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CASE REPORTS

Prenatal Diagnosis, Multimodality Workup and Postnatal Follow Up of Fetal Pancake Kidneys: A Rare Case Report

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Abstract Pancake kidney results from failure of the kidneys to ascend, which may lead to fusion of the two renal masses. Reviewing the literature, this is the first case of antenatal diagnosis from India. No other associated extrarenal abnormalities were found. Postnatal follow up was also performed which confirmed the antenatal diagnosis.

Keywords Congenital anomalies of kidney and urinary tract · Pancake kidney · Prenatal diagnosis · Prenatal ultrasound

Introduction

During embryonic life, the metanephric kidneys are located in the pelvis close to each other and anterior to the sacrum. After the eight week of gestation, the kidneys ascend and reach a more cranial level until the ninth week, at which time the adult position is attained. After this, both the kidneys rotate medially, resulting in the hilum facing anteromedially. Ectopic kidneys result from improper ascent during embryonic development. A single renal mass develops when there is a complete medial fusion of the metanephric blastema at an early embryonic stage. Another theory suggests that during the process of ascent from the pelvis, the nephrogenic primordials are pressed together by the umbilical arteries, resulting in fusion of the two masses [1, 2]. Pancake kidneys are usually drained by two separate ureters that originate from the ureteric buds. These enter the bladder in a normal relationship [1, 2]. However, there has been a case study that reported drainage by a single ureter [3].

In literature very few cases of Pancake kidneys are reported. Miclaus et al [4] estimated that 1 per 65,000 to 375,000 individuals are affected. Many times Pancake kidneys are often misdiagnosed as Horseshoe kidneys, which in a way explains the wide incidence range of diagnosis.

Postnatal literature regarding Pancake Kidneys is quite scarce, and most of the published data are also case reports [3, 5–16]. Reviewing the literature, we did not encounter any case report from India.

Case Report

A 30 week second gravida, was referred to our department for a routine antenatal Ultrasound. Ultrasound showed empty renal fossae, normally located adrenal adrenal glands (Fig. 1) and a single renal mass located in a central position in the fetal pelvis (Fig. 2). They were seen to be fed by iliac vessels (Fig. 2). Both renal arteries were absent from their normal location (Fig. 3). A thorough scan could not diagnose any extrarenal anomalies. Fetal MRI was also performed which confirmed the diagnosis of Pancake kidney in the fetal pelvis, lying posterior to the urinary bladder (Figs. 4 and 5), and ruled out any other major craniospinal anomaly.

A postnatal follow up ultrasound scan was performed at 10 months, which confirmed the antenatal findings. A pancake kidney was seen behind the urinary bladder, near the uterus, with color flow from the iliac vessels (Fig. 6). Ultrasound of the 7 year old elder sibling, and both parents was normal. High resolution microarray of the baby was done.

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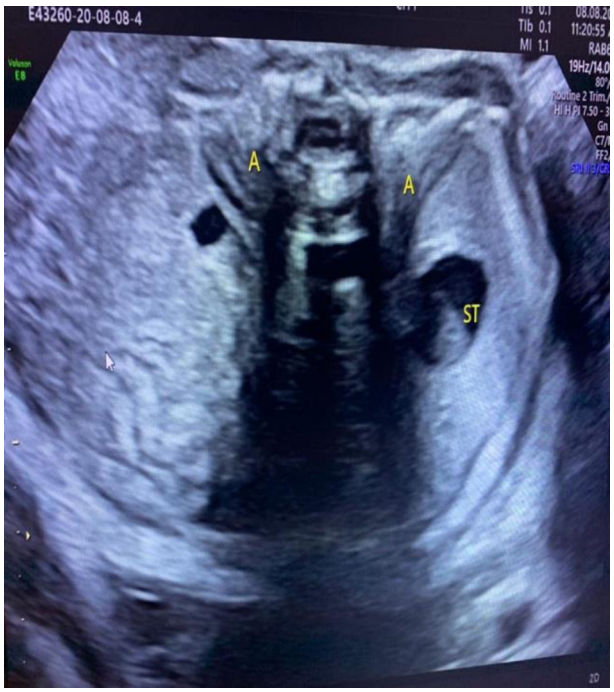

