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A Case Review

PET scan Misleads to Diagnosis but Leads to Correct Operative Approach

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Introduction

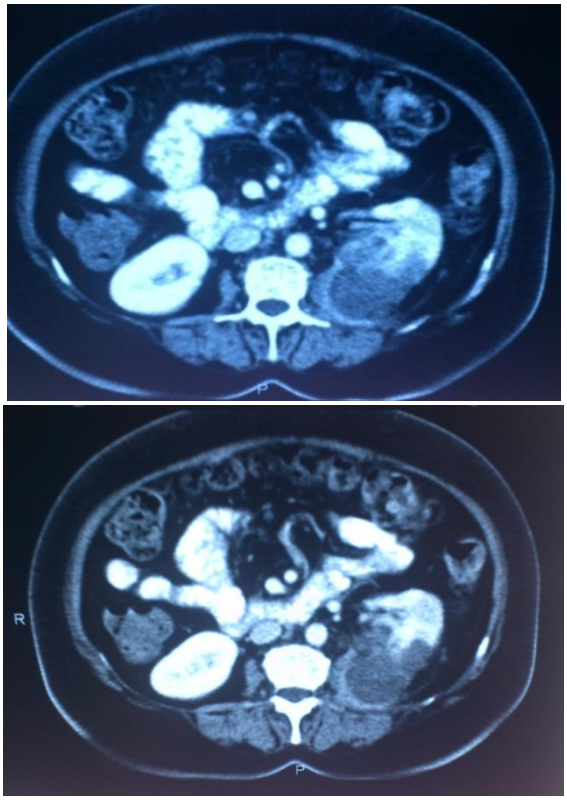
Clinical Features

A 67 year old female presented with high grade fever and abdominal pain since one week. Pain in abdomen was predominantly in the left lumbar region. She also had anorexia and weight loss. Patient had diabetes mellitus since the last 10 years. Patient had a past history of hysterectomy 10 years back for fibroid uterus. On general examination patient was pale. On per abdomen examination no significant findings were found.

Investigations

Complete blood count revealed leucocytosis with raised neutrophil count. Renal function tests were normal. Ultrasonography (USG) of the abdomen showed evidence of approximately 5.2 x 4.6 x 5.1 cm size hpoechoic exophytic lesion involving the upper and mid pole of the left kidney with vascularity most likely suggestive of a neoplastic etiology. Further CT scan whole abdomen and pelvis was done. CT revealed inhomogeneously enhancing exophytic lesion arising from the interpole of the left kidney with large necrotic component. These CT findings suggested the possibility of either a ruptured renal abscess or a neoplastic lesion with spontaneous rupture.

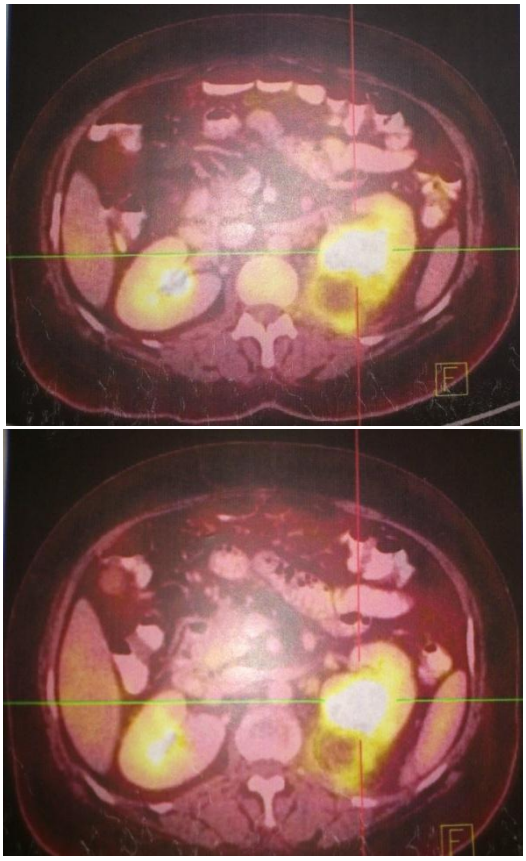
Fig. 1



As CT scan failed to differentiate between abscess and tumor a PET scan of the body was then done

