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Case Report

Intraperitoneal Rupture of Infected Cyst in a Patient with Polycystic Kidney Disease after Kidney Transplant: A Case Report

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ABSTRACT

Background: Autosomal dominant polycystic kidney disease (ADPKD) is a multisystem disorder characterized by progressive renal cysts formation and extra-renal manifestations. Infection within the cysts and abscess formation are rare but life threatening if left untreated. We present a rare case of peritonitis presentation due to intraperitoneal rupture of an infected cyst in a woman with polycystic kidney disease.

Case description: A 42-year-old woman presented with constant progressing abdominal pain and vomiting. She complained of abdominal distention, bloating, and a change in bowel habits from two days ago. On physical examination, bilateral enlarged masses of flanks, generalized tenderness, and distention of the abdomen were found. The patient received conventional therapy. After appropriate fluid and electrolyte management and rescue care, appropriate antibiotics were prescribed, and laparotomy was performed. The rupture of an infected cyst of the right polycystic kidney into the peritoneal cavity was the cause of peritonitis in this patient. She successfully underwent a right radical nephrectomy (32×21cm, and 3,300 gr). The postoperative period was uneventful and the patient was discharged from the hospital after a week.

Conclusion: Antibiotic therapy is the first step in the treatment of renal cyst infection. When primary antibiotic therapy fails, drainage of the infected cyst is recommended. In medically fit patients for surgery and patients who present with complications of the infected cyst, radical surgery and nephrectomy is the procedure of choice. The best outcome is achieved after nephrectomy.

Keywords: Peritonitis, Polycystic kidney disease, Kidney Transplantation.

INTRODUCTION

Autosomal dominant polycystic kidney disease (ADPKD) is a common progressive disease with multisystem involvement. It affects 1 in every 400 to 1,000 people. It is usually diagnosed between the ages of 30 and 50 when signs and symptoms start to appear (1,2). Multiple renal cysts are commonly seen in ADPKD which may lead to renal function impairment. Pain is a common complication of ADPKD mainly due to kidney or liver cysts. In addition, the spleen, heart, pancreas, and brain may be affected in the course of the disease (1). Almost all people with ADPKD who have kidney failure present with some degree of heart failure due to chronic systemic hypertension (2,3).

There are various complications in ADPKD including intracystic bleeding, gross hematuria, obstruction, nephrolithiasis, and infection (2). Infection of a single cyst within a polycystic kidney is a serious complication of ADPKD, which leads to abscess formation, systemic inflammatory response, sepsis, and death. The infections are mainly acquired through the urinary tract and are more common in females (1,3). Rupture of an infected renal cyst is uncommon, and renal cyst rupture into the peritoneal cavity is rare. Early diagnosis and appropriate intervention are necessary to prevent lethal complications. We report a rare case of peritonitis due to the intraperitoneal rupture of an infected cyst in a 42-year-old woman with polycystic kidney disease.

CASE PRESENTATION

A 42-year-old woman with a medical history of ADPKD and kidney transplantation 7 months before with constant progressing abdominal pain and vomiting was admitted to an educational hospital affiliated with the Golestan University of Medical Sciences. She complained of abdominal distention, bloating, and a change in bowel habits from 2 days ago. The patient's medications consisted of prednisolone, losartan, amlodipine, calcitriol, gabapentin, ganciclovir, tacrolimus, mycophenolic acid, omeprazole, ferrous sulfate, Nephro-vite, and erythropoietin.

On physical examination, bilateral enlarged masses of flanks, generalized tenderness, and distention of the abdomen were found. Body temperature was 38.5 °C, and pulse rate was 108 beats/minute. Laboratory data were as follows: white blood cell count: 17,400 cells/µl (polymorph nuclear: 86%) with 25% bandemia, C-reactive protein: +4, blood urea nitrogen: 60 mg/dl, urea: 60 mg/dl, creatinine: 1.8 mg/dl, fasting blood sugar: 213 mg/dl, uric acid: 7. 5 mg/dl, alkaline phosphatase: 275 IU/l, calcium: 9. 9 mg/dl, albumin: 3. 4 gr/dl, and lactate dehydrogenase: 538 IU/l.

Abdominal computed tomography (CT) scan showed pneumoperitoneum and free fluid in the pelvis and abdomen, plus a 98 mm dominant inflated cyst in the lower pole of the right kidney. Moreover, multiple liver cysts and collapse of the distal segment of the ileum were noted (Figure 1).

After appropriate fluid, electrolyte management, and rescue care, antibiotics were prescribed and the patient was scheduled for laparotomy.

The rupture of an infected cyst of the right polycystic kidney into the peritoneal cavity was the cause of peritonitis in this patient. She successfully underwent right radical nephrectomy (32×21cm and 3,300 gr) (Figure 2).

In the postoperative period, she was under close observation by a nephrologist, urologist, and intensivist. The postoperative period was uneventful, and the patient was discharged from the hospital after a week.