Fig. 1 Ultrasound image shows normally located adrenal glands (A) and the stomach (ST). Renal fossae were empty and kidneys were not visualized in their normal locations

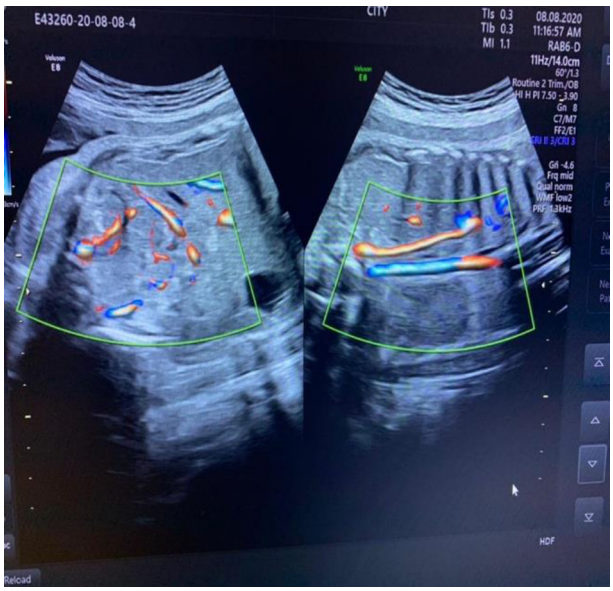

Fig. 3 The origin of normal renal arteries from the abdominal aorta is absent

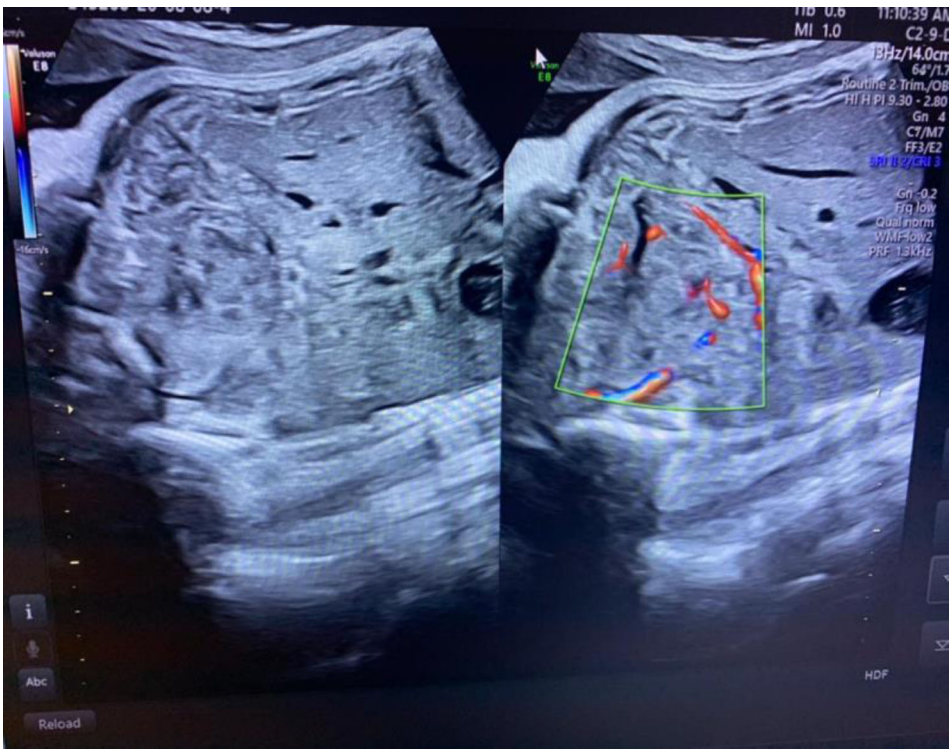

Fig. 2 There is a single common large renal mass located in the fetal pelvis occupying a central position. On color doppler, it is seen to be fed by the iliac arteries