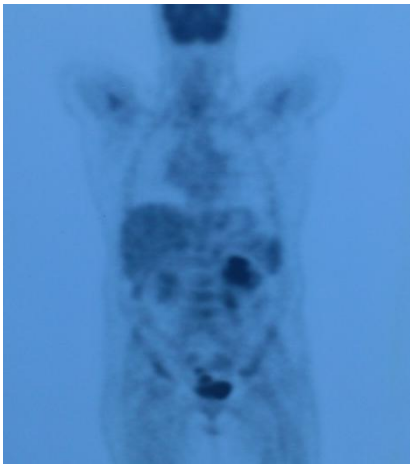
to determine the exact nature of the disease. PET with PET/CT scan demonstrated an ill-defined heterogeneously enhancing lesion in the mid polar region of the left kidney.

Fig. 2



However PET scan also showed significant uptake of FDG at the residual post-operative (hysterectomy) stump, near the right lateral margin of the urinary bladder located superior to the uretero-vesical junction.

Fig. 4



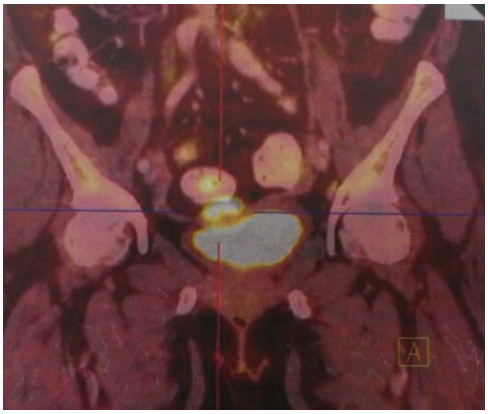
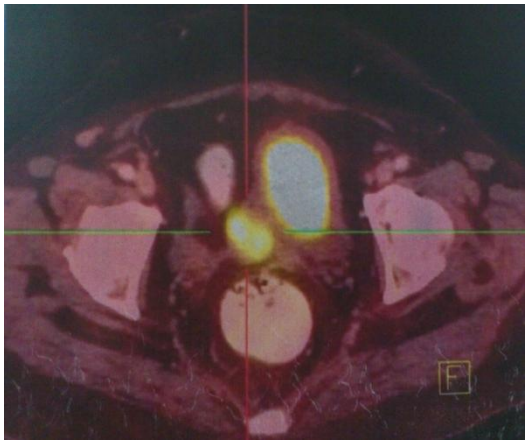
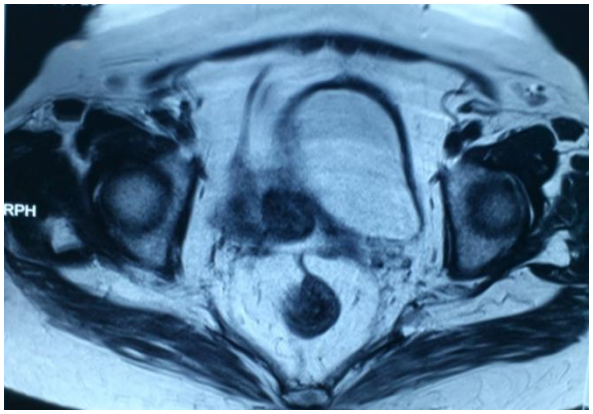


