Rare infectious complication following simultaneous pancreas-kidney transplantation: A case report

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Case reports and series

Rare infectious complication following simultaneous pancreas-kidney transplantation: A case report

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ABSTRACT

Infectious complications are common adverse events of solid organ transplantation and immunosuppressive therapy. In the perioperative setting, most infections are of bacterial or viral origin. Risk assessment of donor and recipient focuses mostly on blood-borne pathogens. Occasionally, parasitic infections are reported after transplantation. In regard to the latter, we report the case of a 57-year-old patient who underwent simultaneous pancreas-kidney transplantation and shortly thereafter developed diarrhea, abdominal bloating and weight loss due to *Giardia duodenalis*.

Case presentation

A 57-year-old caucasian male from Switzerland with long-standing type I diabetes mellitus (T1DM) and end-stage renal disease (ESRD) underwent simultaneous pancreas-kidney transplantation (SPKT) from a deceased brain stem dead donor. Prior medical history included autonomous neuropathy with orthostatic dysregulation, coronary and peripheral artery disease as well as severe secondary hyperparathyroidism. He had not traveled abroad in the year before transplantation.

The donor was a 50-year-old man, who had suffered brain death from an intracerebral bleeding due to arteriovenous malformation. In the patient history, abdominal disease was not reported. The pancreatic graft was transplanted after standard backtable preparation, involving removal of the donor spleen, shortening of the duodenum, sewing over of the mesentery and arterial reconstruction with a "y"-graft using the donor's iliac bifurcation. The duodenal segment of the graft was anastomosed to the second jejunal loop and the portal vein to the vena cava. The donor kidney was implanted into the left iliac fossa. The patient had full function of both grafts with immediate insulin-independency and without dialysis requirement. Immunosuppressive therapy consisted of tacrolimus, mycophenolic acid (MPA) and prednisone. Due to induction treatment with thymoglobulin and an intermediate risk for cytomegalovirus (CMV) reactivation valganciclovir prophylaxis was started. During the hospital stay, a standard two week course of anti-infective therapy with piperacillin/tazobactam and fluconazole was administered. At discharge, the medication also included trimethoprim-sulfamethoxazole for *Pneumocystis jirovecii* prophylaxis, standard-dose proton pump inhibitor and vitamin D.

Four weeks after transplantation, the patient presented to the emergency department with malaise, new-onset of abdominal bloating and diarrhea. Physical examination demonstrated signs of dehydration. His body-weight had dropped by 6.5 kg since discharge. Blood chemistry showed worsening of kidney allograft function with an 1.6 increase in serum creatinine, as well as a hypoosmolar hyponatremia. Tacrolimus trough level was elevated at 20.6 μg/l. Urine sediment was unremarkable except for sparse hyaline casts. Primarily prerenal acute kidney injury due to severe diarrhea with possibly additional calcineurin-inhibitor (CNI) toxicity was concluded. After fluid resuscitation, graft function as well as the hyponatremia recovered well. Tacrolimus was adapted until trough levels were within target range.

Abbreviations: T1DM, type 1 diabetes mellitus; ESRD, end-stage renal disease; SPKT, simultaneous pancreas-kidney transplantation; MPA, mycophenolic acid; CMV, cytomegalovirus.

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To unravel the cause of diarrhea, upper and lower endoscopy were performed one week after admission. Macroscopic finding was unremarkable. Histopathology, however, demonstrated many trophocytes restricted to the donor duodenal segment (Image 1), while the recipient duodenum showed no alterations (Image 2). No MPA- or CMV-associated injury was observed in the colonic biopsies. Stool screening was negative for *Clostridium difficile*.

In conclusion, the diagnosis of transplant-acquired giardiasis was established. To avoid drug interactions with MPA and tacrolimus, antiparasitic treatment with ornidazole 1.5 g OD for 2 days was chosen over metronidazole. Hereafter, diarrhea resolved quickly, kidney graft function remained stable and hyponatremia did not recur. The patient remained insulin independent throughout the course.

Conclusion

Organ transplantation is often the only therapeutic option to prolong survival in the setting of end-stage organ failure. For T1DM with ESRD, SPKT is preferred over kidney transplantation alone, because it improves quality of life and is believed to reduce long-term macro- and microvascular complications of diabetes, therefore leading to an improved kidney allograft survival [11]. While preventing acute rejection, immunosuppressive therapy also places the patient at risk for infections. In kidney transplantation, infections are often associated with worsening graft function and increased morbidity and mortality [3,6]. Most infections in the early post-transplantation period are due to blood-borne viruses (i.e. Cytomegalovirus/Epstein–Barr Virus/BK-Virus) or bacterial pathogens; only few are of parasitic nature [2]. Pre-transplant infectious disease screening assesses the presence of the most common blood-borne pathogens in the donor, as well as previous exposure and immunity of the recipient. With the exception of toxoplasmosis, organ donors are not routinely screened for parasites in most countries [12]. However, due to immunosuppression, recipients are more susceptible to parasitic infections and, depending on the geographical region, might even be at risk of infection with multiple parasites [1].

Worldwide, *Giardia duodenalis* is one of the most common parasites causing diarrhea [5]. The prevalence in humans differs depending on the region between 2% and 30% in industrialized and developing countries, respectively [5,9]. With continuously rising numbers of solid-organ transplantation, especially in endemic countries, the number of publications on post-transplant parasitic infections, including Giardiasis, also increases [8,14–16]. Another contributing factor could be the ever-increasing migratory population in our globalized world. In 2006, 10% of all transplanted organs in Spain were from foreign donors, while 3% were foreign recipients. In addition, 40% of foreign donors or recipients in Spain were from Latin America, potentially endemic areas [13]. Male sex, possibly due to MSM, is also associated with an increased risk for Giardiasis [7]. Finally, potentially overlooked infectious carriers are pets with worldwide pooled prevalence rates of 15.2% and 12% for dogs and cats [4].

