



A case report: accessory right renal artery

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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 celiac trunk, renal and gonadal arteries. During a routine dissection of a male cadaver, one main and one inferior accessory renal artery were found in the abdominal region. We discovered that the inferior accessory renal artery that originated from the right anterolateral aspect of abdominal aorta was running into the lower pole of the right kidney. The origin of the main right renal artery and the inferior accessory right renal artery were 19.8 mm and 53 mm below the superior mesenteric artery, respectively. The inferior accessory right renal artery ran directly into the inferior pole of the right kidney, in the area where the accessory right renal vein was leaving the right kidney. These anatomical variations and anomalies are important to know before any therapeutic or diagnostic procedures are performed in the abdominal area. © IJAV. 2009; 2: 119–121.

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

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 medial border of each kidney there is an area known as the hilum, where 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 [5–7,8]. 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 and anomalies of the renal arteries are necessary for sufficient surgical management during renal transplantation, repair of abdominal aorta aneurysm, urological procedures and angiographic interventions [5,10,11].

Case Report

During an anatomy dissection laboratory session held by medical faculty, an anatomical variation of the origin of the accessory right renal artery was observed in one of our male cadavers. The abdominal cavity was opened, the small and large intestines were removed and the structures close to the posterior abdominal wall were

dissected. We observed all unpaired and paired branches of the abdominal aorta, starting at the celiac trunk and extending through the superior mesenteric artery, renal arteries, gonadal arteries and inferior mesenteric artery. Between two unpaired branches of the abdominal aorta and the superior and inferior mesenteric arteries, we observed an additional renal artery arising from the anterolateral side of the abdominal aorta, reaching the lower pole of the right kidney. We discussed, observed and compared our finding to the literature and came to the conclusion that we had located an accessory right renal artery. A few pictures of the right kidney with its blood supply were taken, capturing the main and accessory right renal arteries (Figures 1, 2). In our male cadaver, the origins of the main right renal artery and the inferior accessory right renal artery were 19.8 mm and 53 mm below the superior mesenteric artery, respectively. The main right renal artery arose 19.8 mm below the superior mesenteric artery, passed behind the inferior vena cava and reached the superior pole of the right kidney, where the main right renal vein left the right kidney (Figures 1, 2). The inferior accessory right renal artery arose 53 mm below the superior mesenteric artery and ran anteriorly to the inferior vena cava directly into the inferior pole of the right kidney, in the area where the accessory right renal vein left the right kidney (Figures 1, 2). The right testicular artery arose from the lateral side of the abdominal aorta approximately 9.5 mm below the main right renal artery and ran down the front of inferior

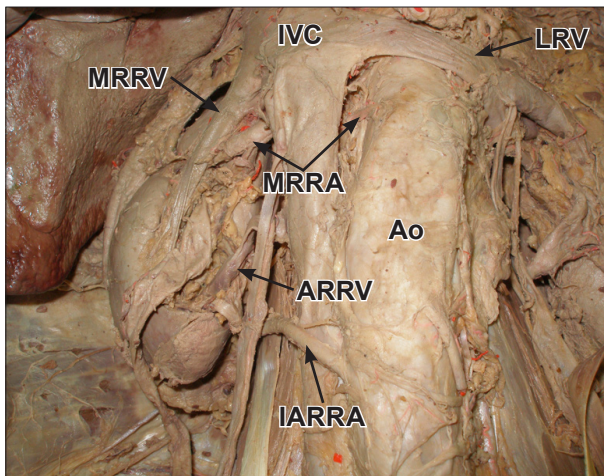


Figure 1. Photograph shows the right kidney and the arteries in this region. (IVC: inferior vena cava; MRRV: main right renal vein; ARR: accessory right renal vein; LRV: left renal vein; MRRA: main right renal artery; IARRA: inferior accessory right renal artery; Ao: abdominal aorta)

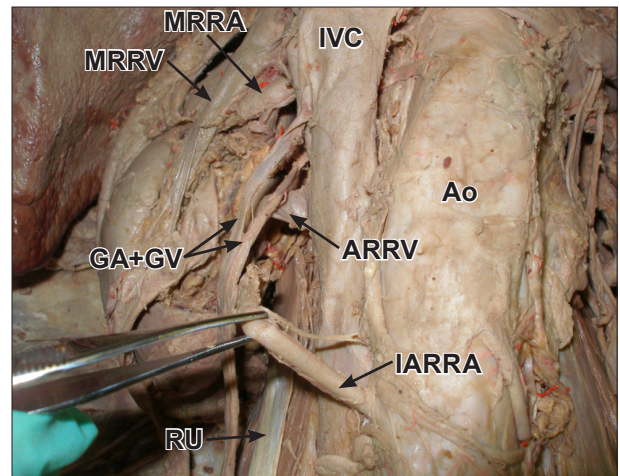


Figure 2. Photograph shows the right kidney and the arteries in this region. (IVC: inferior vena cava; MRRV: main right renal vein; ARR: accessory right renal vein; MRRA: main right renal artery; IARRA: inferior accessory right renal artery; Ao: abdominal aorta; GA+GV: gonadal artery and gonadal vein; RU: right ureter)

accessory renal artery (Figure 2). No other congenital variations were found.

Discussion

Knowledge of the 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 kidney on that side. Different variations in the origin, courses 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 the 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 the variations of the renal arteries is still not clear, as different authors describe them as additional, accessory, hilar, inferior and superior polar arteries [5–7,9,10]. We named our renal arteries as main and inferior accessory right renal arteries. Accessory renal arteries usually arise from the abdominal aorta above or below the main renal artery and follow it to the renal hilum. Here we can open discussion, if our inferior accessory right renal artery entering the right kidney was actually the main right renal artery, because from the same area, called hilum, accessory right renal vein was leaving the right kidney. Described as our main right renal artery, and running behind the inferior vena cava, this can actually be the superior accessory right renal artery, where the main right renal vein was leaving the right kidney (Figures 1, 2). A superior or inferior origin is not uncommon and superior and inferior accessory arteries can reach the superior and inferior renal poles. They are persistent embryonic lateral splanchnic arteries. Inferior accessory renal arteries usually cross anteriorly to the ureter and may cause ureter hydronephrosis by obstruction. The reported incidence of additional renal arteries has a wide range (from 8.7%

to 75.7%) and they, too, can cause hydronephrosis by obstruction [3,4,12]. The present case discusses discovering one main and one accessory right renal artery supplying the right kidney.

The knowledge of this potential anomaly is important for surgical procedures related to the posterior abdominal wall, renal transplantation, abdominal aorta aneurysm, ureter surgery and angiographic interventions. Although it is very rare, fibromuscular dysplasia in an accessory renal artery can be responsible for renovascular hypertension. Selective renal angiography should be performed as the “gold standard” test when renovascular intervention is considered. 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 [13]. Lately, the demand for kidney donation has rapidly increased, so it is essential to be aware of the possibility of donors with multiple renal arteries [14,15]. In order to precisely plan the surgical procedure and avoid any vascular complication, arteriography should be performed before every nephrectomy [13]. In our case, knowing where one main and one accessory right renal artery were present may be important for the surgical view, especially in anticipating pre- and post-operative bleeding.

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