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Case Report

Testicular Artery Arising from an Accessory Renal Artery

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Abstract : During routine cadaveric dissection of a 90-year-old Korean male, a rare vascular anomaly was identified in which the right testicular artery originated from a right accessory renal artery. The accessory renal artery arose from the abdominal aorta below the main renal artery, coursed anterior to the inferior vena cava, and entered the kidney through the renal hilum to supply the inferior renal segment. No typical testicular artery origin from the abdominal aorta was observed on the right. This variation is embryologically attributable to persistence of transitory vessels during kidney ascent. Awareness of such anomalies is important during urologic and retroperitoneal surgical procedures to prevent inadvertent vascular injury. This case adds to the limited data on testicular artery variations in the Korean population.

Keywords : Testicular artery, Accessory renal artery, Vascular variation, Cadaver dissection, Korean

INTRODUCTION

The testicular arteries typically arise from the anterolateral aspect of the abdominal aorta inferior to the renal arteries, providing the primary arterial supply to the testes [1]. Anatomical variations in testicular artery origin have been documented, with aberrant origins from the renal artery or accessory renal artery representing a clinically important subset [2-5].

Understanding these variations is essential for urological and transplant surgeons because inadvertent vascular injury during retroperitoneal procedures can compromise testicular perfusion. Failure to recognize testicular arteries arising from accessory renal arteries may result in inadvertent ligation during nephrectomy, affecting both organs simultaneously.

Despite documentation in various populations, data specific to Korean individuals remains limited. We report a case of a right testicular artery originating from a right accessory renal artery in a 90-year-old Korean male cadaver, contributing to the anatomical knowledge base for this population.

CASE REPORT

During routine cadaveric dissection of a 90-year-old Korean male at the Pusan National University School of Dentistry, an unusual arterial configuration was identified in the right renal and gonadal vasculature.

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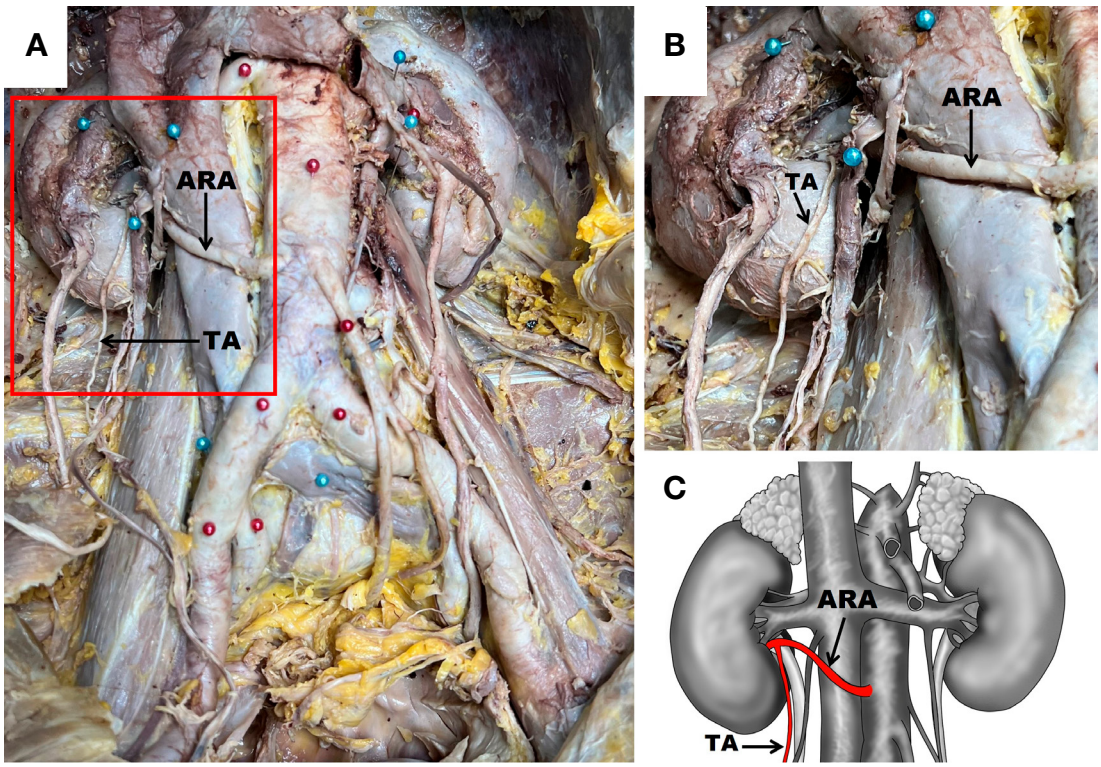

Fig. 1. Cadaveric photographs and schematic illustration of an anomalous right testicular artery. (A) Retroperitoneal view demonstrating the right testicular artery (TA) arising from a right accessory renal artery (ARA). (B) Magnified view showing the TA branching from the ARA coursing anterior to the inferior vena cava. (C) Schematic illustration of the vascular variation.

