Case Report

Aspergillus ‘fungus ball’ within a cadaveric renal transplant graft

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Introduction

Filamentous fungal infections are associated with a high morbidity and mortality in solid organ transplants. Species of the Aspergillus family account for the majority of these infections, and Aspergillus fumigatus, in particular, may be regarded as the most important airborne saprophytic fungus [1,2]. There are numerous conidia of this fungus inhaled constantly by humans, which are normally eliminated in immunocompetent hosts by innate mechanisms. An aspergilloma or allergic bronchopulmonary aspergillosis are the only infections observed in such hosts. Thus, Aspergillus was regarded as a weak pathogen for many years until there were an increased number of immunosuppressed patients, resulting in a dramatic rise in severe and frequently fatal invasive aspergillosis. The majority of solid organ transplant recipients with Aspergillus infection have pulmonary [3], rhino-cerebral or disseminated infection. Renal aspergillosis has rarely been reported [4]. The term ‘fungus ball’ refers to a saprophytic colonization of a cavity by fungal hyphae, without the invasion of the adjacent tissue. We report an isolated unusual case of an aspergilloma present within a cadaveric renal transplant graft in the absence of systemic infection.

Case

Three months after an uncomplicated combined liver and renal (cadaveric) transplant, a 51-year-old man developed a 3-day history of fevers and reduced urinary output. The patient originally had end-stage renal disease secondary to chronic glomerulonephritis and had a living-related renal transplant in 1974. He subsequently developed transfusion-related hepatitis C in 1987, which later progressed to hepatitis C hepatic cirrhosis. In 1997, he became infected by pleural and spinal tuberculosis, but this was treated successfully. Chronic allograft nephropathy was diagnosed in 1999 and haemodialysis was initiated and continued until a combined liver and renal transplant was carried out in 2001.

The patient’s medications at the time included tacrolimus (1 g twice daily), mycophenolate mofetil (250 mg twice daily) and prednisolone (5 mg daily). Physical examination was essentially normal except for the presence of a tender suprapubic area. In particular, the transplanted grafts were not tender to palpation.

The serum creatinine was increased to 426 μmol/l, whereas it was always within the normal range in the 3 months after his combined transplant (normal range 40–150 μmol/l). The serum urea was elevated to 23.1 mmol/l (normal range 2.5–8.5 mmol/l) and the serum white cell count was elevated to 13.23 × 10⁹. Blood cultures and midstream urine cultures were sterile. However, the midstream urine specimen contained >100 white blood cells.

Renal transplant ultrasound sonography displayed a renal graft in the left iliac fossa of 140 mm in length, with mild dilatation of the calyces and slight dilatation of the renal pelvis. The pelvis itself contained an echogenic material reported at the time to be either a blood clot or a ‘fungus ball’ (Figure 1).

A nephrostomy tube was then inserted into the renal graft for decompression of the obstruction. This resulted in a good drainage of contrast, but a small filling defect remained in the renal pelvis consistent with residual particulate matter. Other radiological investigations undertaken at that time included a normal computed tomography (CT) scan of the abdomen and an echocardiogram displaying a good ejection fraction (52%) with normal valvulature.

The patient did not have any further fevers during his hospital stay. On the first day after the insertion of the nephrostomy tube into the renal graft, the patient passed a moderate quantity of solid material per urethra. Until that time, the patient had a reduced
urinary output per urethra, with a good urinary output through the nephrostomy tube. Cultures of this solid material displayed Aspergillus niger. As a result of this discovery, liposomal amphotericin B, at an intravenous dose of 5 mg per kg daily, was commenced and continued for 4 weeks. The nephrostomy tube also remained in place during that period. On removal of the nephrostomy tube, there was no evidence of calyceal dilatation or echogenic material (Figure 2). The patient remained well throughout the period of treatment and his renal function gradually normalized to serum creatinine and urea values of 127 μmol/l and 8.5 mmol/l, respectively.

Discussion

The presence of an isolated aspergilloma within a renal transplant graft in the absence of a systemic infection, as in the case we described, is very rare. There are other notable aspects to the case including the patient’s lack of clinical symptoms and the rapid recovery of renal function by the use of liposomal amphotericin B.

There has been a dramatic increase in the incidence of aspergillosis in the last two decades, yet the mortality has decreased from 92% (between 1990 and 1995) to 60% (between 1998 and 2001) [5]. Increased immunosuppression, multiple organ transplantation as well as environmental factors are just some of the risk factors involved in this increased incidence. It is noteworthy to mention that during the time that our patient underwent the combined liver and renal transplant, construction was taking place at the transplant hospital. It has been shown in the past that the presence of Aspergillus species in the environment is the most important factor in nosocomial invasive aspergillosis [6].

The treatment of our patient with liposomal amphotericin B was based on benefits shown by historical data when used as a first-line treatment [7]. However, itraconazole and, more recently, voriconazole (since 2001) have also proved beneficial. In fact, a recent study, comparing voriconazole with amphotericin B as a primary treatment, showed that voriconazole leads to a more successful outcome (52.8% at 12 weeks) compared with amphotericin B (31.6%), increased survival rates and fewer adverse effects [8].

In the future, it is unlikely that the risk factors for the development of invasive aspergillosis can be avoided. The 28–30 Mb genome of Aspergillus is being sequenced at present and, once this has been completed, it will allow the identification of pathways specific to the pathogenic Aspergillus species and new targets for anti-fungal drugs.

Conflict of interest statement. None declared.

References


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