

Successful kidney transplantation from a deceased donor with multiple renal vessel injury due to harvesting

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Abstract

The best treatment for chronic renal failure is kidney transplantation. Two of the most significant factors that affect the success of kidney transplantation are the vascular anatomy of the graft and the injury to these veins during harvesting. Arterial or venous injuries which might particularly occur during harvesting have significant effects on the success of the operation, and may lead to consequences as far as loss of graft. In this paper, we report a case where multiple renal injuries occurred during harvesting operation and where successful kidney transplantation was achieved through reconstruction.

Key words: Kidney transplantation, Renal vein reconstruction, Arterial injury

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Introduction

Today, end stage renal disease (ESRD) incidence is increasingly growing. While many patients are carrying on their lives through dialysis, some are treated with kidney transplantation. There is no doubt that kidney transplantation is the best treatment method for chronic renal failure [1]. The success of kidney transplantation depends on several factors. Vascular anatomy of the graft and surgical techniques employed are among the primary factors. Multiple arteries and veins, short veins and atherosclerotic veins have always posed challenges for surgeons [2]. Particularly, arterial or venous injuries that might happen during harvesting significantly affect the success of the operation, and may lead to grave consequences which can go as far as loss of graft.

In this paper, we report a case where the graft sustaining iatrogenic arterial and venous injury during harvesting operation was used in a successful kidney transplantation achieved through reconstruction.

Case

Examining right kidney which was sent to our hospital from another city through the matching done, it was found that there were four renal veins and an early-branching renal artery. It was also found that one face of the renal veins at the posterior was defective up to renal hilus, and that the region had been injured during harvesting (Figure 1). Moreover, there was a lateral injury covering approximately 80% of periphery of one of the

renal artery branches (Figure 1). Arterial injury was repaired by interrupted suture through 7/0 polypropylene suture (Figure 2A). A graft suitable for the venous defect was prepared from the v. cava, and reconstruction was conducted. Out of the four veins, the one closest to the upper pole and the one thinner than others were tied. Renal graft on which back table procedure had been performed was transplanted to the 33 year-old female patient who had been in haemodialysis program for the last 4 years. Renal artery was anastomosed to common iliac artery end-to-side (Figure 2B). Renal veins were anastomosed to the iliac vein along with cava patch as a block. No complication developed in the patient postoperatively. The follow-up of the patient in the 3rd postoperative month did not indicate any problem.

Discussion

Essential treatment for chronic renal failure is kidney transplantation. As known, kidney transplantation is possible from living donor but it is ideally essential to increase the rate of cadaveric donors. The rate of cadaveric donor transplantations in many countries of the world has failed to reach desired levels [3]. This is one of the biggest obstacles to transplantation. It is crucial to utilise all extracted organs from this limited donor pool at as highest rates as possible.

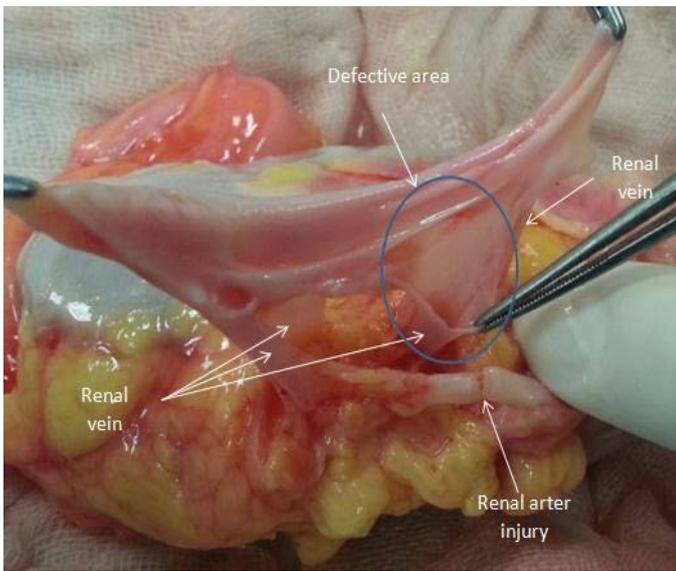


Figure 1 Renal artery and vein injuries.



Figure 2 (A) Renal artery and vein after the reconstruction, (B) transplant kidney in right iliac fossa.

Today, many organs harvested from cadaveric donors are impossible to transplant due to various reasons some of which are anatomical issues, injuries of the vessels or the organ itself and inadequate conditions of preservation. The experience of the harvesting surgeon is the primary factor for prevention of these vascular or parenchymal injuries. The surgeon must certainly examine the imaging studies performed on the donor preoperatively, in order to be familiar with the anatomy of the donor. Injuries occur most commonly during the post-perfusion cold dissection due to the inadequate exposure of the anatomic structure. Therefore, the surgeon should expose the complete anatomic structure with a good preparation and then move on to perfusion. Particularly because of its close proximity to the liver,

the right kidney and its anatomical variations must be clearly understood before perfusion.

After the harvesting procedure, it is crucial to preserve the organ adequately. One of the most common mistakes is freezing of the organ due to direct contact with ice. The organ should be placed in a three layer preservation bag filled with preservation solution enough to keep the organ away from contact with the surface, then the bag should be placed in a transport bag with isolation that contains ice and be transported.

Renal veins which are injured during cadaveric or living donor nephrectomy, or short renal veins may lead to big challenges for transplantation surgeons. When a donor kidney which has damaged vein structure is introduced to a centre, such an organ is rejected as this may lead to thrombosis, bleeding and other conditions which risk renal function [4]. These conditions mostly appear in right kidney. The shorter length of the right renal vein, the more common occurrence of anatomical variations and particularly injuries during liver harvesting due to the close anatomical location might be suggested as reasons of this situation. In this case we report both arterial and venous injury on the right kidney.

Short renal vein anastomoses accompany angling, tension, reduced mobility, difficulties with haemostasis control and folding in donor artery. Technical difficulty involved in anastomoses conducted in this way might cause complications such as delays in warm ischemia time and renal vein thrombosis [5]. Where there is a short or injured renal vein, some of the methods adopted to lengthen the renal vein are tying internal iliac vein and providing more mobility of external iliac vein, and dissection of renal vein up to hilus, and vena cava patch, venous grafts and the use of polytetrafluoroethylene (PTFE) graft [6,7]. In our present case, we repaired defective part of the renal vein using vena cava patch incised in suitable measures.

Harvesting involves risk of injury to renal artery. Multiple renal arteries which is observed around 20% of normal population might increase the risk [8]. Arterial injuries are usually due to unnoticed incisions of small polar arteries, and might as well be, sometimes, due to incisions on main arteries or arterial branches. In such injuries, an operation is performed through a careful repair without narrowing renal artery lumen and causing any folding. In this case, we performed an operation by repairing lateral wall incision on one of the main renal artery branches by interrupted sutures.

In conclusion, harvesting operation is the first stage and one of the most important pillars of kidney transplantation. Serious vein injuries and graft losses may happen in absence of careful and attentive harvesting operations. Therefore, the operations must absolutely be performed by an experienced staff. Transplantation surgeons should also train themselves to handle these injuries, and should be courageous to increase the rate of use of organs supplied from the donor pool which is already limited.

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