

Functional medicine

Kidney transplantation with concomitant simple nephrectomy by thoracoabdominal approach for patients with huge autosomal dominant polycystic kidney disease (ADPKD): A case report

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ABSTRACT

Autosomal dominant polycystic kidney disease (ADPKD) is a common inherited kidney disease with growing multiple cyst formation. We report here a huge ADPKD case of kidney transplantation concomitant with simple nephrectomy through thoracoabdominal approach that allows surgeons to manipulate the renal vessels, the adrenal gland, the trigonal ligament, and the lower pole of the kidney under the wide operative field. Because of the direct recognition of the surgical anatomy, it might be safe and feasible for simple nephrectomy in huge ADPKD patients undergoing concomitant kidney transplantation despite of the wide skin incision required by this approach.

Introduction

Autosomal dominant polycystic kidney disease (ADPKD) is a common inherited kidney disease affecting 12.5 million people and is responsible for 5–10% of end stage renal disease worldwide.¹ It is multi-systemic and progressive disorder characterized by cyst formation and enlargement in the kidneys. More than 50% of patients ultimately require renal replacement therapy by the age of 60.¹ For ADPKD patients with ESRD, and transplantation is optimal renal replacement therapy from the viewpoint of morbidity and has an excellent survival rate.

Depending on the patient, concomitant simple nephrectomy and kidney transplantation should be considered to make space for the graft when a huge kidney occupies the pelvis. However, neither the appropriate surgical approach nor the timing of nephrectomy have been established for the patients with huge ADPKD. We report a huge ADPKD patient who underwent kidney transplantation concomitant with simple nephrectomy through the thoracoabdominal approach.

Case presentation

A 35-year-old man with known ADPKD was admitted to our hospital with end stage renal disease. Serum creatinine level had reached

6.0mg/ml, and he complained of abdominal fullness. Preemptive kidney transplantation was planned and his 63-year-old father was chosen as the donor. CT examination revealed huge bilateral kidneys, both measuring 27 × 14 cm in diameter (Fig. 1). Despite of the huge size of the kidney, there were no anesthesia concerns raised by the anesthesiologist preoperatively.

Under a regular general anesthesia, concomitant right simple nephrectomy was performed by a modified thoracoabdominal approach in the semirecumbent position in order to secure a space for the donor kidney. A 17 cm skin incision in the upper midline was made from the xiphoid process to three finger width below the umbilicus in order to approach the peritoneal cavity. Another skin incision was made from three finger breadths above the umbilicus to the 9th intercostal space. Then, the pleura was carefully opened to avoid injuring the lung. The diaphragm is incised on its thoracic surface, avoiding the phrenic nerve. The retroperitoneal Gerota fascia overlying the kidney is separated, exposing the renal hilum. After identification of renal vessels and adrenal gland (Fig. 2, left), the vessels were ligated with transfixing sutures, and the adrenal gland was spared without injury. The ureter was ligated at the level of the right iliac bifurcation, and the kidney was completely isolated and removed. The pleura and intercostal muscles were reapproximated with suturing the 9th and 10th ribs together using 0-vicryl. We have avoided to remove the contralateral kidney at the

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Fig. 1. Preoperative CT. Preoperative CT showing large polycystic kidneys occupying the pelvis.

same time because we concerned about the prolonged surgical time and postoperative complications reported by Krol et al.²

For kidney transplantation, an additional Gibson incision was made, and the donor kidney was placed in the extraperitoneal position in the right iliac fossa. The renal vein and artery were anastomosed to the right external iliac vein using 5-0 and 6-0 prolene, respectively. Ureterovesicostomy was performed by the extravesical method using 4-0 polydioxanome suture (PDS).

On the first postoperative day, the patient was permitted to ambulate. He had a regular immunosuppression regimen of tacrolimus, mycophenolate mofetil, and basiliximab. He was discharged on postoperative day 21 without any complications. At one-year follow-up, he is doing well with a serum creatinine level of 1.3 mg/dl, and there were

Table 1
Various surgical approaches for simple nephrectomy in patients with ADPKD.

Approach		advantage (A)/disadvantage (D)
Thoraco-abdominal		(A) Useful for nephrectomy for large-sized kidneys (A) Operative field allows for direct visualization of renal hilum (A) Low risk of bleeding (D) May lead to phrenic nerve injury with diaphragm division (D) May lead to abdominal wall incisional hernia
Expanding the Gibson		(A) Useful for nephrectomy for modest-sized kidneys (D) Limited access to renal hilum
Lumber		(A) Useful for nephrectomy for moderate-sized kidneys (A) Less risk of injury to other organs (D) Limited access to the renal hilum
Mid line		(A) Avoidance of abdominal wall muscle division (D) Limited field of vision
Mid line + Transverse		(A) Wide operative field compared to midline incision. (D) Transection of abdominal wall may cause incision hernia
Chevron		(A) Good access to renal hilum (D) Poor access to the lower pole of kidney. (D) Transection of abdominal wall may cause incision hernia
Laparoscopic		(A) Minimally invasive (D) Technically difficult procedure (D) Indication limited to small-sized kidneys

no problems in terms of wound healing (Fig. 2, right).

