locoregional lymphadenopathy or any distant metastasis. Ultrasound-guided biopsy from the metabolically active solid component revealed transitional cell carcinoma with focal squamous differentiation with cells showing strong membrane positivity for high molecular weight cytokeratin [Figure 2a and b]. The patient was started on concurrent chemoradiotherapy (weekly 1 g intravenous Gemcitabine and image-guided radiotherapy - 55Gy in 25 fractions) and achieved complete metabolic and significant morphological regression of the tumor [Figure 3, white arrows] on follow-up ^{18}F-FDG PET/CT scan done 6 months later.

Primary retroperitoneal transitional cell carcinomas are rare malignant tumors of the retroperitoneal space. The tumors probably arise from the vestigial remnants of the urogenital ridge in the retroperitoneal space. The urogenital ridge which appears at around 5th week of gestation further gives rise to the gonadal ridge (further differentiates into ovary/testis), nephrogenic cord (further differentiate into kidneys), mesonephric duct (ureter, male genital ducts, and seminal vesicles), and paramesonephric ducts (uterine tubes).[1] To the best of our knowledge, not more than five cases reported in literature.[2-6] These tumors are usually large, cystic masses with enhancing solid components seen predominantly located in the iliac fossae without any communication with any visceral organ such as the ureter or bladder (common sites for transitional cell malignancies). A dumbell-shaped appearance of the tumor (similar to our case) with an extra-abdominal component extending into thigh through the psoas fascia has been reported previously.[3] Clinically, these tumors usually present late with vascular invasion and complete surgical resection is rarely possible, resulting in poor overall survival.[3-5] Similar to our case, complete

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Address for correspondence:
Dr. Piyush Chandra, Department of Nuclear Medicine, MIOT International Hospital, Manapakkam, Chennai - 600 056, Tamil Nadu, India.
E-mail: drpiyushchandrak@gmail.com

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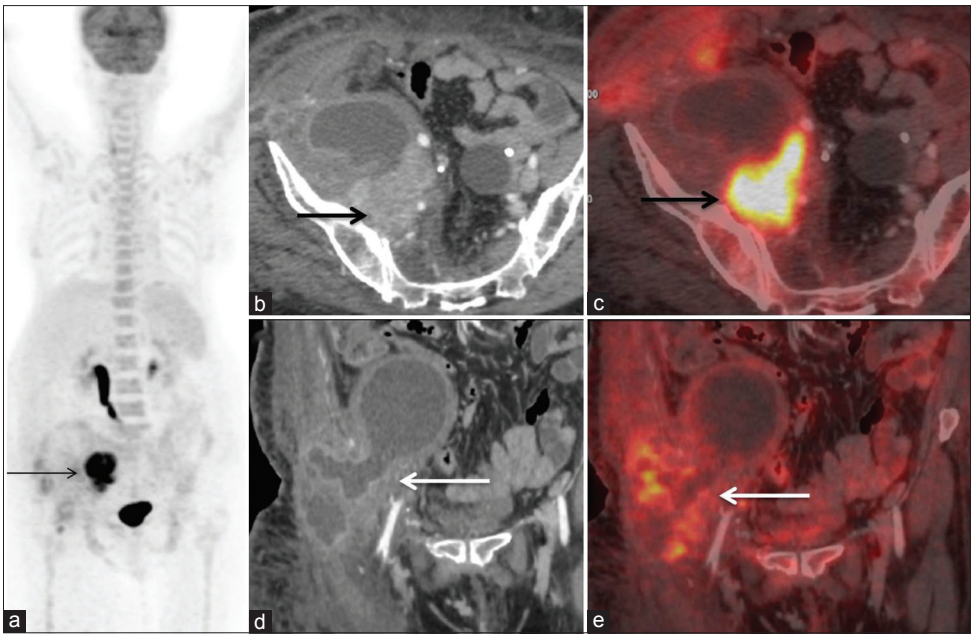

Figure 1: Staging whole-body fl udeoxyglucose positron emission tomography/computed tomography showing the presence of the metabolically active dumbbell-shaped solid-cystic mass (1a, 1 b and 1c- black arrows) in the right iliac fossa extending into groin (1d and 1e, white arrows) with no evidence of any distant metastasis elsewhere in the whole body

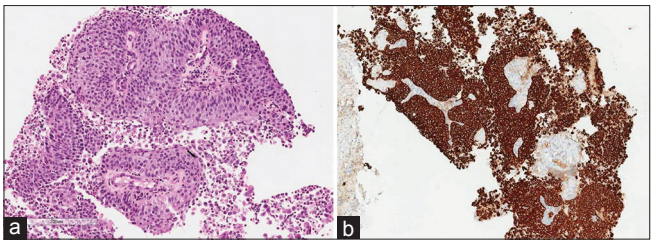

Figure 2: (a) H and E stain: High power view showing a fragment of the transitional cell-like epithelium with atypical mitotic activity (b) Cells showed strong membrane positivity for high molecular weight cytokeratin

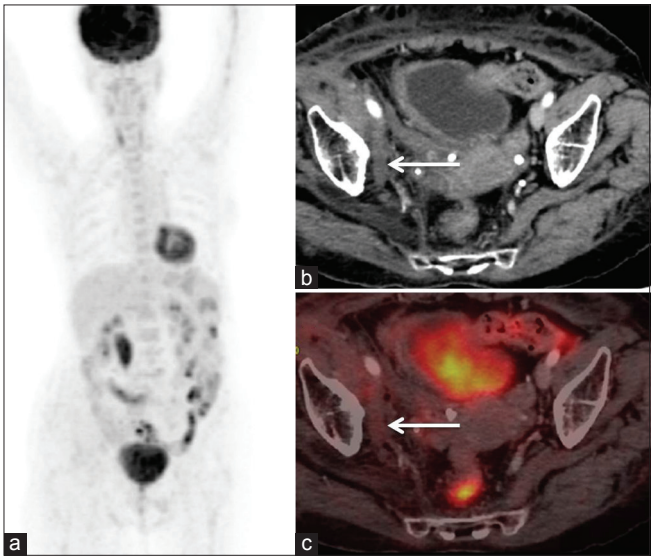

Figure 3: Follow-up whole-body fludeoxyglucose positron emission tomography/computed tomography post chemoradiotherapy showing complete regression of the right iliac fossa lesion as seen on whole body MIP (3a), trans-axial CT and PET/CT images (3b and 3c- white arrows) with no evidence any new lesions elsewhere

tumor regression has been reported in one of the case reports after concurrent radiotherapy and chemotherapy, suggesting that probably this should be the preferred form of treatment for such tumors.[6]

^{18}F-FDG PET/CT compared to diagnostic CT alone in this rare pathological entity can be advantageous. In one single scan, it can help ascertain the malignant nature of the solid-cystic mass, can help guiding biopsy from the most metabolically active area, can be helpful in staging for local/distant metastasis and can also be useful for assessing response to systemic/local treatments. PET/CT can also be useful for surveillance and early identification of disease recurrence as these tumors are generally very aggressive. The solid-cystic nature and intense FDG uptake noted on ^{18}F-FDG PET/CT can also help differentiate it from other nonurological retroperitoneal pelvic soft-tissue tumors such as liposarcomas/leiomyosarcomas, which are usually low-moderately FDG avid tumors.[7]

Declaration of patient consent

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

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Conflicts of interest

There are no conflicts of interest.

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