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Perforated Diverticulitis 16 Years After Renal Transplantation: A Case Report.

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Abstract
Background: *Perforated diverticulitis following renal transplantation is a rare but potentially fatal complication, which may occur days, weeks, or even years after the transplantation.*
Case presentation: *Herein, we report a 53-year-old femalewho appeared in the emergency department with a history of diffuse abdominal pain in the previous 8 hours, associated with vomiting. The patient reported a cadaveric renal transplantation 16 years ago due to autosomal dominant polycystic kidney disease (ADPKD). Clinical examination revealed peritonitis with muscle rigidity, which was confirmed by abdominal computed tomography. A perforated diverticulum of the sigmoid colon and an intra-abdominal abscess were identified during the exploratory laparotomy, and therefore a Hartmann's procedure was performed.*
Conclusion: *Diagnosis of perforated diverticulitis following renal transplantation is challenging, as typical signs of peritonitis might be absent or less impressive due to immunosuppression. The optimal surgical approach remains controversial, although most surgeons prefer Hartmann's procedure.*
Keywords: *Renal transplant patients; gastrointestinal complications; perforated diverticulitis; autosomal dominant polycystic kidney disease; Hartmann's procedure; primary anastomosis; diverting loop ileostomy.*

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I. Introduction

Autosomal dominant polycystic kidney disease (ADPKD) is a relatively frequent genetic disorder, which mostly causes the formation of multiple cysts in the kidney and leads patients to renal replacement therapy (1). Colonic perforation is a major complication after renal transplantation, which can occur days, weeks, or even years after transplantation. Its incidence varies from 0.4 to 2.1%with a mortality rate of 7.7-44.4% in recent years. The main cause of colonic perforation in kidney transplant recipients is diverticulitis with an incidence of 46.2-83.3% (2). It is worth mentioning that patients with chronic renal failure due to ADPKD have a higher incidence of diverticulosis (3).

Diagnosis of perforated diverticulitis is difficult owing to the lack or mildness of the clinical symptoms and signs due to immunosuppression (2). Whether the optimal surgical approach will lead to survival remains an unanswered question (4). It seems that surgical intervention in the first 24 hours improves the survival rate rather than the type of operation (5). Another controversial issue is the need for elective sigmoid resection after the first episode of acute diverticulitis in immunosuppressed patient (6, 7). Here we describe the case of a 53-year-old female who experienced perforated diverticulitis 16 years after renal transplantation.

II. Case presentation

A 53-year-old female visited the emergency department with a history of diffuse abdominal pain in the previous 8 hours, associated with vomiting. She had received cadaveric renal transplantation 16 years ago due to autosomal dominant polycystic kidney disease (ADPKD). Her immunosuppressive medication encompassed Tarcolimus 4 mg twice per day, Mycophenolic acid 720 mg twice per day, and Methylprednisolone 4 mg daily.

Vital signs were as follows: blood pressure (BP) 142/84 mmHg, heart rate (HR) 81/min, respiratory rate (RR) 18/min, SO2 98%, and temperature (T) 36.4 °C. Abdominal examination disclosed peritonitis with muscle rigidity. Laboratory studies revealed elevated white blood cells (14.67 K/Ul), neutrophils (95.2%), and C – reactive protein (384 mg/L).Abdominal computed tomography showed free air in the abdomen, diverticula of the sigmoid colon, adjacent fat stranding, and extraluminal fluid collection in the left iliac fossa (Figure 1). All these findings were in keeping with perforated sigmoid diverticulitis.

Exploratory laparotomy was carried out through a midline incision. A perforated diverticulum of the sigmoid colon was identified as well as an intra-abdominal abscess. Therefore, a Hartmann's procedure was performed involving the resection of the sigmoid colon with closure of the anorectal stump and formation of an end colostomy. The postoperative period was uneventful, and the patient discharged after eleven days without complications. Histopathologic findings of a perforated diverticulum on the antimesenteric portion of the colon, with a complete rupture of the colon wall, acute and chronic inflammatory infiltration along with abscess formation, focal necrosis, capillary dilation of capillaries and haemorrhage in the serosa and subserosa, evinced the diagnosis of perforated diverticulitis.

III. Discussion

ADPKD is a common inherited disorder in humans leading 60% of patients to renal replacement therapy by the age of 60 years. It is characterized by the formation and enlargement of cysts in the kidney, particularly in the collecting duct, and other organs, primarily the liver and the pancreas as well as cardiovascular anomalies such as intracranial arterial aneurysms and vascular dissections (1). Worldwide, it affects 4 to 7 million individuals and is responsible for 7 -15% of patients on renal replacement (transplantation) therapy (8).