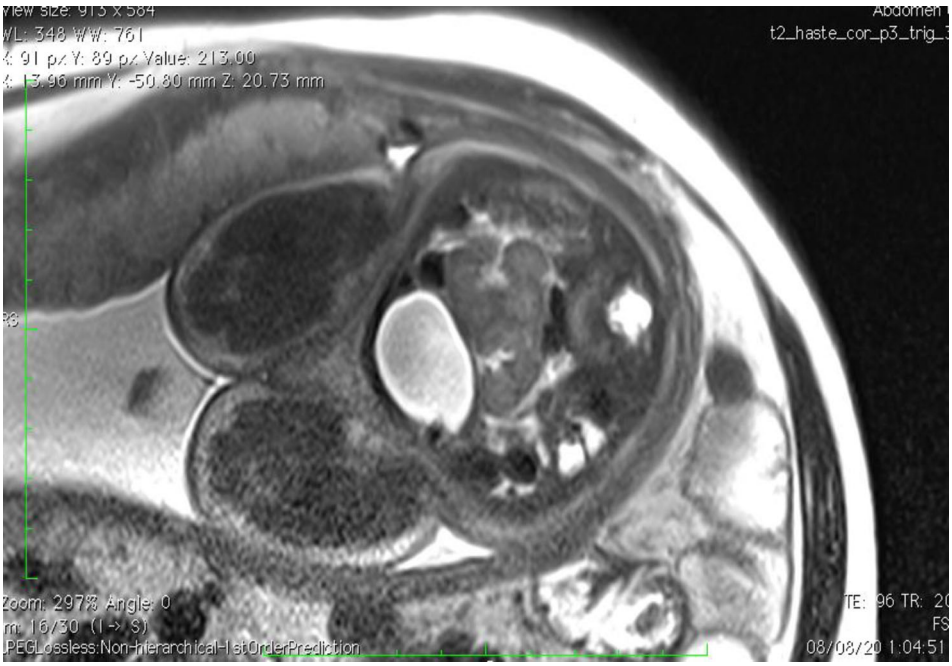

Fig. 4 MRI of the same fetus in an axial and coronal plane shows a centrally placed fused pancake kidney lying in the pelvic cavity, posterior to the urinary bladder

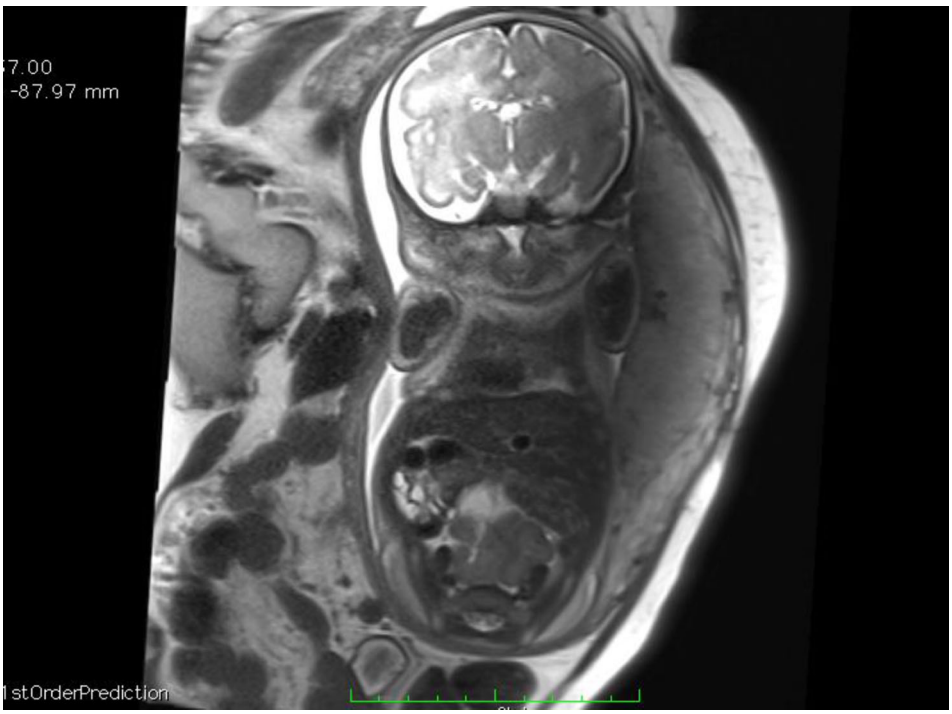

Fig. 5 MRI of the same fetus in an axial and coronal plane shows a centrally placed fused pancake kidney lying in the pelvic cavity, posterior to the urinary bladder

