



Accessory left renal artery and polycystic kidney

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Abstract:

Anatomical variations in the origin of the arteries in the abdominal area are very common. The arteries that show frequent variations include the coeliac trunk, renal and gonadal arteries. During a routine dissection of a male cadaver, one accessory left renal artery supplying polycystic kidney was found in the abdominal region. We discovered that the accessory left renal artery that originated from the left anterolateral aspect of abdominal aorta was running into the lower pole of the left kidney. The origin of the main left renal artery and the accessory left renal artery were 10mm and 12mm below the superior mesenteric artery, respectively. The accessory left renal artery run sinuously into the inferior pole of the left kidney associated with polycystic kidney disease, these anatomical variations and anomalies are important to know before any therapeutic or diagnostic procedures to be performed in the abdominal area.

Key words: accessory left renal artery, vascular variations, polycystic kidney

Introduction:

The renal arteries usually arise from the anterolateral or lateral aspect of the abdominal aorta just below the origin of the superior mesenteric artery.¹⁻⁴ At the hilum of the kidney, the renal artery enters and the renal vein leaves the kidney on each side. Usually one renal artery supplies each kidney and one renal vein drains the kidney. However, variations of the renal arteries are not unusual. The most common variation is the presence of an additional accessory renal artery, occurring in approximately 30% of cases, which has been described by many researchers.⁵⁻⁸ The possible etiology of these variations has been explained by embryological development from the lateral

mesonephric branches of the dorsal aorta.⁹ Knowledge and awareness of these possible variations of the renal arteries are important for sufficient surgical management during renal transplantation, repair of abdominal aorta aneurysm, urological procedures and angiographic interventions.^{5,10,11}

Case report:

During routine anatomy dissection held by medical faculty, an anatomical variation of the origin of the left accessory renal artery and polycystic kidney was observed in one of the male cadaver. The abdominal cavity was opened, the small and large intestine was removed and the structures close to

the posterior abdominal wall were dissected. We observed all unpaired and paired branches of the abdominal aorta, starting from the celiac trunk and superior mesenteric artery, renal arteries, gonadal and inferior mesenteric artery. We observed the position of right kidney which is slightly lower than the left kidney and right renal artery arose from the abdominal aorta lateral to the superior mesenteric artery (Figure-1).

Figure 1. Showing accessory left renal artery (LRA)

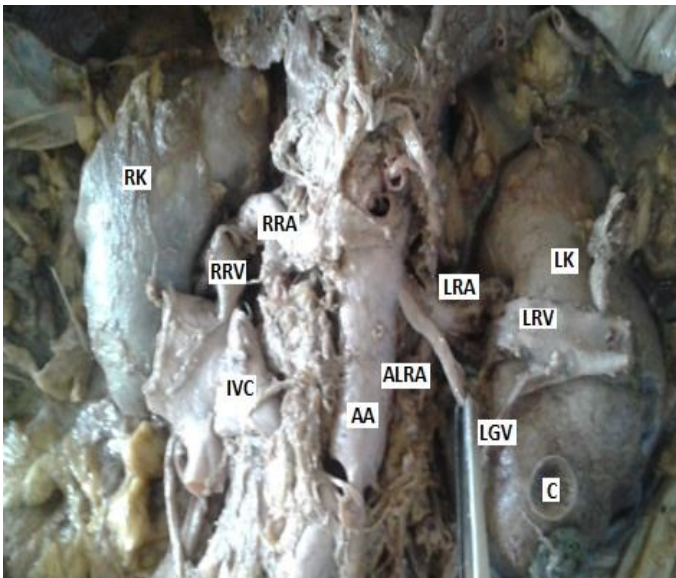


Figure-1 RK-Right kidney IVC-Inferior vena cava RRV-right renal vein RRA-Right renal artery C-Cyst LRV-Left renal vein LRA-Left renal artery LK-Left kidney ALRA-Accessory left renal artery AA-Abdominal aorta LGV-Left gonadal vein

