Available online at **www.ijmrhs.com**

ISSN No: 2319-5886

International Journal of Medical Research & Health Sciences, 2018, 7(5): 83-87

Unilateral Left Renal Agenesis Associated with Congenital Agenesis of Vas Deferens and Seminal Vesicle: A Case Report

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ABSTRACT

Unilateral agenesis of kidney is a defect in the development associated with anomalies of genitourinary system such as unilateral or bilateral absence of vas deferens and seminal vesicle. Here we present a case of unilateral agenesis with genital anomalies.

Keywords: Unilateral renal agenesis, Absent vas, MRI, Reproductive organ imaging, Congenital anomalies

INTRODUCTION

Renal agenesis is often found congenital; anomaly which may be unilateral or bilateral [1,2]. Unilateral renal agenesis is an ancillary finding with opposite kidney showing the compensatory hypertrophy [3-5]. Unilateral; renal agenesis may be linked with ipsilateral abnormalities of urogenital organs. This is due to common origin from the intermediate mesoderm [6-8]. Congenital unilateral renal agenesis occurs in 0.99-1.8 per 1000 autopsies and usually diagnosed on as incidental imaging examination. Genital anomalies occur in 37-60% of females and 12% of males with unilateral renal agenesis [9]. In males with renal agenesis the ipsilateral testis is normal but there may be agenesis of part of epididymis, vas deferens, seminal vesicles, and ejaculatory duct [10-12]. Congenital absence of epididymis and vas deferens occur in up to 15 of men and may be linked with cystic fibrosis transmembrane conductance regulator (CFTR) mutation or in 79% of cases, renal agenesis [13,14]. Seminal vesicle unilateral agenesis is observed in 0.6% to 1% of cases; and may also co-exist with by reno-ureteral malformations [15-17]. Seminal vesicle agenesis does not occur as a seclude phenomenon. It can have seen associated with unilateral or bilateral agenesis or ectopia of vas deferens. And if it occurs before 7th week of gestation i.e. before the urethral budding the patient will have associated ipsilateral renal agenesis [18-20]. Congenital absence of seminal vesicle is an unusual anomaly that subscribes to male sterility [21]. Here we present a case of agenesis of left kidney with ipsilateral agenesis of vas deferens and seminal vesicle

CASE REPORT

A 28-year-old male patient presented with pain in upper abdomen. There was no history of fever, vomiting, diarrhea, or urinary symptoms. Physical examination revealed a healthy looking male with all parameters normal.

On examination the abdomen was soft, non-tender, no rigidity, no guarding. Vitals were stable. An ultrasound examination was ordered to know the cause of pain. The ultrasonography examination revealed absence of left kidney in the left renal fossa. No other signiicant abnormality was found. Patients pain responded to buscopan and anti-peptic medication. However, for non-visualization of left kidney MRI abdomen study was ordered.

MRI study also showed the absence of left kidney in left renal fossa or elsewhere in the abdomen (Figures 1 and 2). Right kidney, right seminal vesicle, and right vas deferens were present with no anomaly. Right kidney showed slight hypertrophy.

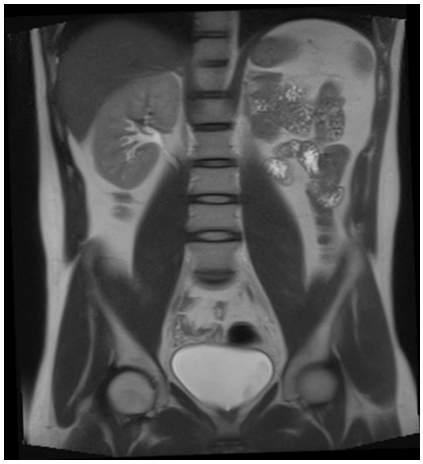

Figure 1 Coronal Trufi images shows absence of left kidney in left renal fossa which is occupied by small bowel loops

