



Rare combined variations of renal, testicular and suprarenal arteries

Published online January 24th, 2011 © <http://www.ijav.org>

Ornkes PANYANETINAD ✦

Department of Anatomy, Faculty of Medicine, Chulalongkorn University, Bangkok, THAILAND.



✦ Ornkes Panyanetnad, MD
Department of Anatomy
Faculty of Medicine
Chulalongkorn University
Bangkok 10330, THAILAND.
☎ +66 (1) 588-8287
✉ ornkes@hotmail.com

Received November 18th, 2010; accepted January 17th, 2011

ABSTRACT

Variations of vessels in abdominal area are quite common. This case report illustrated a unique case of combined variations of bilateral renal arteries, right testicular and right inferior suprarenal arteries. During a routine dissection of a male cadaver, we found bilateral inferior accessory renal arteries. Both arose from abdominal aorta and entered the kidneys exactly at the lower pole. Moreover, right testicular artery did not directly originate from abdominal aorta. It formed common trunk with right inferior suprarenal artery. This common trunk arose from right main renal artery, while left testicular artery originated from abdominal aorta as usual. To best of our knowledge, the variation we discovered in an individual has not been issued in the literature before. Interestingly, variation such as in this case should be kept in mind due to its clinical and surgical significance. © IJAV, 2011; 4: 17–19.

Key words [anatomy] [vascular variations] [accessory renal artery] [suprarenal artery] [testicular artery]

Introduction

Variations of arteries in abdominal area are quite common. Generally, renal arteries originate from the lateral part of aorta just below the origin of superior mesenteric artery. Each kidney receives blood supply from a single renal artery. This pattern presents in 70% of individuals. Accessory renal arteries are found in approximately 25–30% [1]. According to an angiographic study including 855 cases, multiple renal arteries were observed in 202 patients, about 24% [2].

In 14% of kidneys, the gonadal artery which usually arise from the aorta, originated from renal artery, either from main or accessory one [3]. Moreover, several variations of suprarenal artery have been reported [4–8].

In this case report, we report another pattern of combined variations of renal, testicular and suprarenal arteries. Knowledge we learned may contribute to surgical and clinical application.

