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Original Article

# Post-transplantation surgical complications in renal transplant recipient patients – An institution based prospective study

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ABSTRACT

*Introduction:* Kidney transplant remains one of the pioneer branches of solid organ transplant worldwide. With refinement of surgical techniques, especially vascular anastomosis principles, the incidence of surgical complications remains low. Also with introduction of modern immunosuppressant protocol, the incidence of acute graft rejection has come down to less than 1%. But, surgical complications still remain one of the most important post-transplant complications in both early and late periods.
*Methods:* This is a prospective, observational study comprising both live related and deceased donor transplant cases from January 2011 to December 2012 in Department of Kidney Transplantation, Care Hospitals, Hyderabad. Donor characteristics, including number of renal arteries, were noted. Post-renal transplant surgical complications, including arterial, venous, ureteric, lymphocele, and wound infections, were studied.
*Results:* We observed arterial stenosis in 3 (3.66%) patients, arterial thrombosis in 1 (0.91%) patient, venous thrombosis in 1 (0.91%) patient, 4 (3.66%) ureteric complications, 5 (4.58%) wound infections, and intracranial hemorrhage in 1 (0.91%) patient.
*Conclusions:* Surgical complication rates were relatively low in our study. Early diagnosis and effective management of surgical complications were associated with both better graft and patient survival after one year of follow-up in this study.



## 1. Introduction

Kidney transplant remains one of the pioneer branches of solid organ transplant worldwide. Kidney transplantation is done at multiple centers in India both by government and private sector with low morbidity rates. As compared with liver, heart, and pancreatic transplantation, renal transplant has less immediate and delayed complications.[1] With refinement of surgical techniques, especially vascular anastomosis principles, the incidence of surgical complications remains low. Also, with introduction of modern immunosuppressant protocol, the incidence of acute graft rejection has come down to less than 1%.[1] So, surgical complications still remain one of the most important post-transplant complications in both early and late periods. Also, early postop surgical complications can mimic many of the medical conditions like acute graft rejection, acute tubular necrosis (ATN), or drug toxicity. So, careful assessment of both clinical and investigative parameters can lead to early detection of complications and prompt management can lead to improved outcome.[1] So, the aims and objectives of our study were to know incidence of various post-renal transplant surgical complications, to analyze any predisposing factors for the surgical complications, to analyze various management principles of the surgical complications and graft, as well as patient outcomes of these patients at 1 year.

## 2. Methods

The study was carried out at the Department of Urology and Kidney Transplantation, in our institute. The study was of two years duration, with one-year follow-up of all patients.

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### 2.1. Inclusion criteria

All renal transplant recipient patients who were operated in the two-year time period, from January 2011 to December 2012, were included in the study. Both live related and deceased donor transplant recipient patients were included in the study. There was a minimum period of follow-up of one year.

### 2.2. Exclusion criteria

All patients who lost to follow-up were excluded from the study.

### 2.3. Data collection

Data were collected from hospital medical records like pretransplant work-up proforma, operative notes, postoperative recovery notes, and outpatient follow-up records. Institutional Ethical Committee (IEC) written approval was taken before starting the study. Informed written consent of all donor and recipient patients were obtained after formal counseling by Transplant Team.

### 2.4. Operative method

All operative procedures, both donor nephrectomies and recipient surgery, were performed by a single dedicated team of urologists in the study period. All transplant recipient patients in the institute were admitted minimum 24 hrs prior to surgical procedure. As a protocol, all recipients were dialyzed the day before surgery. All blood parameters, especially electrolytes (Na, K), were checked before surgery as a routine. As per nephrology protocol, routine immunosuppressant was started preoperatively.

A curvilinear incision was made in the right lower quadrant of the abdomen. In a child or young adult and with extremely obese abdomen, this incision was carried up to below the costal margin to increase exposure. The lymphatics over the external iliac artery and internal iliac artery were carefully dissected and ligated with fine silk to reduce the incidence of lymphocele formation. The common iliac artery was carefully palpated for any hardness and atheromatous plaques. The external iliac vein was similarly prepared.

Bladder serosal incision was made and bladder was prepared. The Internal iliac artery was divided distally after applying a soft bulldog clamp close to the origin. The lumen of the artery was carefully inspected for any atheromatous plaques. In case of deceased donor kidney, extensive bench preparation was required, including careful inspection of the aortic patch and number of renal arteries. This sometimes required trimming of Carrel's patch.

### 2.5. Vein anastomosis

The renal vein was anastomosed end-to-side, to the external iliac vein using a continuous 5-0 monofilament vascular suture (Gortex).

### 2.6. Arterial anastomosis

In usual circumstances, the renal artery was anastomosed end-to-end with internal iliac artery using 6′0′ proline suture in a continuous fashion. In case the internal iliac artery was grossly atheromatous, then external iliac artery is prepared. An end to side anastomosis in that case was performed. External iliac artery was also used in cadaveric transplants when there is aortic patch and in case of a small accessory lower pole vessel for separate anastomosis. After completion of both arterial and vein anastomosis, clamps were released and perfusion to the kidney was carefully checked. Hemostasis was secured.

### 2.7. Ureteroneocystostomy

An extravesical modified Lich-Gregoir type of ureteric reimplantation was performed.

### 2.8. Follow-up of recipient postoperatively

Postoperatively, vitals, urine output, and drain output were measured at regular interval. Immunosuppressive agents were started as per nephrology protocol. After discharge, the patient was followed up regularly with monitoring of vitals, urine output, general examination, and renal function tests. A routine Doppler USG was repeated on 1st postoperative month and at the end of first year as per institution protocol.

### 2.9. Statistical methods used in the study

Data were collected and put in a master chart in Microsoft Excel© format in this study period. All post-transplant recovery data and surgical complications data were plotted. All statistical analyses were done using SPSS software®. Student's *t* test was used to compare data in the present series with other published contemporary series. *p* value was calculated to analyze if any statistically significant difference could be noted between the incidences of surgical complications between various studies ($p$ value $<0.5$ was taken significant in this study). If any statistically significant difference could be detected, then reasons were analyzed to find out any cause for different complication rates.

## 3. Results

A total of 109 patients were included in this study. These comprised of both live related (103 cases) and deceased organ donor transplant (6 cases) that were performed in a two-year study period from January 2011 to December 2012. Majority of the transplant recipient patients were male (63.30%), compared to female recipients (36.69%). But, both in male and female series, majority of the patients belonged to 16–30 years age group in this study (males – 44.92%, females – 47.5%) (Table 1). Total number of cases with double renal arteries was 10 (5.91%).

A total of 18 post-transplant surgical complications were recorded in the present series of 109 cases (16.51%). Of these complications, four arterial complications, one venous thrombosis, four ureteric complications, and five wound-related complications were recorded. One unusual and rare intracranial hemorrhage was recorded in a series of 109 patients. Two cases of transplant renal artery stenosis were noted out of 99 cases of single donor renal artery (2.02%), whereas two arterial complications, including one transplant renal artery stenosis and one arterial thrombosis, were noted in multiple renal artery patients out of 10 patients (20%).

Early or late arterial complications rate was much higher in cadaveric series (16.66%) compared to live related donor cases

**Table 1**
Recipients according to different age and sex groups.

| Age (years) | Male ($n=69$) | Female ($n=40$) |
|---|---|---|
| 0–15 | 2 | 0 |
| 16–30 | 31 | 19 |
| 31–45 | 27 | 6 |
| 46–60 | 9 | 15 |
| 61–75 | 0 | 0 |