www.jmscr.igmpublication.org
Impact Factor (SJIF): 6.379
Index Copernicus Value: 79.54
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossrefDOI: https://dx.doi.org/10.18535/jmscr/v6i8.112

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

A Study on the Variations in the Renal Artery

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Abstract
Background: *Kidneys derive its blood supply from renal artery (RA), usually single in origin, a branch of abdominal aorta. Variations in the arterial supply of kidney is more frequently encountered during laproscopic or laprotomy surgeries.*
Aim: *This study is to highlight the frequency of accessory renal arteries(ARA) in the cadavers of Rajah Muthiah Medical College.*
Materials and Methods: *The study material was collected from 10 well embalmed adult human cadaver of both the sexes in Rajah Muthiah Medical College.*
Result: *Single ARA was noted in one female cadaver on the right side out of 10 cadavers.*
Conclusion: *Variations in the renal vasculature is necessary for the surgeons to perform renal transplantation and other laparoscopic procedures without any causality.*
Keywords: *RA –Renal artery, ARA-Accessory renal artery, RV-Renal vein.*

Introduction

RA are large vessels that are the branches of abdominal aorta, which arises at right angles to the aorta at the level of the disc between L1 and L2Lumbar vertebra[(3)]. After its origin, it passes laterally towards the renal hilum. It enters the hilum by passing between renal vein (RV) anteriorly and renal pelvis posteriorly. Later it divides into two branches as anterior and posterior which further divides into segmental arteries to supply the different renal segments. If ARA is present, it may enter the substance of kidney through the hilum or it may enter as polar arteries of the kidney.[(5)]

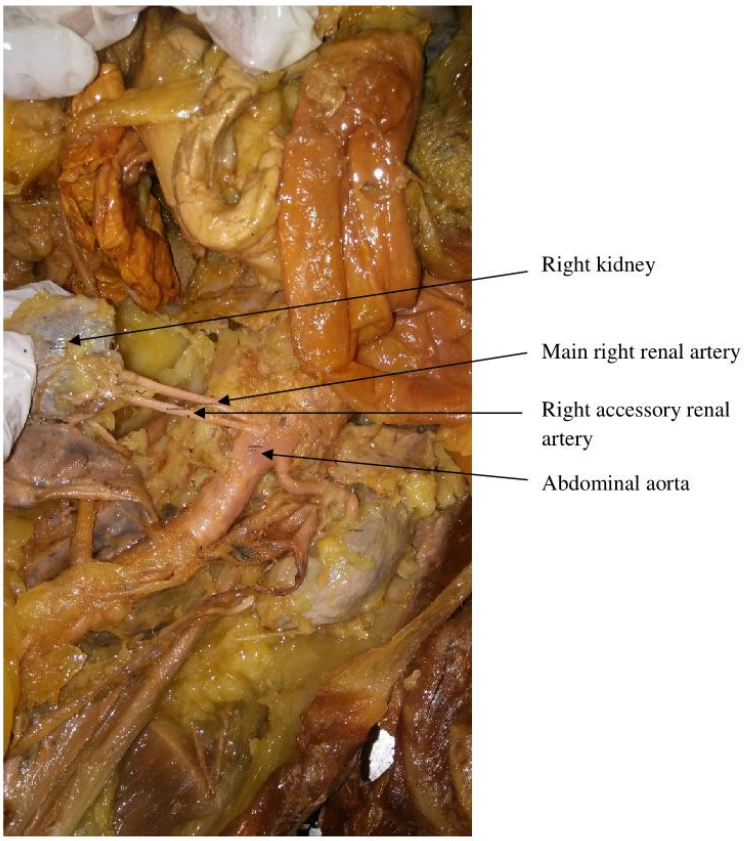
Material and Methods

The study was conducted in 10 well embalmed adult human cadavers of both the sexes in department of Anatomy, RMMCH, Annamalai University, Chidambaram. Dissection was performed in abdomen and posterior abdominal wall were opened as per cunningham's practical manual.[(2)] RA and RV on the both sides were followed from their origin to their distribution.

