

Malrotation of Left Kidney with Accessory Lower Renal Artery: A Case Report

Ashfaq Ul Hassan*, Ghulam Hassan**

Abstract

Malrotation is not a common condition in relation to kidney and can present with certain problems during different surgical procedures. A proper knowledge of Anatomy of Kidneys is important. The condition has been associated with many other clinical conditions like accessory or aberrant vessels and in relation to certain distinctive syndromes. We present a rare case of Malrotation of Left Kidney with Accessory Lower Renal artery.

Keywords: Metanephros; Kidney; Malrotation.

Introduction

Malrotation of kidney is an important embryological defect. They usually remain asymptomatic and silent and are incidental findings which are discovered during autopsies or dissection or radiological procedures performed on urinary system. The anomaly is frequently seen to be associated with Turner's Syndrome. An association with lobulated kidney, ectopic position of kidney and accessory renal arteries is also seen usually. The chances of hydronephrosis and stone formation are increased in malrotated kidneys.

Observations

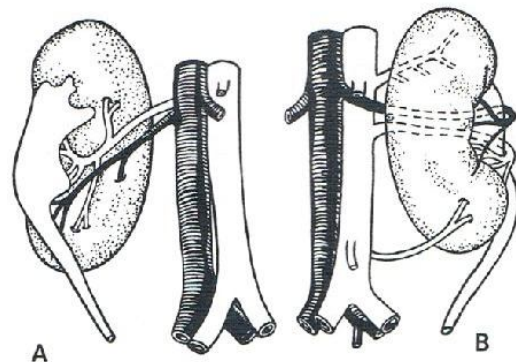
During Educational cadaveric dissection of an adult male, a case of non rotation of left kidney was encountered. In this case the

kidney was of normal appearance, non lobulated and in its normal position however an accessory renal vessel supplying the lower pole was present.

Discussion

The kidneys in humans develop from metanephros. Initially the embryonic kidneys

Fig 1: Kidneys are the organs which ascend early in their development. They begin to develop in the sacral region until they reach their final and normal position in abdomen. This ascent is accompanied by slight rotation of kidneys. Failure to do so can result in problems during radiological procedures, surgeries as well as association with certain other diseases.



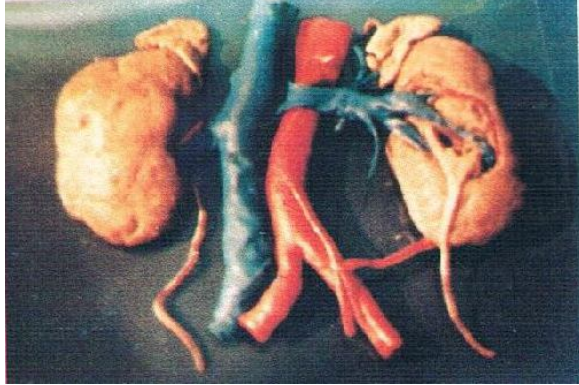
Author's Affiliation: *Lecturer, **Ex Prof and Head, SKIMS Medical College Srinagar Kashmir, India.

Reprint's request: Dr. Ashfaq Ul Hassan, MBBS, MS, Lecturer, SKIMS Medical College Srinagar Kashmir, India.

E-mail: ashhassan@rediffmail.com

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Fig 2: Malrotation of Left Kidney with accessory lower renal artery



are present in the Sacral region. The unique feature of the kidneys is that they ascend as well as undergo medial rotation. Failure to do so results in ectopic kidneys as well as malrotated kidneys.

The embryological development of the kidney results from the interaction between the mesonephric duct-derived ureteric bud, and the metanephros, the most caudal part of the nephrogenic cord. Development begins early in the 4th week of gestation and during the 6th and 8th weeks the lobulated embryonic kidneys ascend from the pelvic region upwards along the posterior abdominal wall to their normal position and undergo a 90% axial rotation from horizontal to medial. At the same time the ureteric bud divides sequentially to form the pelvicalyceal system. During the process of ascent from the pelvis, the kidneys derive their blood supply sequentially from vessels that are closest to them- initially median sacral, then common iliac and inferior mesenteric, and finally, the aorta. An ectopic kidney results from either incomplete, excess or abnormal ascent. If during the process of ascent the kidneys come into contact, a horseshoe kidney or crossed renal ectopia will result.

Normally the kidney rotates through 90° in the ventromedial direction. Felix (1912) postulated that the rotation is a result of unequal and differential branching of uretral tree as more parenchyma develops ventrally than dorsally thus the kidney rotates medially.

Errors in this normal physiological rotation give rise to various types of developmental anomalies described by Braasch[1] and Weyrauch[2] as non rotation, incomplete rotation, reverse rotation or excess rotation. In non rotation the renal pelvis presents itself ventrally in relation to kidney mass. In case of incomplete rotation the pelvis presents itself ventromedially whereas in excessive rotation which is rare the renal pelvis is ventro laterally placed and may assume any position depending upon degree of rotation.

According to Grays and Skandalakis the anomaly is frequently seen to be associated with Turner's Syndrome.[3]

Bilateral additional renal arteries and an additional right renal vein associated with unrotated kidneys have also been found.[4]

Bilateral malrotation and lobulation of kidney with altered hilar anatomy was also reported.[5] Here the renal pelvis was present anterior to the renal vessels instead of posterior position. The right kidney in addition showed lower lumbar position with three supplementary arteries and two veins. The right ovarian vein arched over the laterally rotated hilum of kidney and drained into superior renal vein instead of inferior vena cava.

As such in surgeries on kidneys which present with malrotation it is important to examine the position of kidneys with great care not only to establish the diagnosis but also to make sure that vessels vital to blood supply of kidneys are not damaged. Weyrauch suggested that anomalies of rotation are entirely compatible and may not present clinically, hence no attempt should be made to correct this rotation as it may lead to torsion of ureter causing functional disorders of kidney. According to Badenoch, the malrotations are of little significance but when not appreciated may give rise to difficulty in interpretation of pyelograms in what otherwise appears to be a normally functioning kidney.[6]

Conclusion

Though Malrotation can be clinically insignificant but as the non rotation may be associated with Accessory renal vasculature The importance of the Malrotation lies in realizing this anomaly in case of Renal Transplant Procedures, Surgeries on Aortic aneurysms, performing surgeries on Kidneys and interpretation of arterograms where it can pose a therapeutic and diagnostic challenge.

References

1. Braasch WF. Anomoluous renal rotation and associated anomalies. *J Urol.* 25: 9.
2. Weyrauch HM. Anomolies of Renal Rotation. *Surg Gynaec and Obst.* 68: 183.
3. Gray SW and Skandalkalis. The Kidney and Ureter. Embryology for Surgeons. Phildalephia: WB Saunders 2003: p 124-167
4. Bayramoglu A, Demiryurek D, Erbil KM. Bilateral additional renal arteries and an additional right renal vein associated with unrotated kidneys. *Saudi Medical Journal.* 2003; 24(5): 535-537.
5. Patil ST, Meshram MM, Kasote AP. Bilateral malrotation and lobulation of kidney with altered hilar anatomy. *Surgical and Radiologic Anatomy: SRA.* 2011; 33(10): 941-944.
6. Badenoch AW. Manual of Urology 2nd Edn. William Heinemann Medical Books Pvt Ltd.; 1974.