After reflecting the abdominal viscera and exposing the retroperitoneal structures, careful examination revealed absence of the right testicular artery at its expected origin from the anterolateral aspect of the abdominal aorta (Fig. 1A). Systematic dissection demonstrated that the right testicular artery arose instead from a right accessory renal artery. The aberrant testicular artery descended obliquely through the retroperitoneum alongside the right testicular vein to the right testis. Comprehensive examination revealed no additional arterial branches supplying the right testis from the abdominal aorta, the main renal artery, or the suprarenal arteries.

The right accessory renal artery originated from the abdominal aorta below the main right renal artery and coursed anterior to the inferior vena cava before entering the kidney through the renal hilum to supply the inferior renal segment (Fig. 1B, C). Both the main and accessory renal arteries entered the kidney through the renal hilum at separate points. The accessory renal artery served as an inferior segmental artery, supplying the lower portion of the kidney.

The left renal vasculature demonstrated typical anatomy, with a single renal artery and a testicular artery originating independently from the abdominal aorta. No vascular anomalies were identified on the left side. Examination of the testicular veins revealed no dilation, varicosities, or other venous anomalies bilaterally.

DISCUSSION

1. Classification and rarity of the variant

This case presents a testicular artery originating from an accessory renal artery in a 90-year-old Korean male, corresponding to Type IIB according to the classification proposed by Kayalvizhi et al. (2017) [3]. Although accessory renal arteries have a reported prevalence of approximately 21% in the general population [6], Type IIB variants—defined as testicular arteries arising from an accessory renal artery—were identified in only 16 of 166 cases (9.6%) involving accessory renal artery-related origins in their series, underscoring the relative rarity of this vascular configuration. A similar configuration was recently reported by Cai et al.

(2025) in a 61-year-old Chinese male [7], which suggests this variant occurs across Asian populations. However, population-specific anatomical documentation for Korean individuals remains limited.

2. Embryological considerations

The developmental basis for this variant relates to vascular changes during kidney ascent. Between weeks 6 and 9, the developing kidney ascends from the pelvic to the lumbar region and receives blood supply from successive arterial branches arising from the aorta at progressively higher levels [8]. As the kidney ascends, caudal vessels typically regress while new, more cranial vessels form. The definitive renal artery develops at the L1-L2 level after the kidney reaches its final position [8]. Accessory renal arteries represent persistence of vessels that normally regress during kidney ascent. The association between accessory renal arteries and aberrant testicular arteries occurs when the testicular artery branches from such a persistent vessel during the developmental period. This occurs while the kidney is ascending and the testis is descending. Shoja et al. (2007) demonstrated that 71% of kidneys with aberrant gonadal arteries also possessed accessory renal arteries, supporting this developmental association. The right-sided predominance (11 right versus 3 left) observed in their angiographic study is consistent with our unilateral right-sided finding [9].

3. Clinical and surgical implications

Recognition of this variant carries substantial surgical importance. During nephrectomy, renal transplantation, or retroperitoneal procedures, failure to identify a testicular artery arising from an accessory renal artery may result in inadvertent ligation, affecting both organs simultaneously. Shoja et al. (2007) emphasized that such variations have "clinical and surgical significance regarding their potential influence on the blood flow to the kidney and gonads" [9]. Minimally invasive surgical techniques make preoperative vascular mapping increasingly critical, as intraoperative identification of unexpected variants is more challenging with limited visualization compared to open approaches. Comprehensive preoperative imaging, including CT angiography or MR angiography, enables identification of such variants and allows surgical planning to preserve testicular perfusion. When variants are recognized preoperatively, selective preservation or reconstruction of aberrant testicular arteries can be considered during renal procedures.

4. Significance and limitations

This case adds to the anatomical documentation of testicular arterial variations in the Korean population. While such variants have been extensively studied in Caucasian and other Asian populations, Korean-specific cadaveric data remains sparse. Population-specific anatomical variation data improve surgical safety by informing preoperative planning and intraoperative expectations for surgeons working with specific demographic groups. Continued documentation of vascular variants in Korean cadaveric and imaging studies will contribute to more comprehensive understanding of regional anatomical patterns.

This report represents an incidental finding during routine anatomical dissection. We could not obtain the subject's clinical history. Future studies combining cadaveric dissection findings with preoperative imaging data would provide more comprehensive understanding of the clinical significance and prevalence of such variants in the Korean population. The developmental association between accessory renal and aberrant gonadal arteries is well-established. Nevertheless, each documented case in underrepresented populations adds valuable data for surgical practice and anatomical education.

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