

A Case Report of Failure of Ascent of Left Kidney with Non-Rotation

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Abstract: Present study is a case observed in the Department of Anatomy at Indira Gandhi Government Medical College, Nagpur. During routine cadaveric dissection, a case of unilateral left ectopic kidney with non – rotation was found in about 65 yrs old male cadaveric body. Anomalies of kidney form a significant portion of congenital malformation. Anomalies may occur in the number, position, shape, size and rotation of kidney.

Keywords: Congenital malformations, Ectopic kidney, Rotational anomalies.

1. Introduction

During embryonic development, the fetal kidney first appears as buds inside the pelvis, near the bladder. As the fetal kidneys develop, they ascent gradually towards their normal position near the rib cage in the back. Sometimes, one of the kidney fails to complete the ascent and it may remain in the pelvis. Renal ectopia may present a diagnostic problem when acute disease develops in the kidney and there is always a danger that an unwary surgeon may be tempted to remove it as an unexplained mass. [1]

Ectopic kidney is a birth defect in which a kidney is located at an abnormal position. The frequency of ectopic kidney is 1:500 to 1:1100. ectopic thoracic kidney is 1:13000, solitary kidney is 1:1000, single pelvic kidney is 1:22000, one normal and one pelvic kidney is 1:3000. [Bergman-Ekcp] [2]

Each of the kidneys is situated retroperitoneal in the posterior abdominal wall by the side of the posterior abdominal wall by the side of the vertebral column and extends from T-12 to L-3 vertebrae. Right kidney is slightly lower than its left partner due to the presence of liver. [3]

Kidney develops between 4th to 12th weeks of intrauterine life. Developmentally at first the metanephric kidney lies in the pelvic cavity, opposite the sacral segments. Gradually it ascends and reaches the iliac fossa after crossing the pelvic brim. Finally, it appears on the diaphragm where its further ascent is arrested by the supra renal gland. By 7th week, the Hilum points medially and kidneys are located in the abdomen. The thoracic ectopic kidney with partial or complete renal protrusion above the level of the diaphragm into the posterior mediastinum is the rarest form of all ectopic kidneys. [4]

During the process of ascent from the pelvis, the kidney derives their blood supply sequentially from vessels that are closest to them. Initially median sacral than common iliac and inferior mesenteric and finally from the aorta. Simultaneously, there is degeneration of primitive lower vessels. Any failure of degeneration of primitive lower vessels in ectopic kidney which is caudal in position results

in origin of more than one accessory and polar renal artery. [5]

During ascent, the hilum of the kidney is directed ventrally. When it reaches the permanent position, kidney undergoes 90degree medial rotation around the vertical axis and the hilum turns medially. [2] Anomalies of structure and position of kidney are commonly reported. Rotational anomalies form a rare entity. Though rare there are wider implications of it in advanced surgical procedures and diagnostic evaluations of kidney donors.

2. Case Findings

During routine dissection an unascended left kidney with non – rotation was found. Location position and dimensions of the left kidney were analyzed and compared with the right.

Findings on right kidney: kidney was normal in position between T-12&L-1. It was bean shaped but had compensatory hypertrophy measuring about 13 cm vertically. 9 cm transversally and 3.6 cm antero-posteriorly. There was single right artery arising from abdominal aorta. Right gonadal vessels are normal.

Findings on left kidney: left kidney was situated at the level between L3 to S1 vertebrae. It was oval in shape measuring 12 cm vertically, 8 cm transversally and 4 cm antero-posteriorly, it was vertically oriented. Upper pole is at level of L3 vertebrae and lower pole at level of S1 vertebrae. Hilum face anteriorly and left renal artery arises from abdominal aorta.

