



Laparoscopic appendectomy after kidney transplantation: a case report

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Background: Although appendicitis is commonly encountered in the general population, it is rare among kidney transplant patients. The patients after a kidney transplant have anatomical differences in their right iliac fossa, which is within the surgical site of appendectomy. Herein, a case of acute appendicitis is presented in a recipient of a renal transplant. The laparoscopic view is shown.

Case Description: A 54-year-old Asian man, who underwent kidney transplantation at our hospital 10 years previously, was diagnosed with acute appendicitis and treated with antibiotics at another hospital. Three months later, he hoped to have an appendectomy when he visited our center for a regular follow-up of the transplant surgery. He was scheduled for a laparoscopic appendectomy. During the surgery, the transplanted renal artery and ureter crossing the artery through the peritoneum could be observed. The immunosuppressive therapy was resumed the day following surgery. The patient was discharged on postoperative day 2 without any complications.

Conclusions: To the best of our knowledge, no case of recurrent appendicitis have been reported after kidney transplantation and it is uncertain whether interval appendectomy is necessary or not. However, it may be a safe option to avoid high-risk urgent surgery for patients after renal transplantation.

Keywords: Appendicitis; laparoscopic surgery; kidney transplant; case report

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Introduction

While appendicitis is one of the most common surgical diseases in the general population, there exist very few reports in the literature on acute appendicitis in kidney transplant patients (1,2). Surgeons, especially outside of transplant centers, often face difficulties in treating appendicitis after kidney transplantation owing to immunosuppression and anatomical differences. Herein, a case of appendicitis which was treated with antibiotics and underwent interval appendectomy in a kidney transplant patient with a laparoscopic view is presented. While there are some references to laparoscopic appendectomy for appendicitis in kidney transplant patients (3), this article is unique in that it shows a laparoscopic view of the position

of the appendix in relation to the transplanted kidney and ureter. We present the following case in accordance with the CARE reporting checklist (available at <https://ls.amegroups.com/article/view/10.21037/ls-22-27/rc>).

Case presentation

A 54-year-old Asian man, who underwent kidney transplantation 10 years before at our hospital to treat chronic renal failure secondary to immunoglobulin A (IgA) nephropathy, visited another hospital with a complaint of right lower quadrant pain and anorexia. Investigations revealed a high leukocyte count ($13,880/\text{mm}^3$) and a computed tomography (CT) scan showed a dilated appendix with appendicolith and periappendiceal inflammation. He

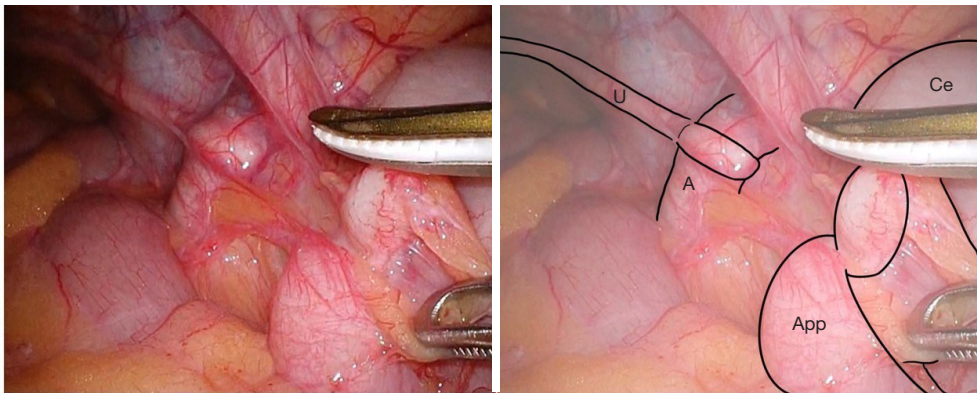


Figure 1 Surgery pictures. The transplanted renal artery (A) and the transplanted ureter (U) crossing the artery, separated from the appendix (App) by the peritoneum on the caudal side of the cecum (Ce) can be observed.

was diagnosed with acute appendicitis and treated with antibiotics at the hospital. When the patient visited his regular clinic of transplant surgery three months later, he decided to undergo an appendectomy after being informed of the possibility of recurrence. He was then referred to the Department of Surgery.

The serum creatinine level had been kept stable and the maintenance immunosuppressant was mycophenolate mofetil 1,000 mg, tacrolimus 5 mg, and prednisolone 4 mg. Laboratory tests revealed a normal white blood cell count ($6,100/\text{mm}^3$) and creatinine at baseline (1.70 mg/dL). Non-enhanced CT scan revealed his transplanted kidney in the right iliac fossa and urinary tract from the proximal to the distal.

The surgical record showed that the transplanted renal artery was anastomosed end-to-end to the right internal iliac artery, and renal vein end-to-side to the right external iliac vein via the extraperitoneal approach. The patient was scheduled for a laparoscopic appendectomy.

