

Case Report

A Left Kidney Present With Arterial Variation: A Case Report



Mohammed A A Abdelmotalab^{1*} , Abobaker Elhmody² 

1. Department of Anatomy, Faculty of Medicine, International University of Africa, Khartoum, Sudan.
2. Department of Anatomy, Faculty of Medicine, Gazira University, Wad Madani, Sudan.



Citation Abdelmotalab AAA, Elhmody A. A Left Kidney Present With Arterial Variation: A Case Report. *Anatomical Sciences*. 2022; 19(1):47-50.



Article info:

Received: 02 Nov 2021

Accepted: 18 Dec 2021

Available Online: 01 Jan 2022

Keywords:

Kidney, Variation, Accessory artery, Renal artery, Cadaver

ABSTRACT

Introduction: Renal vasculature variations were normally found. Awareness of this variation was helpful in many clinical field procedures during the routine dissection of the posterior abdominal wall of approximately a 67-year-old male formaldehyde cadaver..

Case Report: The left kidney presents with an arterial variation. An accessory renal artery was detected from the lateral aspect of the abdominal aorta at the level disc between L2 and L3, just above the origin of the inferior mesenteric artery on the left side.

Conclusion: Knowledge of anatomical variation of the renal arteries has clinical significance in renal transplantation procedures and for interventions in angiography

* Corresponding Author:

Mohammed Abdelsalam Ahmed Abdelmotalab, PhD.

Address: Department of Anatomy, Faculty of Medicine, International University of Africa, Khartoum, Sudan.

Tel: +24 (91) 291687272

E-mail: salam_ahamed@yahoo.com

1. Introduction

The metanephros appears in the fifth week of development. Its excretory parts develop from the metanephric mesoderm in the same manner as in the mesonephric system. The story of the duct system differs from that of the other kidney systems [1]. The renal arteries arise from the aorta between the level of six cervical and third lumbar vertebrae, from the area called rete arteriosum urogenital. As the gross continues, these arteries are obliterated, except for one single mesonephric artery, which is responsible for the blood supply of the kidneys, abnormal development of the mesonephric arteries manifested by the presence of accessory renal arteries [2]. In 86.6% of cases, the blood supply of the kidneys was found commonly [3].

Classically, the renal arteries originate at the intervertebral disc level between the L1 and L2 vertebrae [4]. A study of 594 cadaveric and CT found additional renal arteries in 12.12% of kidneys. The single renal artery was most common in 93.1% while double were 5.6% and 1.4% of cases [5]. A single hilar artery was detected in 82%, while double renal arteries in 17% of the study group [6]. In 22.6% of subjects, the renal arteries were double [7].

2. Case Report

During the routine dissection of nearly a 67-year-old male cadaver posterior abdominal wall for under-

graduate student year 2019-2020 at the department of anatomy, Igraa College for Science & Technology, Fadasi city, Gezera State, Sudan. The accessory renal artery was detected arising from the lateral side of the abdominal aorta, about 1 cm inferior to the origin of the left main renal artery. The posterior abdominal wall was properly dissected according to Cunningham's manual guideline. The structures were cleaned from fasciae. The accessory renal artery was demonstrated and evaluated. It was found emerging from the lateral aspect of the abdominal aorta at the disc level between L2 and L3 just above the origin of the inferior mesenteric artery on the left side. It measured about 3.70 cm. This artery's course is inclined to cross the psoas fascia and front of the ureter. It passes through the superior part of the left kidney hilum in contrast to the left main artery, which expires in the inferior part of the hilum. The left renal vein was noted to intervene between the accessory and the main renal arteries consisting of two smaller veins accompanying the accessory renal artery and the second largest one in the middle part of the hilum superficial and below the left main renal artery. The right side renal vessels were regular in their course without such variation, as shown in Figure 1. The detected variation was photographed and recorded.

3. Discussion

During their development, the kidneys receive their blood supply from superior vessels. Normally the inferior vessels degenerate, and superior ones persist. Failure to degenerate some vessels results in aberrant

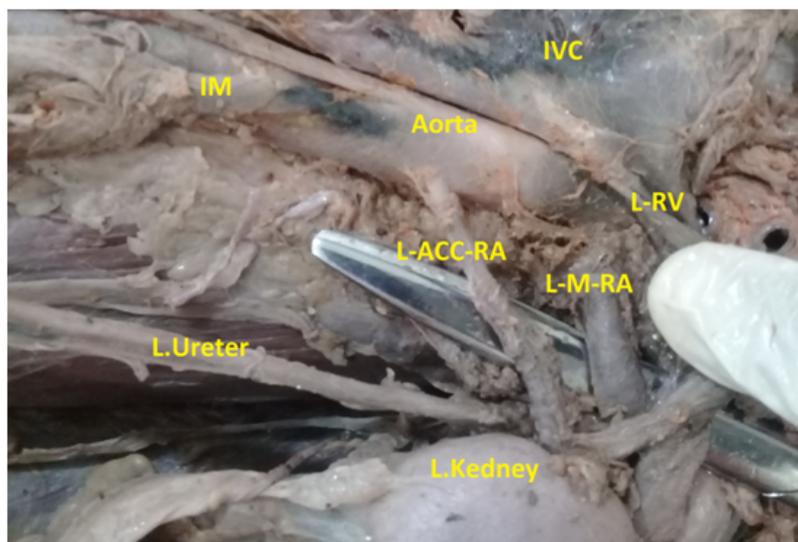


Figure 1. Left accessory renal artery (L-ACC-RA) and its relation left main renal artery (L-M-RA), left renal vein (L-RV), and inferior mesenteric artery (IM).

renal vessels [4]. Ankolekar and Sengupta, in their cadaveric study, reported 17 accessory renal arteries. They mentioned that 12 (20%) emerged from the aorta and 5 (8.33%) arose from the main renal artery [8]. Three renal arteries were observed on the left side. The left main renal artery emerges from the anterior aspect of the abdominal aorta. The other two arteries originated from a common trunk from the lateral side of the abdominal aorta below the main left renal artery [9]. Accessory renal artery penetrating the hilum of the kidney was documented in an 87-year-old female cadaver [10]. Indian 63-year cadaver present with two renal arteries. The principal renal artery arose from the side of the aorta branch at the emergence of the superior mesenteric artery. An inferior polar route crosses the ureter and may obstruct it. The variant accessory artery was emerging from the aorta at a distance of 4.5 cm below the principal renal artery [11].