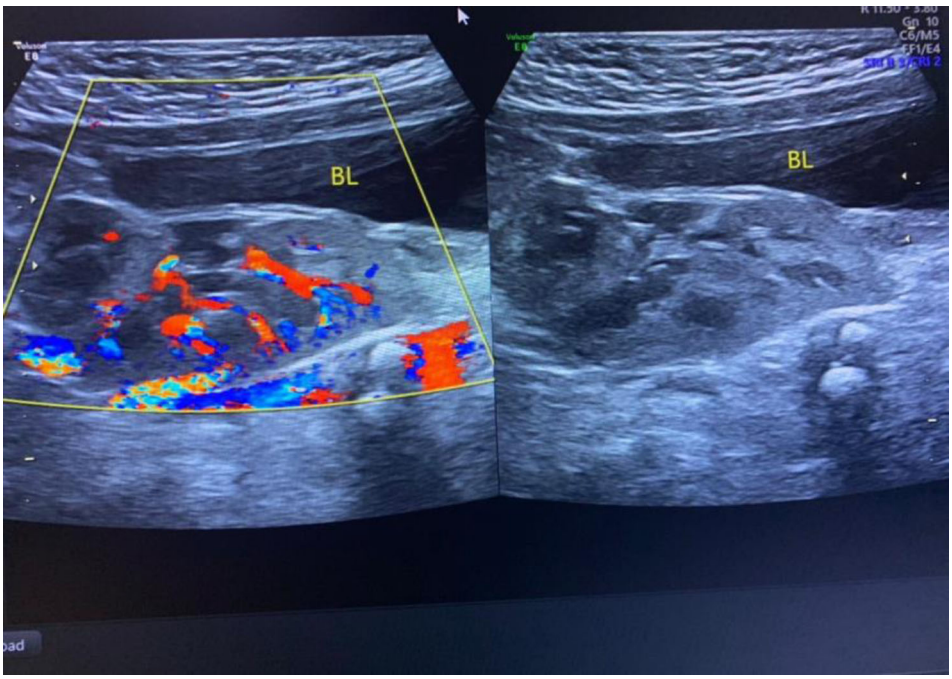

Fig. 6 Postnatal ultrasound confirms prenatal findings, showing a fused pancake kidney in the pelvic cavity with blood supply from the iliac arteries

Discussion

Prenatal diagnosis of pancake kidney is an important diagnosis, and despite the dramatic ultrasound findings, the postnatal outcome is good. Postnatally, it may be confused with the diagnosis of horseshoe kidney. However, the horseshoe kidney has two separate pelvicalyceal systems and is located higher up (cranial migration is limited by the inferior mesenteric artery) as compared to the pancake kidney which presents as a single mass around the urinary bladder.

Previous studies had reported a high incidence of associated urological abnormalities in renal fusion anomalies; the most common abnormality was a vesico-ureteral reflux. [17–20].

Only recently, a retrospective case series of 6 cases have been published by Perlman S et al. [21]. In their series, out of the 5 cases in which chromosomal microarray was performed, only 1 case showed deletion at 15q11.2 in the fetus and his father. In our case, chromosomal microarray was normal. Also, positive family history of renal anomalies was found in 2 of 6 cases. In our case, there was no family history of any such renal anomalies.

Summary

Fetal pancake kidneys are a rare congenital renal abnormality with very few published case reports in the literature, this being the first case report from India. A multimodality imaging approach and postnatal follow up assessed and confirmed the diagnosis.

Declarations

Conflict of interest There is no conflict of interest.

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