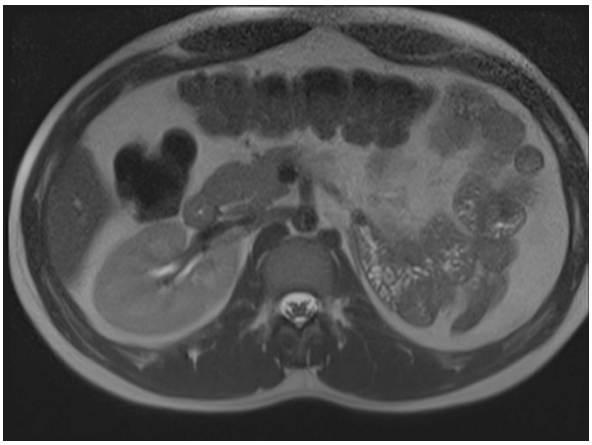

Figure 2 Axial Trufi images shows the same

During MRI examination it was noticed the patients left seminal vesicle, as well as left vas deferens, was not visualized which was suggestive of agenesis (Figures 3 and 4).

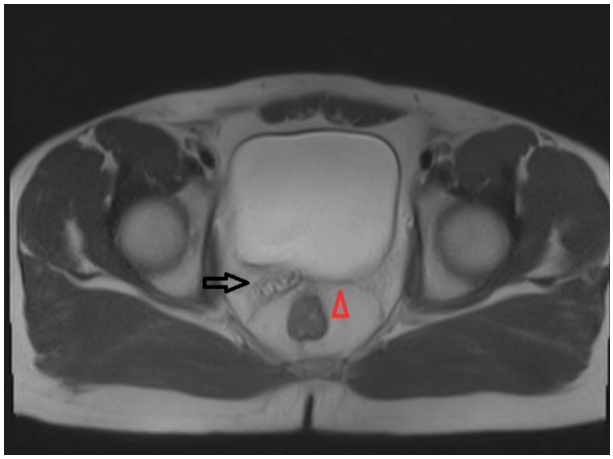

Figure 3 The arrow with black outline shows normal right seminal vesicle whereas the red triangle shows absent left seminal vesicle

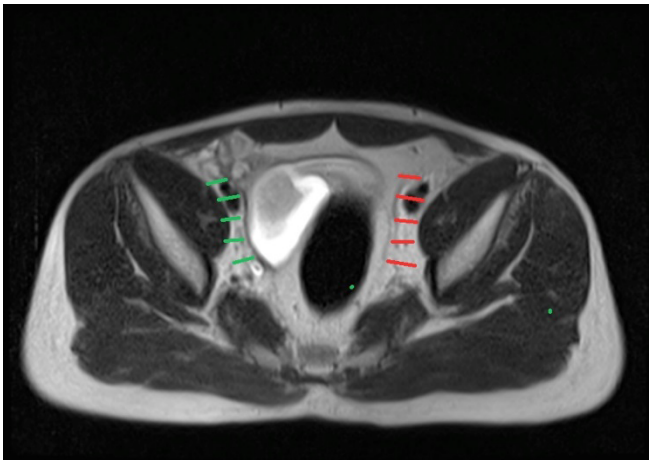

Figure 4 The green line shows black linear structure suggestive right vas deference whereas the red lines mark the absence of left vas deference where it should have seen

DISCUSSION

Renal agenesis may be unilateral or bilateral [10]. Renal agenesis is generally thought to result from a lack of induction of metanephric blastema by the ureteral bud, which may be coming after ureteral bud imperfect development or due to a problem with the formation of the mesonephric duct. Less commonly after birth involution of multicystic dysplastic kidneys results in sole kidney [4,6]. In the present case, the absence of metanephric blastema and failure of induction of ureteric bud could have resulted in left renal agenesis.

The renal agenesis could be also due to the absence of transcription factor (WT1) that influences growth factor FGF-2 and BMP-7 to prevent apoptosis of metanephric cells or failure to convert metanephric cells into nephric epithelium by serving genes PAX2 and WNT4 from the ureteric bud [6,22].