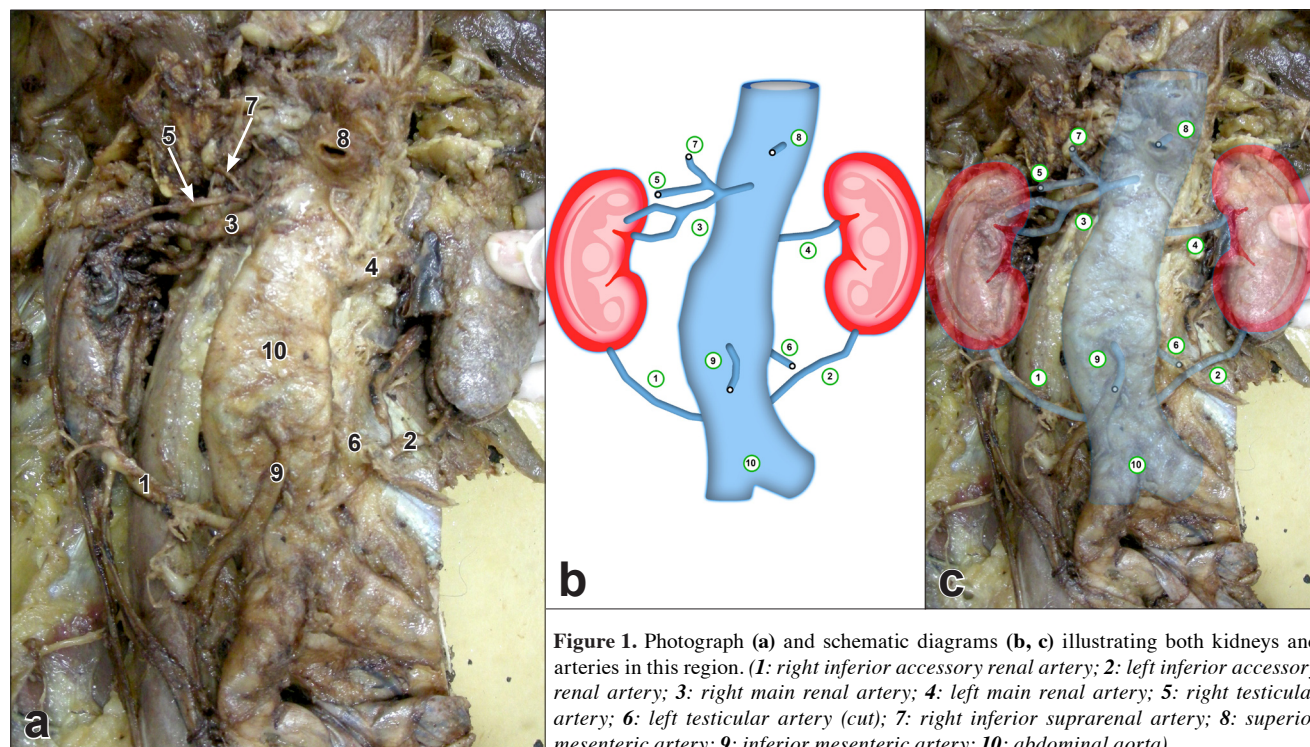
Case Report

During a routine dissection of anatomical class at Faculty of medicine Chulalongkorn University, we found variations in 60-year-old male cadaver with no known unfavorable medical history. Combined variations we discovered were as the followings:

1. Bilateral inferior accessory renal arteries were found. Both originated from abdominal aorta, at nearly the same level, approximately 10 cm below superior mesenteric artery. From its origin, each artery crossed over the ureter and entered the kidney exactly at the lower pole. The ureter at the crossing point looked normal.
2. At the right side, the main renal artery arose from the abdominal aorta 1.8 cm below the superior mesenteric artery, then it branched into anterior and posterior divisions of 3.5 cm long before reaching the renal hilum. The posterior one looked slightly smaller. No variation was seen at left renal artery.
3. Another important finding was a common trunk of right testicular and right inferior suprarenal arteries. The common trunk originated from right renal artery 5 mm from the origin of right renal artery, which was at right anterolateral part of aorta, 1.8 cm below superior mesenteric artery. However, no variations of renal or testicular vein were observed.

Discussion

Knowledge concerning the variations of renal artery has increasing importance due to increasing rate of renal transplants, vascular reconstruction for both congenital



anomalies and acquired lesions, and reconstructive surgery for abdominal aortic aneurysm [9]. Total incidence of multiple renal artery is about 30%: 10% found bilaterally, 20% found unilaterally. Among people transplanted with kidneys with multiple arteries, increasing rate of renal artery thrombosis, hemorrhage and segmental parenchymal infarction was found [10]. Interruption of renal artery can cause ischemia easily because renal artery is end artery and no collateral circulation is present [9].

Hydronephrosis is another significant clinical manifestation related to accessory renal artery. Inferior accessory renal artery usually crossed over the ureter. This may lead to obstruction and hydronephrosis [11]. If this obstruction persists long enough, renal function will decrease. This suggests further work up for obstruction in cases with impaired renal function with no other causes identified. Accessory renal artery should be kept in mind as another cause of obstruction.

Several combined variations of renal, testicular and suprarenal arteries have also been reported. Salve et al. reported right testicular artery arising from right aberrant renal artery [12]. Sylvia et al. reported bilateral variant testicular artery with double renal arteries in male cadaver. Right testicular artery originated from right upper renal artery while left testicular artery originated from left lower renal artery [13]. Brohi et al. reported a case with high origin of left testicular artery with unusual suprarenal branch from it [8]. Ozan et al. reported two cases, in which gonadal arteries and accessory renal arteries arose from abdominal aorta at higher level than

usual. In one of the cases, right middle suprarenal artery and parenchymal branch to the kidney originated from right testicular artery via a common trunk [7].

