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## Original Article

# Study of the outcome of renal transplants with single versus multiple renal arteries in obese recipients



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## ABSTRACT

As we all know, donor nephrectomy of multiple renal arteries (MRA) is not a contraindication, either by open or laparoscopic method. But the study of the effect on the recipients is still going on, and in obese patients, it is very less studied. Here we have made an attempt to study the outcome of single versus multiple renal arteries in obese patients. Graft survival and vascular and urological complications were studied and compared among the single versus multiple renal artery recipients and in obese and nonobese patients.

**Methods and material:** Retrospectively, all the transplants done in the Department of Urology, CARE Hospital during the period of 2004–2015 were analyzed. All the patients underwent renal transplant as per hospital protocol.

**Statistical analysis used:** Data were analyzed using SPSS for Windows version 20 with relative risk calculated using stat pages software. Fisher's exact test and Kendall's tau-b were used to compare categorical data between the body mass index (BMI) and anatomical subgroups.

**Results:** Over all, 320 transplants were done; 224 were single renal artery (SRA) and 96 were multiple arteries. 286 had BMI <30 and 34 patients had BMI more than 30. Delayed graft function (DGF) was seen in 20 (6.25%), vascular complications in 10 (3.12%), urological complications in 15 (4.6%), wound infection in 20 (6.25%), and lymphocele in 16 (5%) was observed. Between single and multiple renal arteries, cold ischemia time, DGF, vascular complications, and one-year graft survival were suggestive of better results in SRA group. Compared to obese and nonobese single artery groups, nonobese group had better graft survival and lesser vascular complications. In multiple renal arteries also, obese patients with multiple vessel anastomosis had poor graft survival and increased vascular complications.

**Conclusions:** Even though obesity is not a contraindication for renal transplant surgery, we need to be conscious while selecting patients with multiple renal arteries for obese recipients.

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## 1. Introduction

Conflicting evidence surrounds clinical outcomes in obese individuals after transplantation. Many of them are denied for the same. Allografts with complex vascular anatomy are regularly used in both deceased and living donor settings.<sup>1</sup> However, multiple renal arteries (MRA) occur unilaterally in 23% and bilaterally in 10% of the population and there is increasing pressure to use such kidneys, to expand the potential donor pool, and thereby overcome a critical limiting factor to organ availability. This is especially relevant as most transplant programs in India rely, almost exclusively, on live related donors.<sup>2</sup>

Body mass index (BMI) remains the standard measurement for degree of obesity, with BMI >30 kg/m<sup>2</sup> defined as obese. There are no national guidelines recommending an unacceptable BMI at which transplantation should not be performed.<sup>1</sup>

Here we have made an attempt to know the outcome of MRA in obese patients.

### 1.1. Aim and objectives

To study the graft survival, patient survival, and vascular and urological complications of recipients and compare the results of single versus multiple renal arteries and obese and nonobese patients.

## 2. Subjects and methods

All the patients who underwent renal transplant recipient surgery at our institute from 2004 to 2015 were included for the study. Retrospectively, we analyzed the medical records of these patients. There were a total of 320 transplants during this period. Recipient characteristics like age, sex, BMI, and donor characteristics, like age, sex, side, and number of renal arteries, were recorded.

Renal transplantation was performed via a retroperitoneal approach with the right iliac fossa used preferentially. Standard vascular (arterial and venous) anastomoses were performed end-to-side to either external or internal iliac vessels, depending on donor and recipient vessel quality and caliber. In few cases, inferior epigastric artery was utilized.

Where multiple arteries were present and not closely positioned on a single Carrel patch, they were either anastomosed as separate vessels or spatulated together to form a single vessel or the smaller artery was attached end-to-side on the dominant artery. Factors influencing this included length and separation of renal arteries, caliber of recipient vessels, and surgeon preference. Ligation of small upper polar arteries was performed if they were thought to account for <10% of the kidney's blood supply, with no easy option to preserve.

Patients underwent standard transplant workup including a chest radiograph, electrocardiogram, echocardiogram, myocardial perfusion imaging, coronary angiography, and pulmonary function tests where appropriate. Weight loss was encouraged in all obese recipients, and such patients had access to the hospital dietician and psychology services if necessary.

Vascular complications were defined as venous or arterial thrombosis, stenosis, or hemorrhage. Urological complications included ureteric leak and ureteric stricture.

### 2.1. Statistics

Data were analyzed using SPSS for Windows version 20 with relative risk calculated using stat pages software. Fisher's exact test and Kendall's tau-b were used to compare categorical data between the BMI and anatomical subgroups.

## 3. Results

Among 320 patients (256 men and 64 women) who underwent transplantation, 224 recipients with single renal artery (SRA) and 96 recipients with MRA (90 with two arteries and 6 with >2 arteries) were investigated. Descriptive statistical data of the donors and recipients are demonstrated in Table 1. The recipients were followed-up for a mean of 12 months. Overall, delayed graft function (DGF) was detected in 6.25% of the patients. Vascular complications were seen in (10) 3.12% and urologic complications occurred in 15% of the recipients. DGF was more common in patients receiving allografts containing multiple arteries when compared with allografts with single artery (5.6% vs 2.2%, respectively, P 0.085) [Table 2]. Vascular complications occurred more frequently in patients with MRA

**Table 1 – Recipient and donor characteristics.**

		Single renal artery N = 224 (70%)	Multiple renal artery N = 96(30%)
Recipient age (years)	40 ± 6 years	35.8 ± 13.6 range (23–65)	38.4 ± 12.6 range (24–50)
Male/female	190/130	106/118	84/12
Donor age (years)	35 ± 5 years	35.3 ± 5	34.2 ± 6
Side	L 230/R 90		
Recipient BMI (kg/m <sup>2</sup> )	26 ± 2	23.9 ± 4	24.8 ± 7
<30	286	200	86
>30	34	24	10
Warm ischemia time	130 ± 13 SEC	120 ± 13 SEC	140 ± 10 SEC
Cold ischemia time	2400 ± 240 SEC	1800 ± 200 SEC	3000 ± 400 SEC

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