

Anatomical Variations of Renal Artery in Nepalese Live Kidney Donors

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Abstract

Introduction: Donor nephrectomy is unique surgery to predispose the surgeon on stress as healthy donors have major surgery purely for others' benefit. Renal vessels are known with the wide range of variations which can lead to major complications or life threatening events if unrecognized. A thorough knowledge of anatomic variations in renal artery facilitates surgeons to anticipate and manage these potential risks and prevent the complications. Here we present anatomical variations in RA in Nepalese live kidney donors.

Methods: This prospective observational study was conducted at Tribhuvan University Teaching Hospital, Kathmandu, Nepal. Live kidney donors over a period of 17 months (From June 2013 to October 2014) presenting for donation were evaluated for renal vasculature with 64- slice multidetector computed tomography and the findings were correlated with intraoperative findings during donor nephrectomy.

Results: Sixty three donors were enrolled in the study. Male & female ratio was 1:2.1. Age ranged from 18 years to 64 years (Mean 44.58 years). Anomalous RA was seen in 25 cases (39.7%). Fifty six percentages of anomalies were seen in female and 44% in male. Majority of anomalies were on left side (22.2%). The most common anomaly was supernumerary RA seen in 16 cases (25.5%). Accessory RA was seen in 11 cases (17.5%). Prehilar bifurcation was seen in 11 cases (17.5%). Aberrant RA was seen in 5 cases (8%). Preoperative CT angiographic findings correlated with intraoperative findings in all cases ($r = 1$, $p = 0$). Polar branch was transected accidentally in two cases which were repaired at bench surgery.

Conclusion: Anatomical variations of renal artery in Nepalese donors are comparable with other populations. Thorough knowledge of the variations can minimize complications and improve outcome during nephrectomy.

Keywords: CT renal angiography, Donor nephrectomy, Renal artery

Introduction

Donor nephrectomy is integral part of renal transplantation. It is unique surgery to predispose the surgeon on stress as healthy donors have major surgery purely for others' benefit. Renal vessels are known with the wide range of variations that have also been evidenced during live kidney donor work-up in recent years.¹⁻³ Most of these variations may not have clinical significance other than surgery during nephrectomy which can lead to major complications or life threatening events if unrecognized.⁴⁻⁶ A thorough

knowledge of anatomic variations in renal artery (RA) facilitates surgeons to anticipate and manage these potential risks and prevent the complications.⁷ The aim is to study the variations of renal artery in Nepalese live kidney donor populations.

Methods

This prospective observational study was conducted at Tribhuvan University Teaching Hospital, Kathmandu, Nepal. After taking informed consent and approval

from the Institutional Review Board, live kidney donors over a period of 17 months (From June 2013 to October 2014) presenting for donation were evaluated with 64- slice MDCT renal angiography and donor characteristics and the MDCT renal angiographic findings were recorded. These findings were correlated with intraoperative findings during donor nephrectomy.

Results

Sixty three donors were enrolled in the study. Age ranged from 18yrs to 64yrs (Mean 44.58 yrs). Male to female donor ratio was 1:2.1 Figure 1

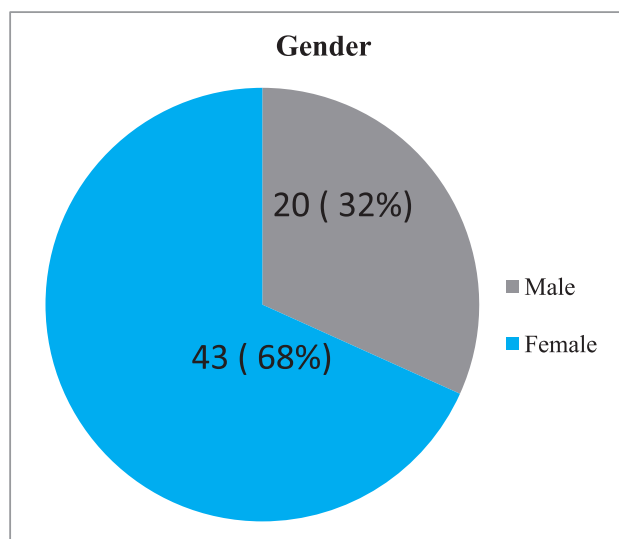


Figure 1. Gender distribution

Anomalous RA was seen in 25 cases (39.7%) and majority was on the left side (22.2%). Most common anomaly was supernumerary RA seen in 16 cases (25.5%) followed by accessory RA in 11 cases (17.5%) and prehilal bifurcation in 11 cases (17.5%). Aberrant RA was seen in 5 cases (8%) Figure 2

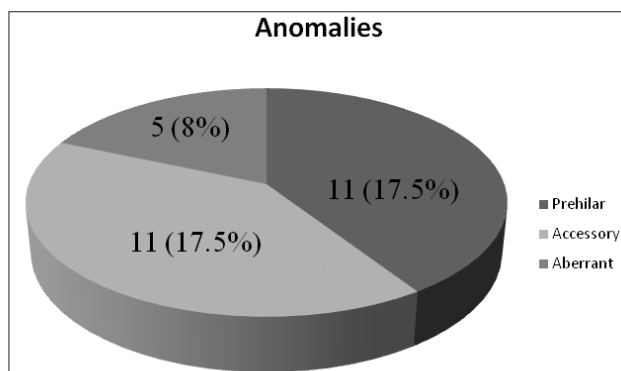


Figure 2. Distribution of anomalies

Preoperative CT angiographic findings correlated with intraoperative findings in all cases ($r = 1$, $p = 0$). Double anastomosis performed in eight cases and polar branch transected advertently in two cases which were repaired at bench. The postoperative outcome was not altered in these two categories of recipients.

Discussion

In this study the incidence of normal RA is 60% and incidence of RA variation 40%. In the study of Patil et al (N=204)⁸, the incidence of normal RA was 74.5% and variation in RA was found in 25.5%. Similarly in the study of Chai et al (N=153)⁹, the incidence of normal RA was 57% and variation was seen in 43% of cases. Perez et al¹⁰ found the incidence of normal RA 70% and variation in 30%.

In our study, most of the variations were on the left side and in female which is different from the report of Gumus et al¹¹ where variations were higher in males. This difference may be due to the fact that females are the major donor in our population.

In our study, accessory RA and prehilal division was found in 17.5% of cases each which is slightly different from the study of Gumus et al¹¹ where accessory RA and prehilal division was reported to be 27% and 26.5% respectively. Patil et al⁸ noted prehilal division in 10% of cases. Similarly Chai et al⁹ reported prehilal division in 12% of cases. Turkvatan et al¹² found accessory RA in 15% of his cases which is comparable with our study.

Triple RA was noted in 1.5% of our cases. Pollak et al¹³ noted triple RA in 4% of their cases and Pozniak et al¹⁴ in 2.6% of their study population. Quadruple RA was not found in our donors but Pollak et al¹³ reported it in 1% of the cases. Miclaus et al¹⁵ demonstrated bilateral quadruple RA in 1.3% of cases. Both these reports highlight the rarity of the condition.

Conclusion

Anatomical variations of renal artery in Nepalese donors are comparable with other populations. Thorough knowledge of the variations can minimize complications and improve outcome during nephrectomy.

Conflict of interests: None Declared

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