In our current case finding, there are two renal arteries. The left main artery arises from the lateral side of the abdominal aorta at level L2, passing through the superior pole of the hilum of the left kidney. However, the accessory renal artery was coming out from the lateral side of the abdominal aorta about 1 cm distal to the main renal artery at level disc between L2 and L3, just slightly above the origin of the inferior mesenteric artery.

Accessory arteries have many clinical implications during renal transplantation, nephrectomy, and endovascular aneurysm repair [12]. A right accessory renal artery was reported. It passes through the hilum below the main renal artery and crosses in front of the renal pelvis [13]. 36-year Korean woman described with right hydronephrosis secondary to additional renal artery [14].

The accessory renal artery, in this case, crosses the anterior aspect of the ureter, which may lead to hydronephrosis. However, the medical history and cause of death were unknown in this case.

4. Conclusion

Knowledge of anatomical variation of the renal arteries has clinical significance in renal transplantation procedures and for interventions in angiography. Reporting of these variations will enhance the academic literature.

Ethical Considerations

Compliance with ethical guidelines

The dissection was performed in accordance with the ethics and guidelines of the Department of Anatomy, Igra College for Science & Technology.

Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

Authors' contributions

All authors equally contributed to preparing this article.

Conflict of interest

The authors declared no conflict of interest.

Acknowledgments

We thank the directors of Igra College for Science & Technology and staff for their support during the dissection period. to the directors of Igra College for Science & Technology and staff for their support during the dissection period.

References

- [1] Sadler TW. Langman's Urogenital System. In: T W Sadler, editor. Medical Embryology. Philadelphia: William & Wilkins; 2012. [Link]
- [2] Özkan U, Oğuzkurt L, Tercan F, Kızılkılıç O, Koç Z, Koca N. Renal artery origins and variations: Angiographic evaluation of 855 consecutive patients. *Diagnostic and Interventional Radiology*. 2006; 12:183-6. [PMID]
- [3] Aristotle S, Sundarapandian, Felicia C. Anatomical study of variations in the blood supply of kidneys. *Journal of Clinical and Diagnostic Research*. 2013; 7(8):1555-7. [DOI:10.7860/JCDR/2013/6230.3203] [PMID] [PMCID]
- [4] Moore KL, Dalley AF, Agur AMR. Clinically oriented anatomy. Philadelphia: Lippincott Williams & Wilkins; 2012. [Link]
- [5] Tardo DT, Briggs C, Ahern G, Pitman A, Sinha S. Anatomical variations of the renal arterial vasculature: An Australian perspective. *Journal of Medical Imaging and Radiation Oncology*. 2017; 61(5):643-9. [DOI:10.1111/1754-9485.12618] [PMID]

- [6] Khamanarong K, Prachaney P, Utraravichien A, Tong-Un T, Sriporaya K. Anatomy of renal arterial supply. *Clinical Anatomy*. 2004; 17(4):334-6. [DOI:10.1002/ca.10236] [PMID]
- [7] Budhiraja V, Rastogi R, Jain V, Bankwar V. Anatomical variations of renal artery and its clinical correlations: A cadaveric study from central India. *Journal of Morphological Sciences*. 2013; 30(4):228-33. [Link]
- [8] Ankolekar V, Sengupta R. Renal artery variations: A cadaveric study with clinical relevance. *International Journal of Current Research and Review*. 2013; 5(5):154-61. [Link]
- [9] Verma P, Arora AK, Sharma P, Mahajan A. Variations in branching pattern of renal artery and arrangement of hilar structures in the left kidney: Clinical correlations, a case report. *Italian Journal of Anatomy and Embryology*. 2012; 117(2):118-22. [PMID]
- [10] Gardner S. An accessory left renal artery: A case report. *Austin Journal of Anatomy*. 2015; 2(3):1041. [Link]
- [11] Chaudhary S, Gopal UB, Prasanna S, Kumar Giri J. Variation in renal blood supply and its clinical significance- a case report. *International Journal of Health Sciences and Research*. 2019; 9(10):170-4. [Link]
- [12] Johnson PB, Cawich SO, Shah SD, Aiken W, McGregor RG, Brown H, et al. Accessory renal arteries in a Caribbean population: A computed tomography based study. *Springerplus*. 2013; 2:443. [DOI:10.1186/2193-1801-2-443] [PMID] [PMCID]
- [13] Rao TR, Shetty P, Rao S. Unusual course of accessory renal artery and its clinical significance: A case report. *International Journal of Anatomical Variations*. 2011; 4:197-9. [Link]
- [14] Park BS, Jeong TK, Ma SK, Kim SW, Kim NH, Choi KC, et al. Hydronephrosis by an aberrant renal artery: A case report. *The Korean Journal of Internal Medicine*. 2003; 18(1):57-60. [DOI:10.3904/kjim.2003.18.1.57] [PMID] [PMCID]