



## The Outcome of Diverticulosis in Kidney Recipients With Polycystic Kidney Disease

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### ABSTRACT

**Introduction.** Diverticulosis is a common finding in autosomal-dominant polycystic kidney disease (ADPKD). To avoid the serious complications of diverticulosis after kidney transplantation, some policies have recommended aggressive actions, such as elective colectomy. These policies are not widely agreed upon. This controversy led us to investigate the serious complications and the outcome of diverticulosis in ADPKD kidney recipients to see whether such therapies are justified.

**Materials and methods.** From 2002 to 2006, we followed 18 ADPKD kidney recipient patients with barium enema-documented diverticulosis. All subjects were asymptomatic for diverticulosis at the time of transplantation. The mean value  $\pm$  SD of follow-up duration was  $25.4 \pm 28.5$  months. We documented demographic data, familial history of ADPKD, barium enema findings, and complications as well as graft and patient survivals.

**Results.** Hepatic flexure was the most prevalent site for diverticula. The mean (SD) of diverticular count was  $6 \pm 5.1$ . Patients with a familial history of ADPKD showed a higher number of diverticular ( $P = .01$ ). Diverticulitis occurred in three patients, all of whom died.

**Conclusion.** Diverticulitis is a fatal and not rare complication in ADPKD patients. The rate of complications in our study was similar to previous findings, but we observed serious complications even among patients asymptomatic at the time of transplantation. The decision to take aggressive action such as elective colectomy is still a matter of debate that needs further evaluation.

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**T**HE NECESSITY FOR pretransplantation prophylactic colon resection in autosomal-dominant polycystic kidney disease (ADPKD) patients and the criteria for patient selection are not well understood. Some studies have recommended aggressive investigation and treatment of diverticulosis in patients with a history of previously symptomatic diverticulosis coli,<sup>1</sup> more than 40 years of age at transplantation, or the presence of signs or symptoms of diverticulosis.<sup>2</sup> In one center, patients with a history of diverticulitis had been refused for transplantation unless they underwent colectomy.<sup>3</sup> In contrast to such studies, a more recent cohort in Sweden with a follow-up of more than 5 years reported no higher rate of gastrointestinal complications in ADPKD patients compared to patients with other causes of end-stage renal disease.<sup>4</sup> The aim of this study was to assess the outcome following kidney transplantation of diverticulosis among ADPKD patients who did not have any previous sign and symptoms of diverticulitis.

### MATERIALS AND METHODS

We reviewed all records of kidney transplantations performed from 2002 to 2006 for ADPKD in our center, a tertiary, university-based hospital and referral center for kidney transplantation. Among 803 kidney transplantations, 24 (2.9%) were in ADPKD patients. As a

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routine, all ADPKD patients in our center undergo a barium enema before kidney transplantation for the diagnosis of diverticulosis. Patients with diverticulosis who had no history, signs, or symptoms of diverticulitis were allowed to undergo renal transplant without performing colectomy. The immunosuppressive therapy in our center included prednisone, mycophenolate mofetil, and Neoral (cyclosporine microemulsion formulation).

Eighteen patients with evident diverticulosis on barium enema and without any previous sign and symptoms of diverticulitis entered the study. We examined demographic and clinical data: age at transplantation, sex, familial history of diverticulosis, history of dialysis, and the number and the site of diverticular. We then reviewed all hospitalization records of these patients. The hospitalization charts related to diverticular problems were fully reviewed to obtain the following data: presenting symptom, final diagnosis, treatment modalities, and outcomes. The final patient and graft status at the last follow-up were extracted from the hospitalization charts or follow-up clinic data.

For statistical analysis, we used SPSS 13 for Windows. We used the relative frequency or mean value (SD) to describe our data. To compare the studied variables between different groups of patients and find any correlations between them, we used Mann-Whitney and bivariate Spearman correlation tests. A *P* value of less than .05 was considered to be significant.

