Radiological findings in the diagnosis of genitourinary candidiasis

Aşte Erden
Suat Fitoz
Tuba Kaygül
Selma Tükel
Serdar Akyar

Abstract The presence of fungus balls within the collecting system is an important clue to the radiological diagnosis of genitourinary candidiasis. In this report, an 8-month-old infant with this opportunistic infection is described. Emphasis is placed on the radiological findings of renal candidiasis, including previously unreported MR appearances. Sonographic and Doppler findings of accompanying Candida epididymitis are also described.

Introduction

Prolonged antibiotic therapy, catheterisation and parenteral nutrition may render a patient susceptible to invasion by Candida species and may lead to development of urinary tract candidiasis [1, 2].

Renal involvement with Candida is usually secondary to systemic infection [1]. However, the kidney may be affected during the course of Candida cystitis or may be involved primarily without other organs being affected and without evidence of candidaemia [2]. Debilitated individuals, diabetics, patients with underlying renal disorders such as obstructive uropathy or chronic pyelonephritis and premature babies are particularly susceptible to this opportunistic infection [2, 3].

In this report, we present a child with urinary candidiasis and emphasize the radiological aspects of this infection, including MR findings of renal involvement that have not been previously described in the literature. We also document the sonographic and Doppler changes of Candida epididymitis.

Case report

An 8-month-old baby was hospitalised with a diagnosis of urosepsis and dehydration. He was born at 29 weeks’ gestation and had developed bronchopulmonary dysplasia after long-term ventilation therapy for respiratory distress. From 6 weeks of age onwards he had experienced recurrent pyelonephritis and received broad-spectrum antibiotics for several days following each episode. At age 3 months, the patient was re-evaluated for oliguria and impaired renal function tests. Sonography was performed to elucidate probable obstructive pathologies. It showed an enlarged right pelvicalyceal system and ureter, which was attributed to obstruction of the ureterovesical junction; percutaneous nephrostomy was performed.

He was readmitted to hospital at age 8 months with a 3-day history of vomiting and lethargy. Physical examination showed weight 4.150 g (< 3rd centile), decreased skin turgor and dry mucous membranes. His nephrostomy catheter had come out of place and urine leaked from the intervention site. Abnormal laboratory values included: BUN 127 mg/100 ml and serum creatinine 1.5 mg/ml. Urine microscopy showed many white cells. After urine culture showed 100,000 colonies/ml of both Klebsiella and Pseudomonas aeruginosa, antibiotic treatment was started.

On the 5th day of antibiotic treatment, renal US showed a slightly enlarged right kidney with dilated pelvicalyceal system.
The walls of collecting system were thickened. There were heterogeneous and hypoechoic masses within the dilated calyces representing fungus ball formation (Fig. 1). Diffuse increase in the parenchymal echogenicity of the right kidney was also noted. The left kidney was normal in size, but multiple tiny stones were present within the pelvicalyceal system. In addition, to these findings, several stones and fungus balls were detected in the bladder.

Renal CT confirmed the findings of the US examination. Non-enhanced scans showed soft tissue masses (14 HU) representing fungus balls, which could hardly be distinguished from urine in the dilated collecting system. Following contrast medium injection the right pelvicalyceal system was poorly opacified due to its delayed excretion.

On T1-weighted (T1-W) images, fungus balls were isointense with renal parenchyma (Fig. 2a). On T2-weighted (T2-W) and STIR images, mycetomas were hyperintense to the nearby renal parenchyma (Fig. 2b). Renal MRI also demonstrated thickening of the perirenal fascia and minimal fluid collection in the right perirenal space. Both CT and MR revealed tiny stones in the left pelvicalyceal system.

Direct microscopic examination and urine cultures yielded Candida tropicalis (100,000 colonies/ml). Antifungal treatment with fluconazole was started. A lump was noticed in his right scrotum at the beginning of the antifungal treatment, while he was under clinical observation and treatment. Scrotal US showed enlarged head of the right epididymis with decreased echogenicity; colour Doppler revealed increased number of identifiable vessels in the affected region (Fig. 3). The US findings were consistent with epididymitis. The causative microorganism was thought to be Candida and scrotal biopsy was recommended, but refused by the family.

On the 15th day of fluconazole therapy, renal US demonstrated no change in the appearance of the fungus balls. Fluconazole was discontinued and lysosomal Amphotericin B was started. On the 22nd day of lysosomal Amphotericin B therapy, the fungus balls disappeared sonographically. Additionally, the thickness of the epididymis had decreased and the hypervascularity of the epididymal head disappeared. It is concluded that the epididymitis was fungal in aetiology because it responded to lysosomal Amphotericin B in the interim period.

**Discussion**

Involvement of various organs, including kidney, spleen, lung, liver, heart, pancreas, meninges, eye, joints, bone and muscle, during the course of systemic candidiasis infection has been reported [3–5].

Infection of the epididymis due to Candida species is unusual and to our knowledge has been documented as a cause of epididymitis in only a few cases [6–8]. Regression of the lump in the infant’s scrotum during the course of the antifungal therapy and confirmation of this finding by US proved that epididymitis was secondary to fungal infection. Coexisting prostatitis or reflux of contaminated urine down the vas deferens may have led to the epididymitis in our patient.

Our patient had several risk factors for Candida infection – prolonged antibiotic therapy, catheterisation for nephrostomy and ureterovesical junction obstruction. Urinary obstruction probably also contributed to