Discussion

In the case of kidney transplantation for renal replacement therapy, simple nephrectomy is required in around 20% of cases with ADPKD.³ Timing of the nephrectomy is arguable. Generally, nephrectomy is

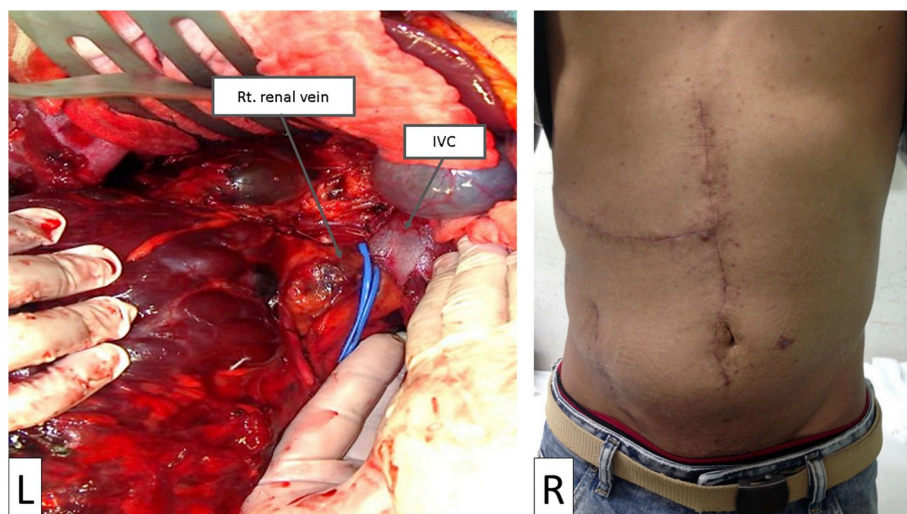


Fig. 2. Intraoperative view and postoperative wound condition. Left: right renal vein, artery, and adrenal gland are exposed under the direct vision. Right: there were no problems with wound healing at six months after the nephrectomy.

performed in one of three ways: 1) pre-transplantation native nephrectomy (PreNNX), 2) post-transplantation native nephrectomy (PostNNX), or 3) Concomitant native nephrectomy (CNNX). From the point of view of avoiding complications and optimizing graft survival, previous reports have espoused the advantage of PreNNX. However, Chebib FT et al. reported 35 PreNNX cases, 79 PostNNX cases, and 356 cases of transplantation without nephrectomy.⁴ They commented that complications were less common in those who underwent PostNNX than PreNNX (26.6% vs 48%) and that graft and patient survival were similar between the groups.

Recently, the observation that kidney volume of ADPKD patients is reduced after kidney transplantations may imply that nephrectomy may not be necessary for all ADPKD patients who are to undergo renal transplantation. Based on the current consensus of the Kidney Disease Improving Global Outcomes (KDIGO) Controversies Conference, routine PreNNX is not mandatory. The indications for PreNNX are malignancy, infection, bleeding, and ensuring adequate graft space, as in the present case.⁵ Unfortunately, there are no sufficient published data comparing clinical outcomes of the patients with postNNx to those with CNNx. However, PreNNX was not suitable for our patient because he had a strong preference to avoid hemodialysis that would be mandatory in a staged approach.

Various surgical approaches have been described for simple nephrectomy in patients with ADPKD (Table 1). In cases of huge kidneys, the lumbar approach gives very little direct visualization of the renal hilum and the adrenal gland, leading to a potentially higher blood loss.

The thoracoabdominal approach may not be commonly performed by abdominal surgeons. However, this approach seems to be safer than other exposures as it allows surgeons to ensure a wide operative field, particularly for the direct recognition of the renal vessels, the adrenal gland, the trigonal ligament, and the lower pole of the kidney. Careful attention is therefore required when dissecting the diaphragm to avoid phrenic nerve paralysis. Even though postoperative incisional pain may be relatively increased in this approach as compared to other methods, there were no adverse perioperative events nor any issues with

rehabilitation in the current case. We employed a separate Gibson incision for kidney transplantation in order to fix the graft by the complete retroperitonealization. If we choose an extension of midline incision, the small intestine would come close to the graft facing the risk of its mispuncture at the time of postoperative percutaneous needle biopsy.

Conclusion

The thoracoabdominal approach might be safe and feasible for simple nephrectomy in huge ADPKD patients undergoing concomitant kidney transplantation.

Conflicts of interest

We have no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.eucr.2019.100973>.

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