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RESEARCH ARTICLE

EMBRYOLOGICAL CORELATION AND CLINICAL PERSPECTIVES OF UNILATERAL AGENESIS OF KIDNEY AND URETER IN FETUS

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ABSTRACT

Birth defects are the leading cause of infant mortality accounting for approximately 21% of infant death rate. Developmental anomalies of the urogenital system is one of them, and of paramount clinical importance. About 100 foetuses of age groups four months to nine months of intrauterine life were collected from local hospitals at Kakatiya Medical College, Warangal, Andhra Pradesh and preserved in 10%formalin. After making an incision in the anterior abdominal wall. The abdomen was eviscerated. The posterior abdominal wall and the excretory organs were exposed on both the sides. Out of 100 foetuses observed, in one foetus (Male, aged 20 weeks) the left kidney, the left ureter and the left renal artery were absent. The foetus had a normal right kidney, right ureter and right renal artery. In conclusion**,** Renal agenesis is the consequence of failure of development of the ureteric bud.

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INTRODUCTION

Kidneys are vital organs of the body. The kidneys develop from the intermediate mesoderm. They appear in the fifth week and develop in the following sequence-Pronephros, Mesonephros, and Metanephros among which only the Metanephros remains and develops into a functional kidney. The ureter develops from the ureteric bud, an outgrowth of the mesonephric duct. Abnormality of kidneys and ureters occurs in 3 to 4% of the newborn infants. Unilateral renal agenesis is relatively common occurring once in every 1000 newborns, and more often in males than in females and Left kidney has been more frequently absent than the right kidney (Keith L Moore and Persaud, 2003). Absence of kidney, ureter and renal artery on one side is a congenital anomaly with significant consequences.

MATERIALS AND METHODS

One hundred foetuses between age groups of four to nine months were collected at Kakatiya Medical College, from various hospitals in Warangal, Andhra Pradesh, India.

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Approval for the study was obtained from the Institutional review committee. All foetuses were either stillborn or aborted. 50cc of 10% formalin was injected into the abdomen of all fotuses and they were subsequently preserved in 10% formalin.

A median incision extending from xiphisternal joint to superior margin of pubic symphysis, and a transverse incision extending from xiphisternal joint until the midaxillary line was made. Lower down a transverse incision extending from superior margin of pubic symphysis along the line of inguinal ligament to the highest curvature of iliac crest was made. The incision was then extended into all the layers of the anterior abdominal wall, and flaps were reflected laterally to expose the abdominal organs. The abdomen was eviscerated (Liver, stomach, Spleen, small intestine, large intestine, Duodenum and Pancreas were removed). The excretory organs on both sides were exposed. The solitary right kidney, right ureter and urinary bladder were painted using oil paint after drying the specimen.

RESULTS

Out of 100 specimens observed, in one male foetus aged about 20wks the left kidney, left ureter and the left renal artery was absent (Fig. 1). There was a single opening of right ureter in the trigone of the urinary bladder. The gonads were normal.

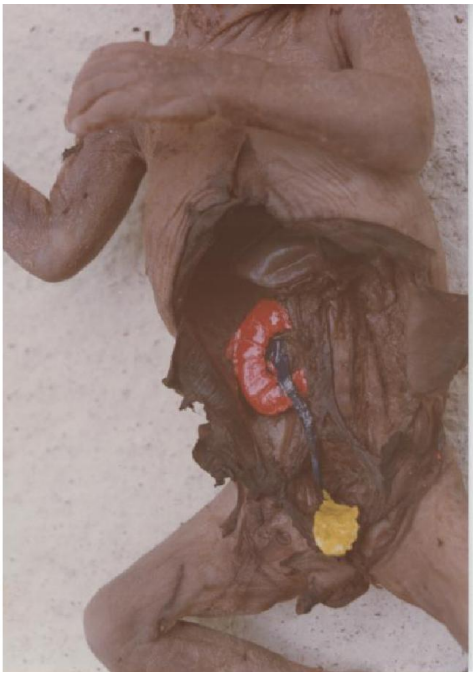

Fig. 1. Male foetus of age 20 weeks with solitary right kidney and withoutleft kidney, left ureter and left renal artery

DISCUSSION

Kiprov *et al*. (1982) conducted autopsy on 9200 individuals and have reported seven cases of unilateral agenesis. In majority of cases of renal agenesis, ureter is missing and this was true in more than three fourths of cases. (Mays, 1946). In unilateral renal agenesis, vas deferens and seminal vesicle on the affected side were lacking, although testes and small part of epididymis were present in a case described by Daseler and Anson (1943). In females with unilateral renal agenesis, tube and ovary of one side may be absent (Lyon, 1917), or there may be general agenesis of vagina and hypoplasia of ovaries, tubes and uterus, (Drummond and Palmer, 1939). Renal agenesis is the consequence of failure of differentiation of metanephric blastema during the 25th to 28th day of development. It is usually though not always due to failure of development of the ureteric bud. It may also occur if ureteric bud fails to contact or induce the metanephric mesoderm. Along with this frequently associated maldevelopments of the genital system may be present (Sadler, 2000). Children born with a solitary functioning kidney show a high incidence of congenital anomalies of the kidney and urinary tract (CAKUT), which can further compromise renal function (Rik *et al*., 2011). Ultrasound study of the kidneys of parents, sibs, and other relatives is always recommended in all families where an individual with unilateral or bilateral renal agenesis is detected (Pherson *et al*., 1987), as renal agenesis can be familial and inherited as a dominant trait with incomplete penetrance and variable expression (Arfeen *et al*., 1993). In individuals born with a solitery kidney, 40% had associated urologic anomalies in the renal collecting system of the solitary Kidney. All children that are born with solitary kidney should undergo a screening voiding cystourethrography (VCUG) even in the absence of hydronephrosis or UTI, as early recognition and treatment is essential to decrease the long-term risk for renal damage (Kanayema *et al*., 2004). It was also reported by Argueso *et al*. (1992). That patients with unilateral renal agenesis and a normal solitary kidney are at increased risk of proteinuria, hypertension, and renal insufficiency. To prolong renal preservation, careful follow-up is mandatory.

Conclusion

Early recognition and treatment of urological anomalies in a patient with solitary kidney and ureter are imperative to decrease the long term risk of renal enlargement. Non invasive techniques like ultrasonography can diagnose this condition in utero.

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