

A PERSISTENT MESONEPHRIC ARTERY: A RUDIMENTARY ACCESSORY RENAL ARTERY (AN EMBRYONIC REMNANT)

**PERSİSTE MEZONEFRİK ARTER: RUDİMENTER AKSESUAR RENA ARTER (EMBRYONİK
BİR KALINTI)**

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SUMMARY: During the dissection of a 60-year-old male cadaver, a persistent mesonephric artery was encountered in the abdominal region. It originated in the anterolateral aspect of the abdominal aorta and crossed behind the left testicular artery and ran upward to the renal hilum. The lateral mesonephric arteries give rise to renal arteries. If one of the lateral mesonephric arteries, in addition to the main renal artery, persists, then the result is an accessory renal artery. This anomaly may be important in surgical procedures related to the abdomen, such as renal transplantation, abdominal aortic aneurysm, ureter surgery, and vascular pedicles of the kidney and in angiographic interventions.

Key Words: Mesonephric Arteries, Accessory Renal Arteries, Vascular Variations

INTRODUCTION

The renal and gonadal arteries usually arise from the anterolateral or lateral aspect of the abdominal aorta (1,7,26). Variations related to the origin, course and number of these arteries are reported by many authors (2,3,13-15,17,19,21-26). The embryological bases for these variations have also been well established (11). From the published studies and reports on accessory renal arteries it can be concluded that the average rate of occurrence is approximately 30% (25).

In this case, we emphasize that the rudimentary accessory renal artery, which supplies the renal hilum and surrounding area, is

ÖZET: Diseksiyon sırasında, 60 yaşında erkek kadavrada abdominal bölgede persiste mezonefrik arterle karşılaşıldı. Bu arter, aorta abdominalis'in anterolateralinden orjinal doğal sol testiküler arteri arkasından çaprazlıyor ve sol renal hilum'a uzanıyordu. Lateral mezonefrik arterlerden renal arterler gelişir. Eğer lateral mezonefrik arterlerden biri kalıcı olursa marenal arterlere ek olarak aksesuar bir renal arter oluşur. Bu anomali, renal transplamayı abdominal aortik anevrizma, üreter cerrahisi, böbreğin vasküler pedikülleri ve mezonefrik girişimler gibi abdominal bölgeye yapılan cerrahi girişimlerde önemli olabilir.

Anahtar Kelimeler: Mezonefrik Arter-Aksesuar Renal Arterler-Vaskule Varsayımlar.

not only of academic interest but may also be of practical importance either for the correct interpretation of radiological examinations, or for surgical interventions in this region. It is, therefore, of considerable practical importance for a surgeon to be as careful in dissecting peripheral fat over the renal polus as in dissecting the hilar region.

CASE REPORT

During the dissection of a 60-year-old male cadaver, a persistent mesonephric artery was encountered on the left side of the abdominal aorta. It originated in the lateral aspect of the abdominal aorta, 16 mm above the inferior

mesenteric artery and 18 mm below the left testicular artery. It crossed anterior to the vertebral column and posterior to the left testicular artery and ran upward to the renal hilum and perirenal areolar tissue and finished behind the left renal vein. There was also a small branch to the renal artery. The diameter of the persistent mesonephric artery was 1.3 mm and the length was 47 mm.

It supplied the loose areolar tissue in front of the renal hilum (Fig. 1a). Its small branch to the renal artery was possibly vas vasorum (Fig. 1b). A schematic representation of the case is shown in Fig. 2. The origins and courses of the testicular, renal and suprarenal arteries were normal and there were no other anomalies.

DISCUSSION

The arterial supplies of the suprarenal glands, kidneys and gonads derive from a network of arteries called the rete arteriosum urogenitale. As development proceeds, some of the aortic roots of the network degenerate in a caudal direction and the metanephros acquires its blood supply from the most caudal of the arteries. Thus, accessory renal arteries are the continuation of the mesonephric arteries. The lower renal pole is more frequently affected than the upper pole



Fig. 1B: The view of the rudimentary accessory renal artery after elevating left renal vein(arrow). AA= Abdominal aorta; K= Kidney; A= Renal Artery.

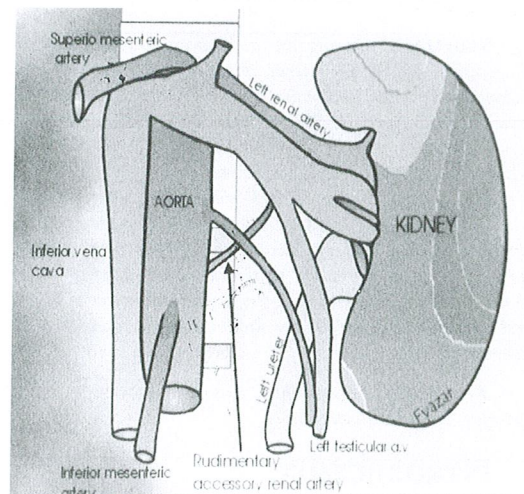


Fig. 2: Schematic representation of the case is shown in Figure 1A (arrow).