## RESULTS

Of the 18 subjects, 14 were men and four were women, with the mean overall age of  $47.1 \pm 9.2$  years (range = 29 to 64). Thirteen patients (72%) had a positive family history of diverticulosis. Thirteen patients (72%) had a previous history of hemodialysis. No patient had a history of previous kidney transplantation and all patients received a kidney from a living donor.

The mean value  $\pm$  SD number of diverticular was  $6 \pm 5$ . Regarding the site of diverticulosis, 38.9% of the patients had diverticular in the hepatic flexure, 33.3% in the sigmoid, and 17.8% in the left colon. None of them had any sign, symptom, or history of diverticular complications at the time of transplantation. The mean follow-up duration was 16.4 months ( $q_1, q_2$ : 8.6, 24.7).

Patients with a family history of diverticulosis had significantly higher number of diverticular ( $6.8 \pm 5.2$  vs  $6 \pm 5.1$ , *P* = .01). No differences were observed in the number of diverticular based on sex and the history of dialysis (*P* > .05).

There was no correlation between the age or the last creatinine with the number of diverticular. During the follow-up, three patients were hospitalized due to diverticular problems. The duration between transplantation and hospitalization due to diverticular problems was 8, 8, and 70 months. The presenting symptom in all cases was acute abdomen. In two patients, it was also complicated with sepsis. All patients had functioning grafts at admission. The final diagnosis in all cases was diverticulitis, confirmed by abdominopelvic computed tomography scan. In all cases, the immunosuppressive therapy was lowered or stopped after admission and antibiotic therapy initiated. One patient underwent laparotomy and a perforated colon diverticulum detected. All the patients with diverticulitis died shortly after hospitalization because of overwhelming sepsis.

The overall mortality rate in our study was 7.9 per 100 patients per year. This rate for hospitalized patients for diverticulitis was 100%. Mann-Whitney test did not reveal a significant difference between patients who developed diverticulitis and those who did not in the number of diverticular or the time after transplantation (*P* > .05).

## DISCUSSION

In our study with a relatively short follow-up, we observed a noticeable overall rate of complications after kidney transplantation among ADPKD patients who were asymptomatic for diverticular problems before and at the time of kidney transplantation. Other studies, with longer follow-up duration, have reported even more complications in ADPKD patients who underwent renal transplantation.<sup>4</sup> We also observed a mortality rate of 100% among patients who developed diverticulitis.

It is controversial whether ADPKD patients with diverticulosis should undergo prophylactic elective colon resection before kidney transplantation.<sup>2</sup> Some studies have recommended this procedure for patients with confirmed diverticulitis.<sup>2,3</sup>

Regarding serious complications of diverticulitis in these patients, early diagnosis and treatment of lower abdominal signs in any ADPKD patient who has a transplanted kidney is important.<sup>2</sup> Other studies have recommended that diverticulitis should be an initial consideration in the differential diagnosis of abdominal pain in patients with polycystic kidney disease.<sup>1</sup> Reduction of immunosuppression to its minimal levels and effective antibiotic coverage have been shown to contribute to a decrease in the mortality rate.<sup>5</sup> Also, using steroid-sparing immunosuppressive regimens and prevention of constipation, both in the preoperative and postoperative period, may contribute to a decreased incidence of colon perforation and mortality.<sup>6</sup>

In our study, the prevalence of ADPKD in kidney recipients was similar to previous studies in Iran.<sup>7</sup> Seventy-five percent of ADPKD patients had diverticulosis. This prevalence had been reported to vary from 53.5%<sup>8</sup> to 83% in previous studies.<sup>1</sup>

The count of diverticular was significantly different between patients with and without a family history of diverticulosis. The hepatic flexure was the most frequent site of diverticula in our study. The sigmoid colon has been reported to be the most frequent site in the other studies.<sup>2</sup>

In conclusion, proper management of diverticulosis in ADPKD kidney recipients remains a challenging surgical problem. Further studies are necessary for more accurate recommendations about performing elective pretransplantation colectomy in these patients.

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