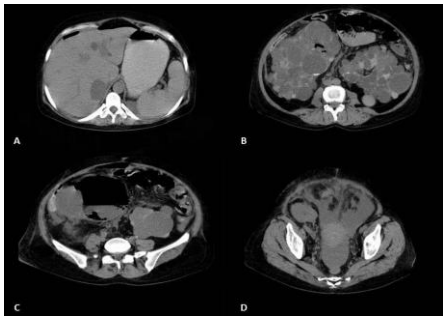

Figure 1- CT scans of the patient. A: free air in the peritoneal cavity; B: bilateral polycystic kidney; C: ruptured infected cyst of the right kidney; D: free fluid in the pelvic cavity

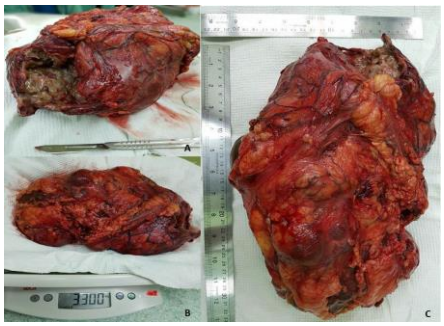

Figure 2- The resected specimen (A, right polycystic kidney), weight of the resected kidney (B), and diameter of the resected specimen (C)

Table 1- Comparison of our case with previously reported cases

Authors	Year	Age (years)	Sex	Background & history	Diagnostic method	Surgical approach	Culture result	Outcome	Refernce
Migali et al.	2008	56	Male	ADPKD and right sided cadaveric kidney transplantation with homolateral nephrectomy	Ultrasound, CT, PET[a], MRI[b], laparotomy	Left nephrectomy	Blood and urine cultures: *E. coli*	Survived	(6)
Zahir et al.	2013	52	Female	Bilateral polycystic kidneys with end stage renal failure on hemodialysis	X-ray abdomen, Ultrasound, CT, laparotomy	Right simple nephrectomy	Peritoneal puncture: *E. coli*	Survived	(1)
Hammami et al.	2010	66	Male	Polycystic left kidney and liver disease	X-ray, CT, laparotomy	-	Urine culture: *E. coli*	Expired	(5)
Afghani et al	2019	42	Female	ADPKD and kidney transplantation 7 months before that	CT, laparotomy	Right radical nephrectomy	Urine culture: *E. coli*	Survived	(Present study)

a. Positron Emission Tomography
b. Magnetic Resonance Imaging

DISCUSSION

Both kidneys are affected by ADPKD (3, 4). This multisystem disorder is characterized by progressive renal cysts and extra-renal manifestations including cysts in other organs, such as the liver, intracranial aneurysm, mitral valve prolapse, and abdominal wall hernia (5). An ADPKD-induced kidney cyst could block the urinary tract and lead to obstruction. This causes bacteria growth and kidney infection. Usually, ADPKD occurs when the size of the cysts reaches half an inch or more. Abdominal pain, renal mass, systemic hypertension, urinary tract infection (UTI), stroke, cardiovascular involvement, and colonic diverticulitis have been reported as common complications of ADPKD (2). Diagnosis is made by using ultrasound, CT scan, magnetic resonance imaging, and genetic tests.

Cyst infection within the kidneys is uncommon but lethal and is more observed among females. This indicates that these infections are acquired retrograde from the urinary tract (3). Intraperitoneal rupture has been previously reported in three case reports from Tunisia (5), Kuwait (1), and Belgium (6) (Table 1).

The clinical manifestations of peritonitis are fever, generalized abdominal pain, repeated episodes of nausea, and vomiting. Transplant patients might not manifest typical signs and symptoms of an infection; therefore, diagnosis may be confounded. Other challenges faced in such patients include drug interactions, modification of dose, maintenance of immunosuppression to avoid allograft rejection, as well as surgical intervention in immunocompromised patients. Severe immunosuppression is a risk factor for UTI in transplant recipients, and women are at a higher risk. Patients may present with asymptomatic UTI, which is mainly caused by *Escherichia coli*. All UTIs in kidney transplant recipients should be considered complicated and require standard treatment protocol (7).

Antibiotic therapy is the first step in the treatment of renal cyst infection. When primary antibiotic therapy fails, drainage of the infected cyst is recommended. In medically fit patients for surgery and patients who present with complications of the infected cyst, radical surgery and nephrectomy is the

procedure of choice. The best outcome is achieved after nephrectomy (8, 9).

CONCLUSION

The rupture of an infected cyst of the right polycystic kidney into the peritoneal cavity was the cause of peritonitis in our case patient. She successfully underwent right radical nephrectomy. The postoperative period was uneventful, and the patient was discharged from the hospital after a week. In kidney transplant patients, it is necessary to evaluate the signs and symptoms of UTI during the initial antibiotic treatment for choosing the standard and correct treatment protocol.

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Ethics approvals and consent to participate

Not applicable.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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