ACCESSORY RENAL VESSELS

Ammar Mohammed Ali Mohammed, Rami Gusm Elsede Abdalrasol, Khatim Alamin Abdalhai, Mohamed Gommaa Hamad

Department of Anatomy, Faculty of Medicine and Health Sciences, University of Dongola, Dongola, Sudan.

Corresponding author: Ammar Mohammed Ali Mohammed, MD. Head, Department of Anatomy, Faculty of Medicine and Health Sciences, University of Dongola, Dongola, Sudan. Elgomaih Medical Research Centre, University of Dongola, Dongola, Sudan. Email: amamero2002@hotmail.com, Mobile: +249912634109.

1. INTRODUCTION

Multiple (accessory, supernumerary) renal arteries and their position are common; accessory renal arteries commonly derived from the abdominal aorta (1, 2, 3, 4), rarely from single trunk (5, 6), common iliac (4, 7), and superior mesenteric (8); rarely originate from inferior mesenteric (9). Also variations in number doubled (3, 4, 5, 6, 7), triplet (2, 4, 10), and four (11) renal arteries have been reported. In addition multiple renal veins have been reported (2, 11, 15).

Accessory renal vessels may associated with other vascular variations (10) including testicular (15, 16), suprarenal (2) and inferior phrenic vessels (17, 19).

Knowledge of the variations of the renal artery has grown in importance with increasing numbers of renal transplants, vascular reconstructions and various surgical and radiologic techniques performing in recent years. We report the presence of unilateral doubled renal vessels, discovered on routine dissection of a male cadaver, on the right side; additional renal artery originated from the abdominal aorta. In addition the right suprarenal gland received arteries from right renal and inferior phrenic arteries only. The right inferior phrenic originated from the right renal artery.

Key words: renal artery, accessory renal vessels.

Figure 1. The renal arteries of right kidney AA: Abdominal aorta, CT: Coeliac trunk, IRA: Inferior renal artery, IRV: Inferior renal vein, SMA: Superior mesenteric artery, SRA: Superior renal artery, SRV: Superior renal vein.

2. CASE HISTORY

During a gross anatomy dissection of the abdomen of a 55-year-old male cadaver, at (faculty of Medicine and Health sciences, University of Dongola); we observed multiple variations included the right renal and inferior phrenic vessels. The right kidney received two (superior and inferior) renal arteries, of which took their origin from the lateral aspect the abdominal aorta just at the level, and below the origin of superior mesenteric artery respectively (Figure 1). Both arteries were equal in size, and reach the kidney through the hilum, the superior lied anteriorly with the renal veins while the inferior behind them; both arteries gave arise to hilar branches.

The right inferior phrenic artery originated from the superior renal artery. The right suprarenal gland received arteries from superior renal and inferior phrenic arteries only (Figure 2). In addition the right kidney had two renal veins of almost equal size, both of which terminated into the inferior vena cava (Figure 3). No such variations found in the left side.

3. DISCUSSION

Accessory renal arteries are common and mainly derived from the abdominal aorta (1, 2, 3, 4), as well as our case. Levine (5), and Shimada et al (6), reported that both renal arteries originated from abdominal aorta by single trunk. Pestemalci et al (4), and Asala et al (7) reported accessory renal arteries originated from common iliac artery. Origin of accessory arteries from superior and inferior mesenteric has been reported (8,9).

According to number of accessory arteries doubled (3, 4, 5, 6, 7), triplet (2, 4, 10), and four (11) renal arteries have been reported comparing to our case there was unilateral double renal arteries and vein which are enter and emerged through the hilum of the right kidney.

Nayak (2) reported a case of doubled renal veins in addition to supernumerary renal arteries; the inferior one received the testicular vein. Fernandes et al (12) reported case of trip-
let renal veins drained the right kidney; also the inferior one received the testicular vein. In this case there was two unilateral, right renal veins, no such variation concerning the right testicular. All of the accessory renal veins drained into the inferior or vena cava directly with respect of level of drainage (2, 11, 15).