Colonic perforation following renal transplantation is a rare but potentially fatal complication. Its incidence varies between 0.4 – 2.1%. Mortality has been reduced with years due to higher suspicious index, better radiologic imaging, the punctual accurate onset of antibiotics, aggressive surgical intervention treatment, and the lower dose of steroids (2, 4, 5, 9, 10).

The main cause of colonic perforation in renal transplant recipients is diverticulitis with an incidence 46.2-83.3% followed by other causes like ischemia, malignancy, infectious diseases, non-obstructive colonic dilatation, non-specific ulcers, as well as iatrogenic, and idiopathic causes (2, 4, 5, 10, 11). The majority of cases with colonic perforations (44-90.4%) afflicted renal transplant patients with underlying ADPKD (9-11). Sigmoid colon is the commonest place of perforation (69.2-88.9%) due to the preferred anatomic location of diverticula. Colonic perforation can also occur in the descending colon, transverse colon and caecum, while a right-side colon perforation is very rare (2, 4, 5).

There are two patterns of colonic perforation: acute and chronic. Acute colonic perforation happens few days or weeks after renal transplantation and is ascribable to diverticulitis or cytomegalovirus, whereas chronic pattern presents after years and is attributable to diverticulitis or malignancies (12).

The prevalence of diverticulosis in individuals is 20% at age of 40 years and 60% at age of 60 years, while in patients with end-stage renal disease due to ADPKD rises to 53.5-83%, which is significantly higher than those without ADPKD or without renal failure (3, 4). This condition is attributed to a congenital colonic defect or the secretory action from the renal cysts on the colonic wall (4). Similarly, the lifetime risk of developing diverticulitis in individuals with diverticulosis is less than 5%, while in patients with kidney failure is 16-20% and 3% respectivel. Not only do patients with kidney failure due to ADPKD experience a significant higher rate of diverticulitis, but diverticulitis in these patients is also frequently severe (13, 14).

Diagnosis of perforated diverticulitis in kidney transplant patients is challenging because classic symptoms and signs of colonic perforation may be absent or less impressive because of immunosuppression. The main symptoms are abdominal pain with a wide variation in its severity (85-100%), fever with or without chills (66-87.5%), anorexia (66%), localized or generalized signs of peritonitis (23-87.5%), and leukocytosis (69-87.5%). Other symptoms include nausea-vomiting (25-33%), diarrhea (31%), constipation (33%), rectal bleeding (25%), abdominal mass (15%), and pneumaturia (8%). It is worth mentioning that pneumoperitoneum on the chest or abdominal x-rays is present in 23-87.5%. Abdominal computed tomography should be carried out to establish the diagnosis (2, 9, 14).

In terms of immunosuppressants, the introduction of cyclosporine brought about a revolution in the field of renal transplant. However, the exception of cyclosporine in immunosuppressive treatment was not a significant risk factor for the development of complicated diverticulitis (9). Nowadays, corticosteroids are used at lower doses or only during the immediate postoperative period. It has been suggested that corticosteroids depress cell-mediated immunity and reduce connective tissue proliferation leading to intestinal injury (4).

The optimal surgical approach for perforated diverticulitis in these patients remains debatable. Many techniques have been used such as diverting proximal colostomy which has been almost totally discarded, Hartmann’s procedure, and resection with primary anastomosis with or without protective diverting loop

ileostomy. Most surgeons preferred Hartmann's procedure, especially in cases of severely infected peritonitis. There is a significant concern regarding the lack of bowel preparation, which results in intraluminal and intraperitoneal fecal contamination at the anastomotic site (4). Another problem in immunocompromised patients is the fact that free perforation of acute diverticulitis occurs more often compared to immunocompetent patients, while mortality and morbidity are significantly higher in immunosuppressed patients (15).

Regardless of the type of operation, mortality is 18.1-22% if the surgery performed within 24 hours from the onset of symptoms compared to 47-50% if the surgery carried out beyond 24 hours from the manifestation of symptoms (5).Therefore, the decision is based on the judgment of the surgeon, taking into account the clinical status of the patient including the comorbidities, the health of the remaining intestine, and the extent of peritoneal contamination.

