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Case report
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^{18}F-FDG PET/CT demonstrated renal and hepatic cyst infection in a patient with autosomal dominant polycystic kidney disease

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Abstract

Infection of renal or hepatic cyst is a serious complication of autosomal dominant polycystic kidney disease (ADPKD) and early diagnosis is crucial for the correct management. We report a case of 64-year-old male with ADPKD, who required renal transplantation some years before, with recent recurrent episodes of fever and abdominal pain, who underwent ^{18}F-FDG PET/CT twice at 18 months intervals, after not conclusive conventional imaging studies (CT, ultrasonography). ^{18}F-FDG PET/CT has proven to be a useful method for the diagnosis of renal and hepatic cyst infection in a patient with ADPKD and for the subsequent management.

KEY words: PET/CT, ^{18}F-FDG, cyst infection, autosomal dominant polycystic kidney disease, hepatic cyst, renal cyst

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Background

Autosomal dominant polycystic kidney disease (ADPKD) is one of the most common hereditary disorders affecting approximately 1 in 500–1000 individuals [1]. Over 50% of patients with ADPKD eventually develop end stage kidney disease and require dialysis or kidney transplantation [2]. Usually the diagnosis is performed by renal imaging using ultrasound, CT or MRI but all these methods have some limits especially in patients with end stage renal disease. The role of ^{18}F-FDG PET/CT is still not clear.

Case report

A 64-year-old male with a history of ADPKD, left-sided nephrectomy and renal transplantation from deceased donor in 1996, presented with a 3-weeks history of fever, chills and abdominal pain not responsive to antipyretics. Laboratory findings showed elevations of C-reactive protein levels (200 mg/dL), procalcitonin (12 ng/mL) and creatinine (2.9 mg/dL); liver enzymes and leukocytes were normal and urine culture was negative. An abdominal ultrasound and abdominal CT showed the presence of multiple cyst in the right kidney without signs of infection. Patient started empirical parenteral antibiotic therapy (piperacillin-tazobactam) but the symptoms persisted, so he underwent a positron emission tomography with computed tomography (PET/CT) scan. ^{18}F-FDG PET/CT was performed after intravenous administration of 3.5 MBq/kg; total body images were acquired 60 minutes after injection on Discovery ST tomograph (GE — Milwaukee, Wi, USA; 4-slice-CT, 80 mA, 120 Kv; 3 minutes PET-bed; 128 × 128 matrix, 60 cm field of view). PET/CT revealed moderate uptake of FDG at the ring shape of the wall of one renal cyst in the upper right kidney. No other pathological uptakes were discovered in the remaining body studied (Figure 1). Cyst fluid culture was positive for Escherichia coli. Then the patient underwent radical right nephrectomy, symptoms disappeared and laboratory findings returned normal. After 18 months from first PET/CT scan, patient returned for a new febrile episode with a blood culture positive for Escherichia coli. PCR was 362 mg/dL, procalcitonin 182 ng/mL. An abdominal CT revealed hepatic polycystosis with biggest cyst about 8 cm in the segment VIII. After a new fever pitch, the patient underwent an ^{18}F-FDG PET/CT to search infective foci, which showed an increased FDG uptake in the liver corresponding to the wall of a big hepatic cyst between segment VI and VII. Besides, increased metabolic activity was seen in some mediastinal nodes (Figure 2).

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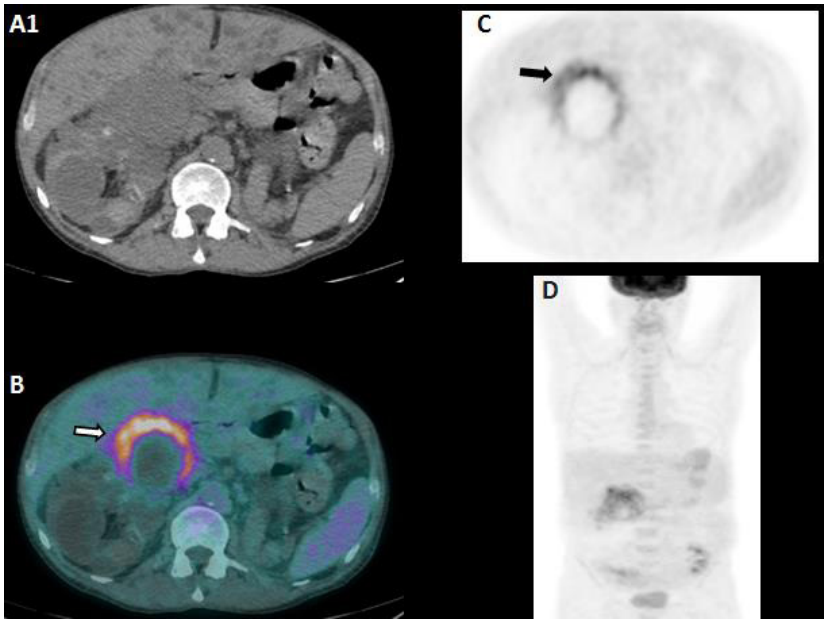