In addition to left renal artery arising from left anterolateral side of the abdominal aorta, reaching the hilum of the kidney an accessory left renal artery was seen going to the lower pole of the left kidney. We discussed, observed and compared our finding to the literature and came to the conclusion that we had located an accessory left renal artery. A few pictures of the left kidney with its blood supply were taken, capturing the main and accessory left renal artery (Figures 1, 2). In our male cadaver, the origins of the main left renal artery and the accessory left renal artery were 10mm and 12mm below the superior mesenteric artery, respectively. The main left renal artery arose 10mm below the superior mesenteric artery, passed towards the left behind the renal vein and reached at the hilum and

divides into anterior and posterior division and then enters the kidney (Figures 1, 2). The accessory left renal artery arose 12mm below the superior mesenteric artery and 2mm from the left renal artery and ran laterally downward towards the left and reached at lower pole of the left kidney and we observed cysts on anterior surface of the lower pole and posterior surface of both the kidney (Figure 1, 2, 3).

Figure 2. Another view showing accessory left renal artery and cyst

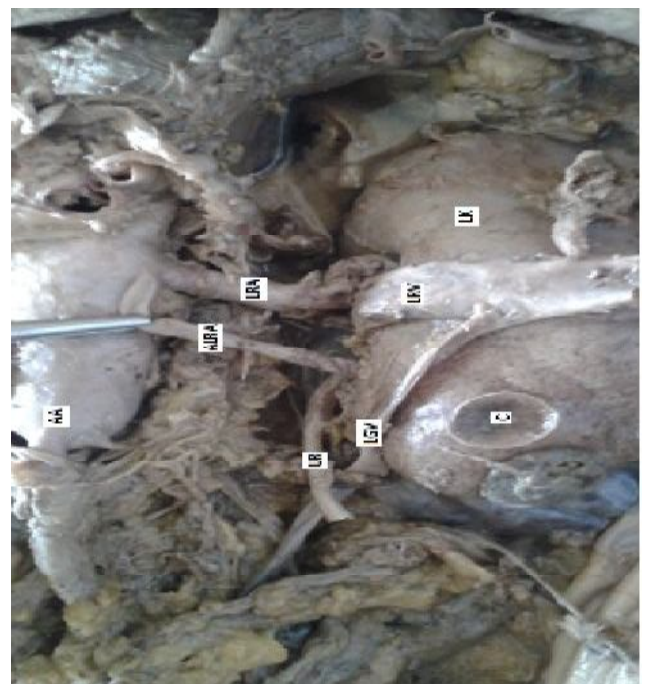


Figure 3. Showing multiple cysts in right and left kidney.



Discussion:

Knowledge of embryology of the renal vasculature and development of the kidney is essential in order to understand the possibilities of the multiple anomalies and variations of the renal arteries.⁸ In the typical pattern, one right and one left renal artery arise from the anterolateral aspect of the abdominal aorta and each artery supplies the respective kidney. Different variations in the origin, course and branches of renal arteries have been described by many researchers and authors.^{5-7,9,10} In about one-third of our general population there are variations in number, location and branching patterns of the renal arteries, with over 30% of patients having one or more accessory renal arteries.¹¹ The nomenclature of variations of the renal arteries is still not cleared, as different authors described them as additional, accessory, hilar, inferior and superior polar arteries.^{5-7,9,10} Here we can open discussion, if accessory renal arteries are common; they derive from the persistence of embryonic vessels that formed during ascent of kidneys. These arteries usually arise from the aorta and enter the superior or inferior poles of the kidneys.¹² This accessory left renal artery cross anteriorly to the ureter and may cause ureter hydronephrosis by obstruction. The reported incidence of additional renal arteries has wide range (from 8.7%-75.7%) and they, too can cause hydronephrosis by obstruction.^{3,4,13} The present case discusses discovering one accessory left renal artery supplying the inferior pole of left kidney.

