Abstract: MULTIPLE RENAL ARTERIES IN DECEASED DONOR RENAL TRANSPLANTATION- a case study

BACKGROUND: The use of multiple renal arteries in renal transplantation poses a great challenge to any transplant surgeon. The presence of multiple renal arteries was considered a relative contraindication for renal transplantation surgery due to associated urological and vascular complications. But with the available expertise nowadays it not considered to be an important constraint.

METHODS: In our study we analyzed 2 cases of cadaveric donor with multiple renal arteries which were transplanted to end stage renal disease patients between October 2014 and January 2015 in the department of urology, Stanley medical college, Chennai. We analysed the patient and graft survival, incidence of post-operative acute tubular necrosis, post-operative creatinine levels and incidence of vascular and urological complications.

RESULTS: We found that there were no significant episodes of acute rejection or acute tubular necrosis. Creatinine levels reached normal levels within a month. Furthermore, patient and graft survival were also good.

CONCLUSION: The presence of vascular anomaly in the graft and their complexity of repair do not represent a theoretical disadvantage in deceased donor renal transplantation. To maximize the quality of end stage renal disease patients even vascular anomaly grafts can be utilized without much difference in the outcome.

Keyword: multiple renal arteries, vascular anomaly, vascular anastomosis, creatinine, urine output

Here we report 2 cases of deceased donor renal transplantation with grafts having multiple renal arteries. In the first case sequential anastomosis of three renal arteries to internal and external iliac arteries were made. In the second case, carrel’s patch of the first 2 arteries anastomosed to common iliac artery and the third to internal iliac artery.

CASE REPORT:

CASE 1:
54 year old cadaveric male donor with history of road traffic accident, right kidney was received. On bench dissection, 3 renal arteries of equal calibre and two renal veins were found. In that the uppermost artery (fig 1) was found cut close to the aortic cuff. Two other renal arteries (fig 2) were close to each other and had separate cuff. Cut uppermost artery was anastomosed to end to end to internal iliac artery using 6-0 prolene. The other 2 arteries with separate cuff, anastomosed separately with external iliac artery. (fig 3) Renal vein anastomosed to external iliac vein in end to side fashion using 6-0 prolene. Second vein sacrificed. Initial post operative period output was around 30ml/hour later gradually increased to around 2000ml/day after 5 days.

CASE 2:
35 year old male cadaveric donor with history of road traffic accident, right kidney was received. On bench dissection, 3 arteries and one vein were found. (Fig 4) Upper two arteries were closer and with single cuff, of which one found cut 1.5cms from cuff. Cut end of the upper artery was anastomosed end to end on bench, and the two arteries with single cuff anastomosed to common iliac artery. Lowermost artery was separate, 2cm away from other two and anastomosed to end to internal iliac artery (fig 5). Renal vein was anastomosed end to side with 6-0 prolene to external iliac vein. Initial post operative period output was around 50 ml/hour improved to 2 litres /day after one week. Creatinine was 1.2 mg/dl after 2 weeks.

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artery, inferior mesenteric artery, lumbar artery, common or internal celiac trunk, superior mesenteric artery, Adrenal artery, gonadal or external iliac artery and median sacral artery. The significance of kidneys. Aberrant vessels may originate from inferior phrenic artery, other than Aorta or main renal artery, seen in ectopic / horseshoe the lower segment is supplied by accessory vessel. Anomalous or branches supplying the same renal segment. In 25-40% of kidneys renal arteries. Accessory vessel is defined as 2 or more arterial kidney supplied by more than 1 vessel are said to have multiple renal arteries. Accessory vessel is defined as 2 or more arterial branches supplying the same renal segment. In 25-40% of kidneys the lower segment is supplied by accessory vessel. Anomalous or Aberrant vessels are defined as arteries originating from vessel other than Aorta or main renal artery, seen in ectopic / horseshoe kidneys. Aberrant vessels may originate from inferior phrenic artery, celiac trunk, superior mesenteric artery, Adrenal artery, gonadal artery, inferior mesenteric artery, lumbar artery, common or internal or external iliac artery and median sacral artery. The significance of this anatomical variation in renal transplantation is that the lower pole artery to right kidney passes anterior to IVC during donor dissection and care is needed to safeguard it and in recipient surgery this lower polar artery is to be revascularized. On the contrary, small upper polar artery may be ligated it and that it supplies < 1/8 of kidney.

In cadaveric kidneys with multiple arteries, a Carrel patch may be used. All arteries can be preserved on a shared cuff of donor aortic tissue. This may be anastomosed directly to external or common iliac artery using continuous 6-0 polypropylene suture. When two arteries are encountered in a live donor kidney, implantation of the smaller artery into the dominant artery (end-to-side) using optical loupe can be done. A single anastomosis of the dominant artery into either the external iliac or hypogastric artery can then be performed. If the two arteries are equal in size, a conjoined anastomosis may be performed. Where there are three vessels and no aortic patch as encountered in a live donor operation, utilising a branched hypogastric artery autograft as a conduit is useful. A single anastomosis of the conduit to either the hypogastric or external iliac artery may be performed. For widely separated arteries, when there is a diminutive lower pole artery, another option is to take advantage of the epigastric artery.

The dominant upper pole artery can be anastomosed end-to-side to the external iliac artery. The upper pole artery and renal vein can be unclamped and the majority of the kidney’s circulation restored. A fine bulldog clamp should be placed on the lower pole artery and the epigastric artery controlled as well. The vessels are then spatulated and the anastamosis is performed using interrupted 6-0 or 7-0 suture. The lower pole circulation is then restored.

CONCLUSION: Suboptimal donor organs with multiple renal arteries, missing aortic patches or severe arteriosclerosis challenge the technical skills of every transplant surgeon. Transplantation of donor organs with multiple renal arteries using the sequential anastomosis technique presents similar indexes of surgical and urological complications and outcome. Thus inspite of increasing technical difficulties, kidney transplantation with multiple renal arteries is a safe and highly efficient procedure

REFERENCES:

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