The presence of sole kidney usually is not detected, but sometimes is detected by chance during ultrasound [69]. In the present case too, it was an accidental inding during ultrasonography.

The left kidney is more commonly involved than right and males are affected more than females [9,23]. In the present study, there was agenesis of left kidney in a male patient.

Renal agenesis is associated with other congenital anomalies like imperfect development of Mullerian duct, unilateral or bilateral agenesis if vas deferens, seminal vesicle, hemi or complete absence of trigone of urinary bladder [6,8]. In our case, MRI report showed agenesis of ipsilateral vas deferens and seminal vesicle. No anomalies of urinary bladder were noticed. This indicates that there is an imperfect development of mesonephric duct of the left side.

Seminal vesicle anomalies are rare and poorly known, causing male infertility in 2% of cases. Pelvic MRI is required when an ultrasound is inadequate [15]. In our case also for non-visualization of left kidney pelvic MRI was done to rule out any ectopic position of the left kidney but it disclosed the agenesis of vas deferens and seminal vesicle of the same side.

Anomalies of seminal vesicle and vas deferens are twined together. In fact, in patients with congenital bilateral absence of vas deferens, bilateral seminal vesicle agenesis was found in 23% to 43% of cases and unilateral seminal vesicle agenesis in 27% to 50% of cases [15,24,25]. Also, patients with congenital unilateral absence of vas deferens presented with ipsilateral seminal vesicle agenesis in 71% to 90% of cases. Moreover, it is well proved that if an embryological event that causes damage to the fetus before 7 weeks of gestation when the ureteric bud separates from the mesonephric duct, seminal vesicle agenesis may be associated with renal agenesis. To carry out a renal ultrasound is therefore mandatory in case of seminal vesicle agenesis [15].

Embryological Basis

Although exact set of causes is unknown there are various theories put forward to explain the renal agenesis [1]. The development of urinary tract follows a logical and racially balanced developmental process of the primitive renal

elements. Abnormalities of this system results from the defects occurring during embryogenesis between 15 and 94 days of fetal life. Influence of environmental factors such as maternal illness and exposure to toxic agents as well as the genetic factors around this period result in the malformations of this system [9,24].

Embryologically male genitourinary system is acquired from mesonephric of Wolffian duct and is under the impact of testosterone from fetal testis. The Wolffian duct derivatives include epididymis, rete testis, vas deferens, seminal vesicle, ejaculatory duct, trigone of urinary bladder. Ureteric buds derived from mesonephric fuse with the metanephros at 32 days to begin nephrogenesis. Thereafter unilateral renal agenesis could be due to the non-appearance of metanephric blastema, ureteric bud maldevelopment or lack of induction of the metanephros by the ureteral bud [1,21,25]. Since the development of urinary bladder may be associated with ipsilateral urogenital anomalies and complete failure of the mesonephric duct to develop will result in failure of development of its derivatives [1,21,25,26].

This suggests that in our case the entire region of the urogenital ridge formed from the intermediate cell mass of secondary mesoderm and the mesonephros could account for the failure for ipsilateral renal, seminal vesicle and vas deferens.

CONCLUSION

Although unilateral renal agenesis is common; its definitive etiology is unknown. Unilateral renal agenesis may be associated with urogenital defects as seen in the present case. MRI can show accurately the anomalies of vas deferens and seminal vesicle; thus, MRI should be considered as the better tool for such diagnosis.

The patients with unilateral renal agenesis should be also screened for the anomalies of vas deferens and seminal vesicle; or else the surgeons encountering an absent vas deferens while undertaking a unilateral inguinal hernia repair must remember to assess the patient for other associated anomalies also such as; renal agenesis or seminal vesicle agenesis.

DECLARATIONS

Consent for Publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Conflict of Interest

The authors have disclosed no potential conflicts of interest, financial or otherwise.

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