SPKT represents a unique circumstance, as transplantation of the duodenum exposes the recipient to the additional risk of infection with intraluminal pathogens, like *Giardia spp.* However, as SPKT is performed only in selected patients, post-transplantation Giardiasis is a rare occurrence. In the early setting after SPKT, only one other case has been reported by Kristensen and colleagues [10]. Several factors set our case apart. The donor of our patient did not originate from an endemic region, e.g. Middle East. He was a Swiss national with a seemingly unremarkable travel history. Secondly, in our case, the rapid development of symptoms and early histopathologic diagnosis clearly unmasks the transplantation as the modality of infection. Biopsies demonstrated trophozoites only in the donor and not recipient duodenum, making the reactivation of a latent infection unlikely.

The question that arises is whether pre-transplantation infectious disease screening should include testing for *Giardia spp.*, especially before SPKT. For parasites like *Trypanosoma cruzi* and *Strongyloides stercoralis*, the American Society of Transplantation Infectious Diseases Community of Practice recommends screening of donors from endemic regions, due to their significant prevalence in those areas and the associated morbidity with peri-transplant infection [12]. Regarding Giardiasis, however, the literature is sparse and consists mainly of case reports. For European patients, travel to tropical countries appears to be the main risk factor for post-transplant parasitic infections, including Giardiasis [16].

In conclusion, parasitic infections – like Giardiasis – are rare complications in the early post-transplant setting, but carry the risk for significant morbidity. As this case shows, they should be considered even in a scenario, where donor and recipient are not from endemic regions. Currently, empirical screening cannot be advised. However, early recognition and stool antigen testing could prevent invasive diagnostic procedures like endoscopy.

Author contributions

AD and FM wrote the article. JR and EM provided the histopathology pictures. KH, HS, OdR and CG critically read the article.

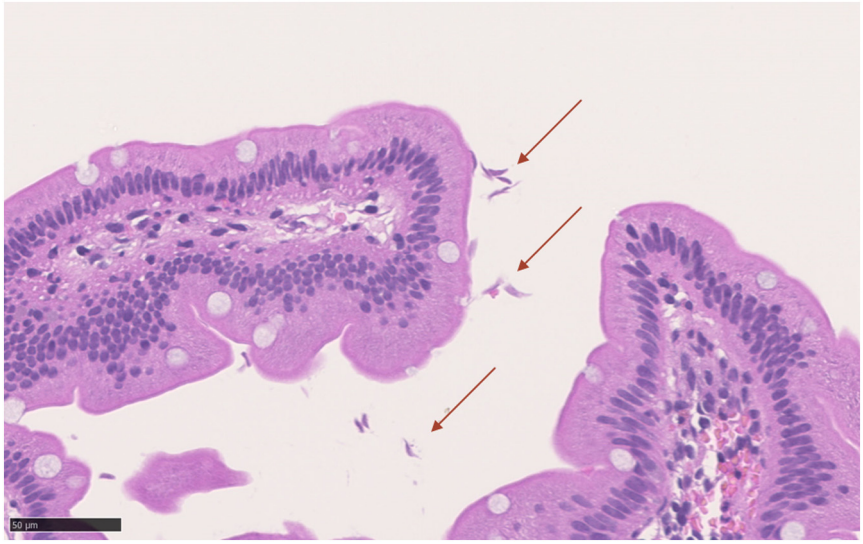

Image 1. Biopsy of the donor duodenum with trophozoites (arrows) present at luminal surface of the duodenal mucosa.

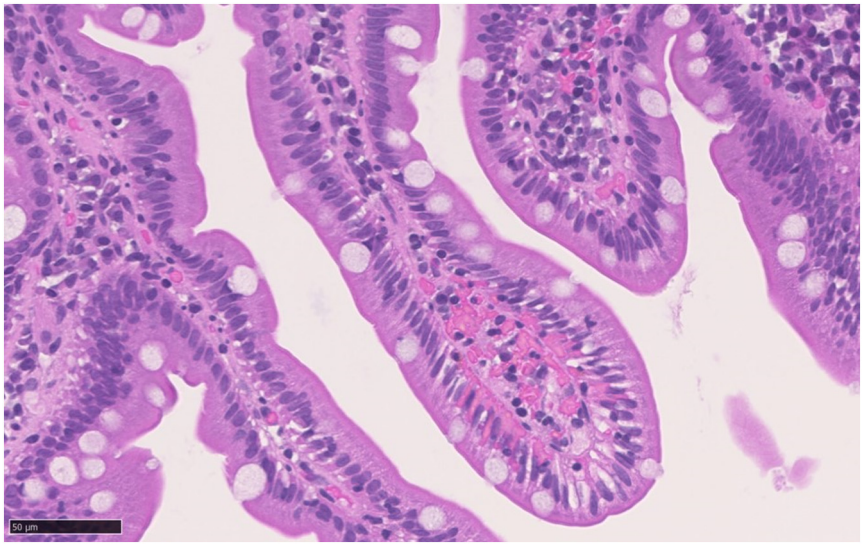

Image 2. Biopsy of the recipient duodenum with an unremarkable mucosa.

Declaration of competing interest

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