Elective sigmoid resection is recommended in immunosuppressed patients after the first episode of acute diverticulitis. However, Biondo et al. after evaluating 1,166 immunosuppressed and 2,765 non-immunosuppressed patients with colonic diverticulitis concluded that no elective sigmoid resection is required after successful medical treatment of acute diverticulitis in immunocompromised patient (7). Besides, mortality and morbidity of elective sigmoid resection can reach 1.9% and 25% respectively, which should be taken into consideration prior to any decision (6).

IV. Conclusion

ADPKD is one of the most common, life-threatening genetic diseases, which leads to renal failure. Perforated diverticulitis is a rare but potentially fatal complication after kidney transplantation. It may occur days, weeks, or even years after kidney transplantation. Diagnosis is challenging due to immunosuppressive. Typical symptoms and signs can be absent or less impressive, while pneumoperitoneum is not always visible on the chest or abdominal x-rays. Computed tomography is necessary to confirm the diagnosis. The optimal surgical approach remains controversial. Most surgeons prefer Hartmann's procedure. It seems that surgical operation in the first 24 hours is associated with a better outcome of the patients rather than the type of surgery. The role of elective sigmoid resection after the first episode of acute diverticulitis in immunosuppressed patients is contentious. Therefore every surgeon needs to have a high suspicion index for this condition as the early administration of antibiotics and aggressive surgical management, particularly in the first 24 hours, are correlated with lower mortality.

Abbreviations

ADPKD: autosomal dominant polycystic kidney disease

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5. Kefala MA: Analysis and interpretation of data.
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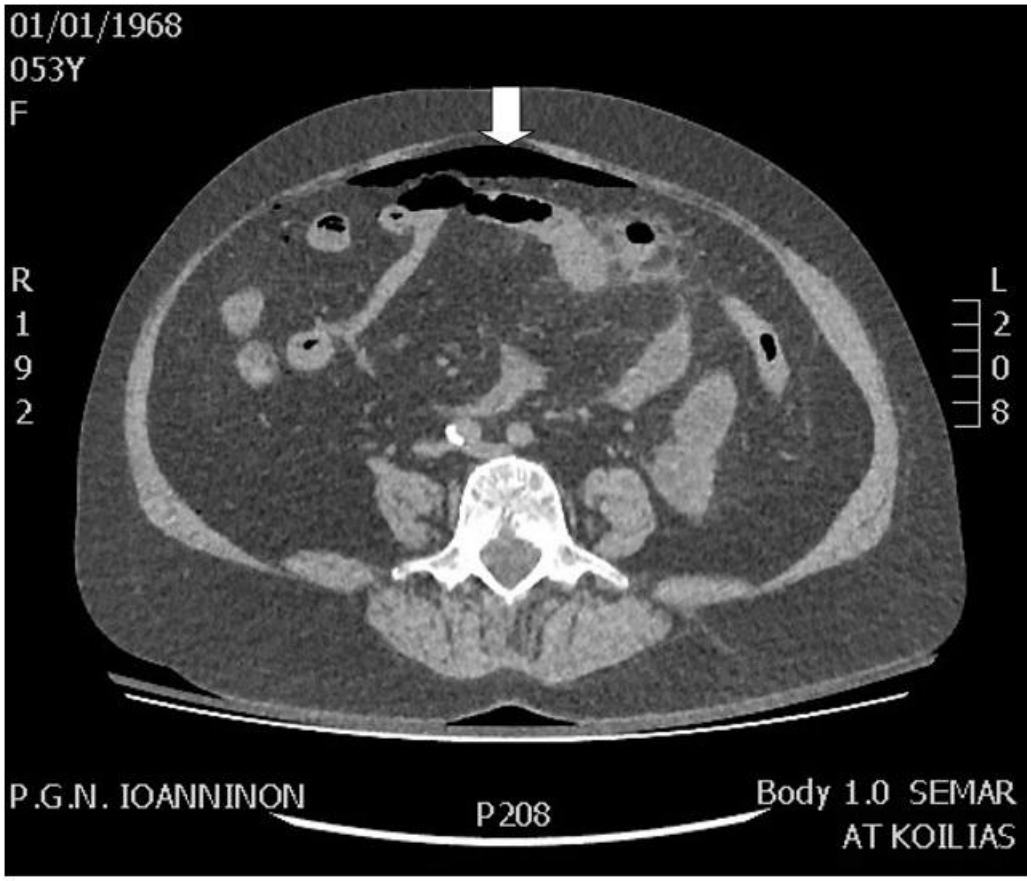

Figure 1: Computed tomography of the abdomen: Free air in the abdomen (arrow).

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