The patient was administered the same immunosuppressants on the morning of the surgery. During the surgery, the patient was placed in a supine position and operated using single-incision laparoscopic surgery. The transplanted renal artery and the transplanted ureter crossing the artery, separated from the appendix by the peritoneum on the caudal side of the cecum was observed (*Figure 1*). The transplanted kidney lifted his cecum towards the ventral side. While the transplanted ureter was constantly checked, the appendix was detached from the retroperitoneum and the appendicular artery was dissected with ultrasonic devices. The appendix was then cut with an automatic stapling device. Intra-abdominal pressure was maintained at

8-10 mmHg.

Ropivacaine was infiltrated into the subcutaneous tissue and deep into the anterior rectus fascia after closing the fascia. The patient resumed the immunosuppressive therapy from the day following the surgery and was discharged on postoperative day 2 without any complications. No malignancy was detected pathologically. The baseline serum creatinine level was maintained for 2 months post-surgery.

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Discussion

Despite the high incidence of appendicitis, there have been few reports of appendicitis in kidney transplant patients (1,2). However, the growing number of patients with functioning allografts (4) is believed to popularize appendicitis after transplant. For patients who were initially treated with antibiotics for uncomplicated acute appendicitis, the likelihood of late recurrence was relatively high (5). To the best of our knowledge, no case of recurrent appendicitis in patients after kidney transplantation has been reported. It is uncertain whether interval appendectomy is necessary or not. Herein, a single-incision laparoscopic appendectomy was performed in consultation

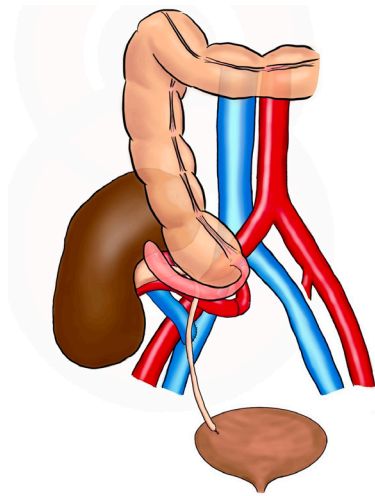


Figure 2 The anatomical change in the patient. In most cases of renal transplantation, including this case, the donor's left kidney is translated into the recipient's right iliac fossa.

with the patient and the transplant surgeon for the kidney transplanted patient successfully treated for appendicitis with antibiotics three months earlier.

In most cases of renal transplantation, surgeons preferred to harvest the donor's left kidney because the left kidney donor nephrectomy is technically easier to perform due to a longer renal vein (6). Since the right iliac vessel is relatively superficial compared to the other, the allograft is mainly transplanted into the right iliac fossa. In this pattern, the ureter, renal artery, and renal vein are arranged in this order from the cranial side, unlike that associated with a normal kidney. The position of the appendix relative to the transplanted kidney should also be checked (7). The CT scan is essential not only for diagnosing appendicitis, but also to make sure of anatomical differences. The transplanted ureter from the kidney to the bladder could be tracked on the patient's non-enhanced CT. The transplanted ureter, transplanted renal artery, and appendix root were anatomically close to each other (*Figure 2*). Existing literature states that the laparoscopic approach was similar to that for non-transplanted patients because the transplanted kidney was implanted in the extraperitoneal space (8). A case involving laparoscopic surgery on a patient after kidney transplantation observed no adhesion around the transplanted kidney that could have interrupted the surgical approach (9,10). Laparoscopic appendectomy was adopted because it has the advantages of relatively lesser postoperative pain and reduced wound infection than open

appendectomy (11).

Immunosuppression is known to interfere with surgical procedures in terms of risk for drug interactions, adverse effects, wound healing, and postoperative complications (12). In a study, all the patients returned to their baseline serum creatinine level while continuing their preoperative immunosuppressive therapy regimen (2).

In the present case, surgery was conducted three months after the diagnosis of appendicitis. The appendix was associated with mild adhesions to the retroperitoneum due to post-inflammatory changes, although that did not interfere with the procedure. The transplanted ureter was visible through the peritoneum from the center to the periphery at the height of the appendix. The ureter lay in close approximation to the appendix; accordingly, it was located constantly and care was taken to prevent heat damage during the surgery. No difficulties were faced using the single incision laparoscopic appendectomy approach. Local anesthetics might have decreased the postoperative pain and the patient did not require any non-steroidal anti-inflammatory drugs (NSAIDs). Interval appendectomy is a safe alternative for treating appendicitis in a patient with a history of renal transplantation. It is controversial to perform interval appendectomy after successful non-surgical management because to the best of our knowledge, no cases of recurrent appendicitis after kidney transplantation have been reported. However, from the point of view of safety, interval appendectomy may be a suitable alternative to avoid high-risk urgent surgery on patients after renal transplantation.

Conclusions

Laparoscopic appendectomy appears to be safe for renal transplant patients if the procedure is performed while constantly checking the transplanted ureter.

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Footnote

Reporting Checklist: The authors have completed the CARE reporting checklist. Available at <https://ls.amegroups.com/article/view/10.21037/ls-22-27/rc>

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <https://ls.amegroups.com/article/view/10.21037/ls-22-27/coif>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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