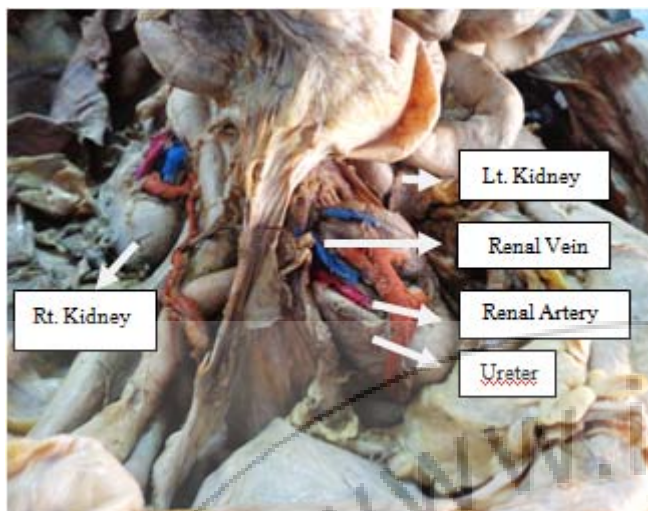


Figure 1: showing the findings of left and right kidney

3. Discussion

Unilateral ectopic kidney is common. Congenital pelvic kidney is commoner on right than on the left side. Muhammadasghar and Fidaullahwazir in their study for the prevalence of renal ectopia by diagnostic imaging found renal ectopia in 25% [0.2%] patients out of total 12000 patients with abdominal complaints. Out of 25 renal ectopia, 7 were on right side, 5 were left ectopic pelvic kidneys were found in only 2 cases. [6]

Belsare et al reported a similar case of ectopic pelvic kidney on the left side but in a female cadaver with enlarged uterus, displaced left ovary and multiple renal vessels on both the sides, variations in the aorta, inferior vena cava and in the gonadal vessels. [7]

Banner concluded that in case of females, the pelvic kidney may result in obstetric complications thus, in the present case most of the findings are in accordance with the present case. Most of the findings of Belsare et al expect that features of ectopic kidney with malrotation with vascular variation were found in a male cadaver. [7]

Sometimes excessive cranial ascent of kidney prior to diaphragmatic closure or delayed closure and maldevelopment of pleuroperitoneal membrane can lead to an ectopic thoracic kidney in 15,919 autopsies of children among which only one was intra thoracic kidney. [8]

Anomalies of rotation may be seen in normal as well as renal ectopia. [9] Four types of rotational anomalies have been identified. In non rotation, renal pelvis faces ventrally. In incomplete rotation, it presents ventromedially. In rare case, reverse and excessive rotation presents hilum faces laterally and presents itself in a position depending upon the degree of rotation. In present case, it is non rotation with hilum of ectopic kidney facing ventrally.

Kidneys in ectopic [pelvic] position are dysplastic and often non functional. They may go undetected in life and get noticed only after death either in autopsy or during dissection often they are diagnosed for presence of a pelvic

mass or on pyelogram. Ectopic or congenital unascended kidney has to be carefully differentiated from [acquired] nephroptosis where the length of the ureter is normal. Symptoms due to ectopic kidney may vary from none to pain, hydronephrosis, pyelonephritis, reno sigmoid fistulae or lithiasis [gray and skandalsasi] 1972

Treatment is mainly based on the functional capacity of the kidney, nephrectomy being done on non rotational kidneys and corrective procedures forming the main line of treatment for the functional kidneys. [10]

An ectopic kidney may not cause any symptoms and may function normally, even though it is not in its usual position. Many people have an ectopic kidney and do not discover it until they have tests done for other reasons. Sometimes, a doctor may discover an ectopic kidney after feeling a lump in the abdomen during an examination. In other cases, an ectopic kidney may cause abdominal pain or urinary problems. When a kidney is out of the normal position, drainage problems are likely. Sometimes urine can even flow backwards from the bladder to the kidney, a problem called vesicoureteric reflux, or simply "reflux". Abnormal urine flow can set the stage for some of the problems associated with ectopic kidney. [11]

4. Conclusion

Ectopic kidneys with their atypical locations, malrotation and vascular peculiarities have a major clinical significance. In addition to the routine contrast x-rays i.e. intravenous pyelogram and ascending pyelogram the modern methods of investigations such as ultrasonography (USG), computer tomography (CT) and magnetic resonance image (MRI) scan etc are very useful to diagnose the ectopic kidney. Hence, the knowledge regarding these anatomical variations is not only important for anatomists but also for urologists in kidney transplantation, percutaneous nephrectomy and other surgical procedures. It is also important for interventional radiologists in investigatory procedures. [12]

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