However, uniqueness of this case report is the combination of variations of bilateral renal arteries, right testicular and right suprarenal arteries in just one individual. Without concerning to this pattern of variation, manipulation to the renal artery may lead to testicular infarction following a procedure. For example, in 1988, Siniluoto et al. reported testicular infarction following ethanol embolization of a renal neoplasm [14]. Impaired blood perfusion to suprarenal gland leading to ischemia may also happen. Unlike testis, suprarenal gland is internal organ and supplied by several vessels, this ischemia may not be detected or misdiagnosed. Riddell et al. reported a case with acute onset of left flank pain given a provisional diagnosis of left-sided renal colic. MRI was done and showed final diagnosis as left adrenal infarction [15].

Despite a large number of renal artery variations reported, this pattern of combined variation is not common. Knowledge from this case report should be applied to reduce surgical or interventional radiologic complication. For instance, in laparoscopic surgery in which operative field and view are limited, identifying variations in vasculature is one of the important factors determining success in operations [16]. Angiogram should be performed before any intervention involving vessels in this area.

Acknowledgements

The author would like to thank to:

- Professor Apiwat Mutirangura for valuable comments and suggestions.
- Associate Professor Thanwa Tansatit for interesting ideas.
- Dr. Chupong Ittiwut for the great illustration.

References

- [1] Standring S, ed. *Gray's Anatomy: Anatomical Basis of Clinical Practice*. 39th Ed., Edinburgh, New York, Elsevier Churchill Livingstone. 2005; 1827.
- [2] Ozkan U, Oguzkurt L, Tercan F, Kizilkilic O, Koc Z, Koca N. Renal artery origins and variations: angiographic evaluation of 855 consecutive patients. *Diagn Interv Radiol*. 2006; 12: 183–186.
- [3] Shoja MM, Tubbs RS, Shakori AB, Oakes WJ. Origins of the gonadal artery: embryologic implications. *Clin Anat*. 2007; 20: 428–432.
- [4] Dutta S. Suprarenal gland-arterial supply: an embryological basis and applied importance. *Rev J Morphol Embryol*. 2010; 51: 137–140.
- [5] Cimen M, Erdil FH, Kosar MI, Sabanciogullari V. A rare variation of the right middle suprarenal artery. *Ann Anat*. 2007; 189: 287–289.
- [6] Manso JC, DiDio LJ. Anatomical variations of the human suprarenal arteries. *Ann Anat*. 2000; 182: 483–488.
- [7] Ozan H, Cumusalan Y, Onderoglu S, Simsek C. High origin of gonadal arteries associated with other variations. *Ann Anat*. 1995; 177: 156–160.
- [8] Brohi RA, Sargon MF, Yener N. High origin and unusual suprarenal branch of a testicular artery. *Surg Radiol Anat*. 2001; 23: 207–208.
- [9] Harrison LH Jr, Flye MW, Seigler HF. Incidence of anatomical variants in renal vasculature in the presence of normal renal function. *Ann Surg*. 1978; 188: 83–89.
- [10] Coen LD, Raftery AT. Anatomical variations of the renal arteries and renal transplantation. *Clin Anat*. 1992; 5: 425–432.
- [11] Patasi B, Boozary A. A case report: accessory right renal artery. *International Journal of Anatomical Variations (IJAV)*. 2008; 2: 119–121.
- [12] Salve VM, Ashalatha K, Sawant S, Gajendra K. Variant origin of right testicular artery – a rare case. *International Journal of Anatomical Variations (IJAV)*. 2010; 3: 22–24.
- [13] Sylvia S, Kakarlapudi SV, Vollala VR, Potu BK, Jetti R, Bolla SR, Rao M, Pamidi N. Bilateral variant testicular arteries with double renal arteries. *Cases J*. 2008; 2: 114.
- [14] Siniluoto TM, Hellstrom PA, Paivansalo MJ, Leinonen AS. Testicular infarction following ethanol embolization of a renal neoplasm. *Cardiovasc Intervent Radiol*. 1988; 11: 162–164.
- [15] Riddell AM, Khalili K. Sequential adrenal infarction without MRI-detectable hemorrhage in primary antiphospholipid-antibody syndrome. *AJR Am J Roentgenol*. 2004; 183: 220–222.
- [16] Kawamoto S, Montgomery RA, Lawler LP, Horton KM, Fishman EK. Multi-detector row CT evaluation of living renal donors prior to laparoscopic nephrectomy. *Radiographics*. 2004; 24: 453–466.