Accessory renal vessels may associated with other vascular vari-

tions (10) including testicular (15, 16), suprarenal (2) and inferior phrenic vessels (17, 18, 19). In this case the right superior renal artery gave arise to both right inferior phrenic and branch to right suprarenal gland.

The authors suggest explanation for this case based on this step of the embryological development of the right renal vessels. There was error in fusion of the dorsal and ventral vessels which appeared in distribution of these vessels at the hilum.

**Conflict of interest:** none declared

**REFERENCES**

1. Harvey R W. A case of multiple renal arteries. Anat Rec. 1914; (8): 6. 333-9.

2. Nayak BS. Multiple variations of the right renal vessels. Singapore Med J, 2008; 49(6):153-5.

3. Kara A, Kurtoglu Z, Oguz U, Oztürk A H, Uzansel D. Two Accessory Renal Arteries with Histological Properties. Turk J Med Sci. 2006; (36). 133-8.

4. Pestemalci T, Mavi A, Yildiz YZ, Yildirim M, Gumusburun E. Bilateral triple renal arteries. Saudi J Kidney Dis Transpl. 2009; 20:468-70.

5. Levine ND. An unusual renal arterial anomaly; common origin of arteries to the lower poles. Br J Radiol. 1970; 43(505):66-7.

6. Shimada K, Ohashi I, Sakai Y, Kijima T, Yoshida S, Okuno T, Hanafusa K, Shibuya H. An unusual renal vascular anomaly: common origin of arteries to the lower poles demonstrated by a computed tomography angiography using 16-slice multidetector computed tomography. Acta Radiol. 2006; 47(3):332-4.

7. Asala SA, Asumbuko-Kahamba NM, Bidmos MA. An unusual origin of supernumerary renal arteries: case report. East Afr Med J. 2001; 78: (2). 686-7.

8. Lacout A, Thariat J and Marcy P-Y. Main right renal artery originating from the superior mesenteric artery. Clin Anat. 2011. doi: 10.1002/ca.22002

9. Gesase AP. Rare origin of supernumerary renal vessels supplying the lower pole of the left kidney. Ann Anat. 2007;189(1):53-8.

10. Loukas M, Aparicio S, Beck A, Calderon K, Kennedy M. Rare case of right accessory renal artery originating as a common trunk with the inferior mesenteric artery: a case report. Clin Anat. 2005;18(7):530-5.

11. Madhyastha S, Suresh R, Rao R. Multiple variations of renal vessels and ureter. Indian J Urol. 2001; 17:164-5.

12. Fernandes RMP, Conte FHP, Favorito LA, Abidu-Figueiredo M & Babinski MA. Triple right renal vein: an uncommon variation. Int. J. Morphol. 2005; 23(3):233-3.

13. Verma R, Kalra S & Rana K. Malformation of Renal and Testicular Veins– A case Report. J. Anat. Soc. India. 2005; 54: (1). 29-31.

14. Chavan S K, Wabale N R, Daimi R S. Unusual variation of the renal vessels – A case report. Pravara Med Rev. 2010; 5: (3). 31-4.

15. Kayalvizhi I, Monisha B, Usha D. Accessory left testicular artery in association with double renal vessels: a rare anomaly. Folia Morphol. 2011; 70: (4). 309–11.

16. Bergman RA, Cassell MD, Sahinoglu K, Heidger PM Jr. Human doubled renal and testicular arteries. Ann Anat. 1992; 174: (4).313-5.

17. Topaz O, Topaz A, Polkampally PR, Damiano T, King CA. Origin of a common trunk for the inferior phrenic arteries from the right renal artery: a new anatomic vascular variant with clinical implications. Cardiovasc Revasc Med. 2010; 11: (1).57-62.

18. Bakheit MA, Motabagani MA. Anomalies of the renal, phrenic and suprarenal arteries: case report. East Afr Med J. 2003; 80: (9). 497-8.

19. Bakheit MA, Motabagani MA. Anomalies of the renal, phrenic, suprarenal arteries. Saudi Med J. 2004; 25: (3):376-8.