The knowledge of this anomaly is important for surgical procedures related to the posterior abdominal wall, renal transplantation, abdominal aorta aneurysm, angiographic interventions. Every multiple renal artery is related to segmental arteries, so the risk of bleeding during urological surgery or renal transplantation, segmental ischemia and postoperative hypertension increases.¹⁴ The demand for kidney donation has rapidly increasing, so it is essential to be aware of the possibility of donors

with multiple renal arteries.^{15,16} In order to precisely plan the surgical procedure and avoid any vascular complication, arteriography should be performed before every nephrectomy.¹⁴ In our case, knowing where one accessory left renal artery. It may be important for the surgical view, especially in anticipating pre and post-operative bleeding.

Conclusion:

Accessory renal artery care should be taken especially in cases where renal transplant may be required due to conditions like polycystic kidney.

References:

1. Bauer FW. The aortic origin of renal arteries. *ArchPath* 1968;88:230-3.
2. Clemente CD. Clemente Anatomy, A Regional Atlas of the Human Anatomy. 4th Ed., Baltimore: Williams & Wilkins. 1997:230-1.
3. Drake RL, Vogl AW, Mitchell AWM. Gray's anatomy for students. 2nd Ed, Edinburg-London-Melbourne-New York, Churchill livingstone. 2005:324 -8.
4. Moore KL, Dalley AF. Clinically oriented anatomy. 4th Ed, Philadelphia-Baltimore-New York-London-Buenos Aires- Hong Kong- Sydney-Tokyo: Lippincott, Williams & Wilkins. 1999:286-7.
5. Satyapal KS, Haffejee AA, Singh B, Ramsaroop L, Robbs JV, Kalideen JM. Additional renal arteries: incidence and morphometry. *Surg Radiol Anat.* 2000;23:33-8.
6. Bergman RA, Afifi AK, Miyauchi R. Illustrated encyclopedia of human anatomic variations. <http://www.anatomyatlases.org/anatomicVariant/s/AnatomyHp.shtml>(accessed May 2009).
7. Nathan H. Aberrant renal artery producing developmental anomaly of kidney associated with unusual course of gonadal (ovarian) vessels. *Urol.* 1983;89:570-2.
8. Vashinder GB, Nelemans PJ, Kessels AG, Kroon AA, Maki JH, Leiner T et al. Renal artery diagnostic imaging study in hyperlession

- (RADISH) study group: Accuracy of computed tomographic angiography and magnetic resonance for diagnosing renal artery stenosis. *Ann Inter Med.*2004;141:874-82.
9. Felix W. Mesonephric arteries In; Kiebel F, Mall FP, eds. *Manual of Human Embryology*, Vol.2. Philadelphia, Lippincott.1912:820-5.
 10. Nathan H, Glazer I. Right and left accessory renal arteries arising from a common trunk associated with unrotated kidneys. *J Urol* 1984;132:7-9.
 11. Olsson O, Wholey M. Vascular abnormalities in gross anomalies of kidneys. *Acta Radiol Diaga* 1984;2:420-32.
 12. Sadler TW. South Asian edition, *Langman's medical embryology*, Elevent edition:240-3.
 13. Singh G, Ng YK, Bay BH. Bilateral accessory renal arteries associated with some anomalies of the ovarian arteries: A case study. *Clin Ana* 1998;11:417-20.
 14. Sampaio FJ, Passos MA. Renal arteries: anatomic study for surgical and radiologic practice. *Surg Radiol Anat* 1992;14:113-7.
 15. Kadolani Y, Okamoto M, Akioka K, Ushigome H, Ogino S, Nobori S. Management and outcome of living kidney grafts with multiple arteries. *Surg Today* 2005;35:459-86.
 16. Benedetti E, Troppmann C, Gillingham K, Sultherland DE, Payne WD, Dunn DL et al. Short and long term outcomes of kidney transplants with multiple renal arteries. *Ann Surg.*1995;221:408-14.