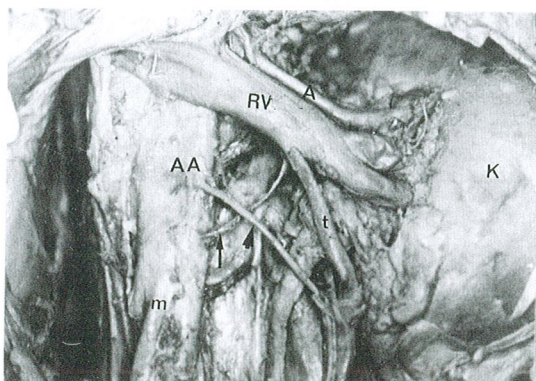


Fig. 1A: The accessory renal artery (arrow); AA= Abdominal aorta; K= Kidney; RV= Renal Vein; A= Renal Artery; t= testicular vein; ^= testicular artery, m= Superior mesenteric artery, U= Ureter.

(8,10,12). The origin of the accessory renal arteries is usually the abdominal aorta.

Among the reports on renal and gonadal arteries Merklin and Michels' (14) is one of the most detailed. Their series included 185 cases; they also discussed the literature, including 11,000 kidneys, and concluded that the inferior polar artery was of aortic origin in 5.5% of cases.

Nathan (16) reported a case in which the ovarian artery arose from the aorta at a higher

level than normal and an accessory renal artery of common iliac artery origin and a ptotic kidney with lateral malrotation were present. She stated that the probable cause of these anomalies was the persistence of the inferior renal artery, thus preventing the upward migration of the fetal kidney from the pelvic to the lumbar region. Aquino et al. (4) stated that 52 accessory renal arteries were documented in 37 patients (12%) during the endovascular repair of abdominal aortic aneurysm (AAA). They also said that exclusion of accessory renal arteries to facilitate endovascular AAA repair appears to be well tolerated and long-term sequelae seem infrequent and mild.

The lateral mesonephric arteries, approximately nine in an embryo of 18 mm, are divided into three groups: 1) the cranial group consisting of the 1st and 2nd arteries, which are located cranial to the celiac trunk and run dorsal to the suprarenal body; 2) the middle group consisting of the 3rd-5th arteries, passing through the suprarenal body; and 3) the caudal group consisting of the 6th-9th arteries, passing over the ventral side of the suprarenal body and forming the rete arteriosum urogenitale (9). If one of the lateral mesonephric arteries, in addition to the main renal artery, persists, then the result is an accessory renal artery. In relation to the present data the possible embryological explanation of our case is that one of the caudal groups of lateral mesonephric arteries persisted and developed as the rudimentary accessory renal artery.

Some authors have stated that similar anomalies in their cases may be important from the clinical point of view in that they may cause the following:

1. Varicocele (ovarian varicocele in females) secondary to compression of the renal vein by an arched gonadal artery (18),
2. Hydronephrosis due to occlusion or compression of the ureter by an inferior polar artery,
3. Nephroptosis and malrotation of the kidney associated with an inferior polar artery,
4. Arterial hypertension because of the constriction of renal arteries and subsequent renal ischemia,
5. The risk of infarction in a kidney during

urologic or oncologic surgical interventions and renal transplantations. Since the inferior polar artery is a segmental artery, the erroneous ligation or division of it is clearly hazardous as it may result in the necrosis of a segment of the kidney tissue (14,25).

To be aware of the facts concerning such a rudimentary accessory renal artery is of great importance in the following respects:

- a. repairing an aortic abdominal aneurysm,
- b. determining the gonadal arteries and having a crossing with testicular arteries, like in this case,
- c. being liable to be cut by mistake in abdominal surgery and cause bleeding,
- d. diagnosis in roentgenographic examining.

This anomaly is important in surgical procedures related to the posterior abdominal wall, renal transplantation, AAA, ureter surgery, and vascular pedicles of the kidney. It may also be of practical importance for correct interpretation of roentgenographic examinations in angiographic procedures.

In our case, the relationship between the accessory renal artery and testicular artery may be important surgically, especially in operative or postoperative bleeding. Furthermore, the potential collateral circulation between the abdominal aorta and left renal artery may be important in the obstruction of renal circulation.

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