Figure 1A–D. Axial CT (**A**), axial PET (**B**) and axial PET/CT (**C**) displays one renal cyst with ring shape of the wall FDG avid in the right kidney. Maximum intensity projection, MIP, shows no other pathological uptakes in the remaining body studied (**D**)

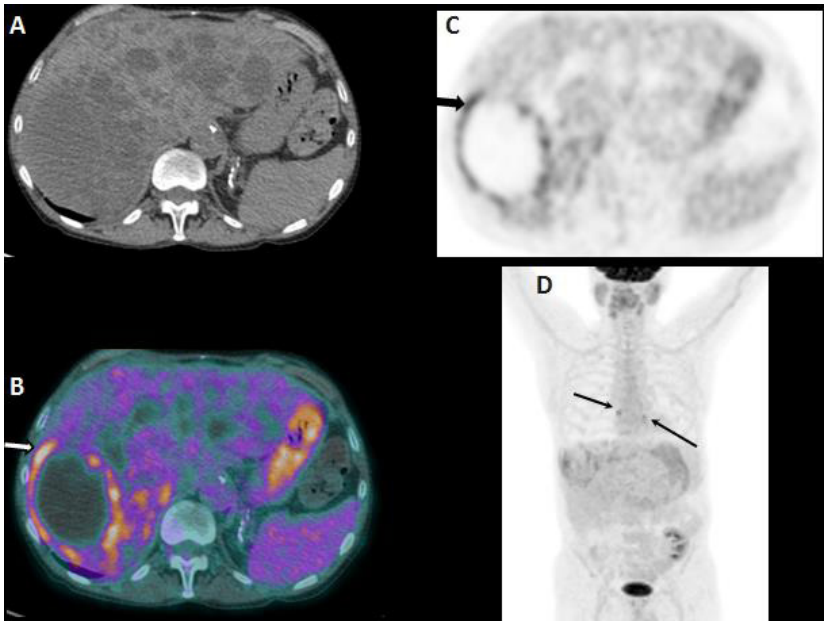

Figure 2 A–D. Axial CT (**A**), axial PET (**B**) and axial PET/CT (**C**) shows an increased FDG uptake in the liver between segment VI and VII corresponding to the wall of a big hepatic cyst. MIP (**D**) shows some mediastinal nodes FDG avid (thin arrows)

Antibiotic therapy with daptomycin and ceftriaxone was started successfully.

Discussion

ADPKD is the most frequent genetic kidney disease and cyst infection, both hepatic and renal, is an important challenging diagnostic issue in these patients because of potential dangerous complication [3]. The diagnosis of cyst infection is difficult because of the lack of specific signs and symptoms [4] and the limitation of conventional imaging procedures (like ultrasound, CT and MRI) especially in patients with renal failure [5–7]. Sallèe et al. [7] and Balbo et al. [8] compared sensitivities of ultrasound, CT, MRI and PET/CT in patient with ADPKD and suspected cyst infection proving the superiority of PET/CT. The actual role of PET/CT is still not clear. A few reports described the role of PET in detecting cyst infection, either renal [9–13] or hepatic [14–17] or both [18–21], in patients with ADPKD, particularly recognizing

if there is an infective process in progress, guiding the biopsy and the better treatment. Our case is of interest because the PET/CT has proven to be useful in the early diagnosis either of renal cyst or hepatic cyst infection in a patient with ADPKD and unresponsive fever and guiding the choice of the correct management of the patient.

Conflicts of interest

The authors declare that they have no conflict of interest.

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