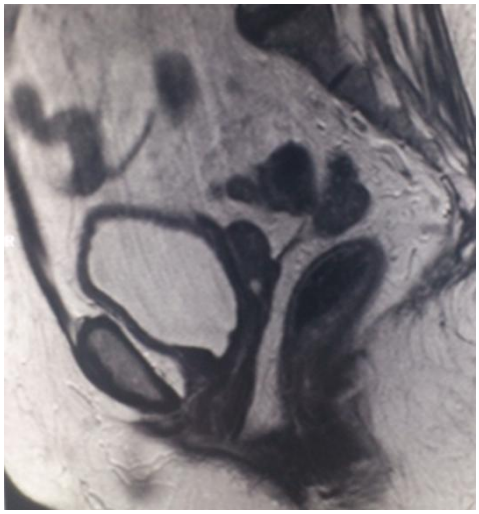
Fig. 5



This finding of a pelvic mass along with the primary lesion raised the possibility of a metastatic lesion in the pelvis from the suspected renal tumor. Further MRI of the abdomen was done in order determine the exact nature of the pelvis mass. MRI showed heterogeneous enhancing lesion in the mid pole of the left kidney with associated posteromedial T2 hyperintense enhancing lesion, most representing a neoplasm with suspected rupture. The pelvic mass was seen as a mildly heterogeneous enhancement at the superior most part of the vaginal stump, right posterolateral to the bladder.

Fig. 5





Management

Apart from the kidney lesion the pelvic mass represented the only distant lesion in the body. So a decision to explore the abdomen and excise the renal tumor as well as the pelvic mass was taken. After thorough discussion with the patient and her relatives the patient was taken for surgery. Consent for radical nephrectomy was also obtained. Intra operatively, on gross examination, the left kidney was found to be pyonephrotic with dense perinephric adhesions. There was also a palpable firm mass in the mid pole of left kidney. Intra operative frozen section analysis of the kidney mass and perinephric tissue was done to determine the exact nature of the disease. Frozen section analysis showed xanthogrannulomatous pyelonephritis without any evidence of malignancy. Further frozen section study of the para aortic lymph node confirmed the absence of any metastatic focus. On exploration of the pelvic region a single foreign body with surrounding adhesions and pus formation was found in the right superolateral aspect of the vaginal vault. On gross examination the foreign body appeared as a gauze piece left during previous hysterectomy. The foreign body was excised completely. Since the entire kidney was found to be pyonephrotic a nephrectomy was done. Post operatively the patient recovered well without any complications. The patient was discharged on the tenth post operative day.

Discussion

PET scan as a diagnostic investigation in evaluation of renal masses is not well established. PET scan shows uptake of 18 Flurodeoxyglucose (FDG) in metabolically active tissues in the body. As malignant tumors have more metabolic activity than the surrounding normal tissue, they appear as enhancing lesions on PET scan. However, even some inflammatory masses can be seen as enhancing lesions in PET scan thus giving a false positive result[5]. In this case, PET scan revealed significant uptake in a pyonephrotic kidney, leading to the assumption of a neoplastic mass. However, PET scan did show uptake in the pelvic region which finally turned out to be a foreign body in the pelvis. This led to thorough exploration in the pelvic region which would not have been otherwise during routine nephrectomy.

In literature, there are several cases that show FDG uptake corresponding to foreign body reaction. Such uptake has been reported in conjunction with mesh and teflon prostheses, breast silicone, catheter, arthroplasty, and the other foreign bodies. The FDG uptake mechanism is considered as a foreign body granulomatous reaction with inflammation and fibrosis. Careful correlation with the patient's history and correlative imaging techniques such as CT are recommended to avoid misdiagnosing malignancy[6,7,8,9].

In 2001, a meta-analysis by Gould et al. was published, noting a high accuracy in diagnosing metastatic non-small cell lung cancer (94% sensitivity and 83% specificity). However, more recent data indicate PET scans might not be as good as originally thought. For example, false-positive PET scans may be rampant in Histoplasma-endemic areas, resulting in missed diagnosis of metastatic cancer, which could result in denial of potentially curative surgery[1].

Deppen et al. published a study in 2011 demonstrating that as much as 60% of PET scans suggestive of lung cancer in a Histoplasma-endemic area (Nashville, Tennessee) were in fact false positives[2].

In another study published in 2011 (Darling et al.), researchers found that PET scans can wrongly diagnosed metastatic disease to the lymph nodes inasmuch as 35% of cases, again resulting in denial of potentially curative surgery[3].

Conclusion

A PET scan initially misleads into diagnosis of a foreign body as a suspicious lesion, thereby changing the operative approach to a midline laparotomy rather than conventional loin incision for nephrectomy.

PET-CT is an advantageous investigation for the malignant cases for better approach and follow up. False positive testing could result in unnecessary resections or denial of curative resection and false negative testing could result in delay of appropriate treatment[4].

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