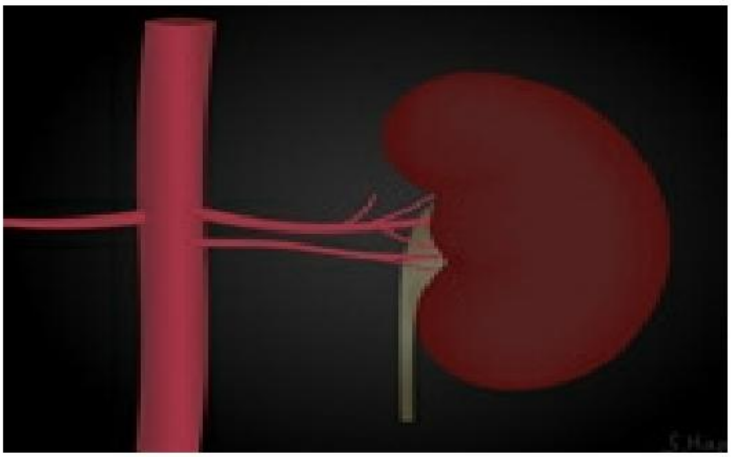
Results

Out of 20 Kidneys with their hilar structures dissected from 10 embalmed adult human cadavers of rajah muthiah medical college, normal pattern of renal arteries were observed in 19

kidneys. In one kidney, ARA was found as the variation. ARA arose from the abdominal aorta along with the main RA and entered the renal hilum on the right side of female cadaver. It related anteriorly with RV and posteriorly with ureter.



Accessory Renal Artery



Discussion

Awareness about variation in renal vasculature is significant to perform operative, diagnostic and other renal vascular procedure to avoid the complications during surgical procedures. Occurrence of renal dysfunction increases the renal transplant procedure as the treatment option that further increased the importance to investigate the renal vascular anatomy before the treatment option.

In this study, the right kidney in one of the cadaver shows two arterial supply, main RA and ARA. The right RV and renal pelvis are normal in morphology. The right ARA originates from abdominal aorta just below the main RA. It takes its course towards the renal hilum by passing laterally and reaches the hilum along with the main RA between RV anteriorly and renal pelvis posteriorly. The left kidney doesn't show any variation in renal vasculature. The branches of abdominal aorta were traced and shows no abnormality. Normal renal vasculature and morphology were observed in remaining 9 cadavers.

Each kidney derive its blood supply by single RA in 70% of population and 30% shows the variations[(1)]. ARA are the additional arteries which reach the kidney through the hilum along with main RA or it may reach the kidney surface as a polar artery[(4)]. Daniel et al classified[(7)] ARA as two artery type, three artery type, four artery type, superior polar, inferior polar artery totally as 6 types.

Type 1; two separate RA arise from the side of the aorta to supply the kidney. The two arteries enter the hilum of the kidney. This variety may be called the two- artery type

This study shows two artery type of ARA in addition to the main RA, which corresponds to the type 1 classification of Daniel et al.,[(7)]

According to graves,[(6)] any artery arising from the aorta in addition to the main RA is named as "accessory" and RA arising from other source is called "aberrant" artery.

Vrinda Ankolekar et al[(8)] reported that additional RA was common on the right side and this study also favour's this.

Variations in renal vasculature is common because of different developmental positions of the kidney. Initially the RA originates from common iliac arteries as the kidneys ascend further, they receive their supply from the branches of aorta.[(4)] ARA are common variant, occurring due to persistence of embryonic vessels that are formed during the ascend of the kidneys[(5)]. Hydroureteronephrosis is the common complication in inferior polar type of artery as it reach the kidney it may cross ventral to the ureter and thereby obstructing it.[(5)] Knowledge of variations in renal vasculature plays a vital role for surgeries without any complications procedures like renal transplant, abdominal aneurysm and vascular surgeries. Accessory arteries are about twice common as accessory vein.[(5)]

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