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S.A. Asala, MBBS, PhD, N. Masumbuko-Kahamba, BDS and M.A. Bidmos, MBBS, Department of Anatomical Sciences, Medical School, University of the Witwatersrand, 7 York Road, Parktown 2193, Johannesburg, South Africa.

Request for reprints to: Dr. S.A. Asala, Department of Anatomical Sciences, Medical School, University of the Witwatersrand, 7 York Road, Parktown 2193, Johannesburg, South Africa.

AN UNUSUAL ORIGIN OF SUPERNUMERARY RENAL ARTERIES: CASE REPORT

S.A. ASALA, N. MASUMBUKO-KAHAMBA and M.A. BIDMOS

SUMMARY

Patent left and right supernumerary inferior polar renal arteries were found in a dissection room cadaver. Both arteries originated from the left common iliac artery. This is an unusual form of origin of these arteries in the presence of an apparently normal ascent and position of the two kidneys.

INTRODUCTION

The kidneys are developed from the intermediate mesoderm of the nephrogenic cord in the sacral region of the embryo. As a result of a disproportionate growth of the embryo caudal to the developing kidneys, there is a relative ascent of these organs to the upper lumbar region. The ascent of the kidneys is accompanied by changes in their blood supply. The first set of arteries arises from caudal ends of the dorsal aortae. But as the kidneys ascend, the renal arteries arise at progressively higher levels of the aorta until the definitive renal arteries develop at the level of the second lumbar vertebra. As new arteries are developed at higher levels, the caudal ones degenerate and disappear. If these caudal arteries persist and supplement the normal renal arteries, they are referred to as supernumerary renal arteries. These arteries may enter the kidney at sites other than the hilus. A supernumerary artery that enters the kidney at its lower pole is called an inferior polar renal artery.

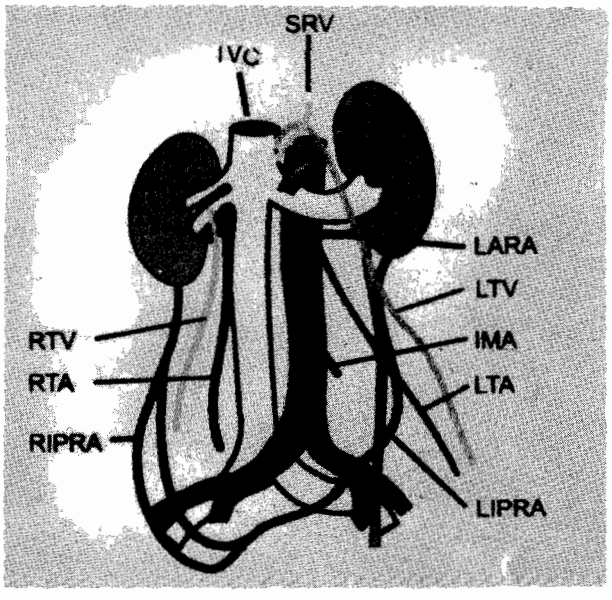
Varying sites and mode of origin of renal and supernumerary renal arteries have been documented(1-3). The right and left renal arteries may arise from the aorta by a common stem. They may arise from the aorta at a lower level than usual. In these cases, the affected kidneys lie inferior to their usual position. There may be several renal arteries on each side or a single renal artery may divide into several branches close to its origin. The renal artery and supernumerary renal arteries on one or both sides may arise from the bifurcation of the aorta, the ipsilateral common iliac artery, the internal iliac artery, the inferior mesenteric or the middle sacral artery. The right renal artery may cross anterior to, instead of posterior to, the inferior vena cava. The branches of the renal artery may pierce the kidney at sites other than the hilus. The renal artery may give rise to branches that are normally derived from other arteries, such as the inferior phrenic, hepatic, middle suprarenal, some of the colic arteries, testicular and ovarian arteries, one or more lumbar arteries and pancreatic artery. Cederlung *et al*(4) reported a case in which the left kidney received its blood supply from the right renal artery. Supernumerary and accessory renal arteries, which vary in size and are generally derived from the aorta, are common. These may enter the kidney at almost any part of the organ.

CASE REPORT

The case that is being reported was found in one of the cadavers that were dissected by students of the Medical School, University of the Witwatersrand, Johannesburg, South Africa. A supernumerary inferior polar renal artery was present bilaterally. Both arteries originated from the left common iliac artery rather

Figure 1

Unusual origin of right (RIPRA) and left (LIPRA) inferior polar renal arteries from the left common iliac artery. The right testicular vein (RTV) terminates in the right renal vein and left testicular vein (LTV) terminates at a high level in the inferior vena cava. The right testicular artery (RTA) originates from the right renal artery. IVC – inferior vena cava; SRV – suprarenal vein; LARA – left accessory renal artery; IMA – inferior mesenteric artery; LTA – left testicular artery



than from the aorta or the ipsilateral common iliac artery (Figure 1). The right inferior polar renal artery crossed to the right side of the greater pelvis anterior to the right external iliac artery and vein, and the right ureter. The two arteries then ascended to, and pierced the inferior pole of the corresponding kidney, which were of normal size and lied at the level of the upper lumbar vertebrae. Both arteries were patent and measured approximately 2 mm in their external diameter. The right renal artery was of normal size. The left renal artery, which was smaller than the right one, was accompanied by a small accessory renal artery that originated separately from the aorta at the level of the lower border of the second lumbar vertebra (Figure 1).

Other vascular variations that were present in this cadaver were a right testicular artery arising from the right renal artery, a right testicular vein termination in the right renal vein rather than in the inferior vena cava, and a high level of termination of the left testicular vein in the inferior vena cava (Figure 1).

DISCUSSION

Supernumerary renal arteries are of clinical importance because they are usually end arteries(3). Therefore, blockage or surgical removal of these arteries, for example during abdomino-pelvic surgery, could lead to avascular necrosis of the segments of the kidney to which they supply blood. The occurrence of supernumerary renal arteries originating from a single common iliac artery is unusual and cannot be readily explained on the basis of the normal embryonic development of the dorsal aortae, especially as the two kidneys in this cadaver lied in normal lumbar positions.

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