Antenatal Ultrasound Diagnosis of Fetal Horseshoe Kidney

Karen L. King, RDMS, Alexander D. Kofinas, MD, Nicholas V. Simon, MD, Diane Clay, RDMS

Horseshoe kidney occurs in 1 in 400 persons.[1] Despite its relative frequency, to our knowledge horseshoe kidney has never been reported to be diagnosed prenatally. The following report presents prenatal ultrasonographic findings of an isolated horseshoe kidney.

CASE STUDY

The patient is a 22 year old white woman, gravida 2, para 1, who was referred to the antenatal testing unit of York Hospital at week 34 of fetal development for ultrasonic evaluation of growth. An early pregnancy sonographic examination performed at another institution was reported to be normal. Evaluation of the urinary tract with high resolution ultrasound equipment (Toshiba 270 A-Sonolayer, Tokyo, Japan) revealed an abnormality of the fetal kidneys. Coronal images showed what appeared to be an extension of renal parenchyma joining the lower poles of the two kidneys (Fig. 1). In transverse images, this bridge of tissue appeared anterior to the aorta, connecting the two kidneys at the lower pole (Fig. 2). No other abnormalities were observed. A diagnosis of horseshoe kidney was made and a postnatal sonographic examination confirmed this finding.

DISCUSSION

Horseshoe kidney is a result of fusion of the upper or lower poles of the kidneys occurring between 4 and 6 weeks of fetal development, before the kidneys have migrated upward and rotated on their long axis. Thus, the pelves and ureters usually face anterior and cross ventral to the isthmus. The renal vasculature varies greatly, depending on the exact location of the kidneys.[2]

Horseshoe kidney frequently is associated with other congenital anomalies, including urogenital, central nervous system, cardiovascular, gastrointestinal, musculoskeletal, and chromosomal abnormalities.[3,4] In one study,[4] the percentage of associated congenital malformations in stillborn fetuses, neonates, and infants was 78.9% but was considerably lower in children (28.5%). In adults the incidence of associated anomalies is only 3.5%, suggesting that horseshoe kidney occurs more often with severe lethal anomalies. In only 5% of cases was death attributable to disease of the malformed kidney. Other studies have shown that the horseshoe kidney without anomalies in other systems rarely has fatal consequences.[5]

In addition to associated congenital anomalies, the horseshoe kidney may present some other clinical problems. These malformed kidneys may remain asymptomatic and are capable of normal function because the collecting system usually develops normally and the ureters usually enter the bladder normally. However, horseshoe kidneys are associated with a higher prevalence of renal calculi, chronic urinary tract infections, and hydronephrosis.[7] The high rate of stone formation is probably attributable to poor drainage from the renal pelvis and infection resulting from the anomalous relation of the renal pelvis and ureter.[5]

The ability to make a prenatal diagnosis of horseshoe kidney depends totally on the way the kidneys are imaged. A single transverse view or even sagittal paraspinal views is very likely to miss the abnormal kidney. However, when both multiple transverse views at different levels between the upper and lower renal poles and coronal views of both kidneys are obtained,

Received February 20, 1991, from the York Hospital, York, Pennsylvania. Revised manuscript accepted for publication April 29, 1991.

Address correspondence and reprint requests to Dr. Kofinas: York Hospital, 1001 South George Street, York, PA 17405.

J Ultrasound Med 10:643–644, 1991

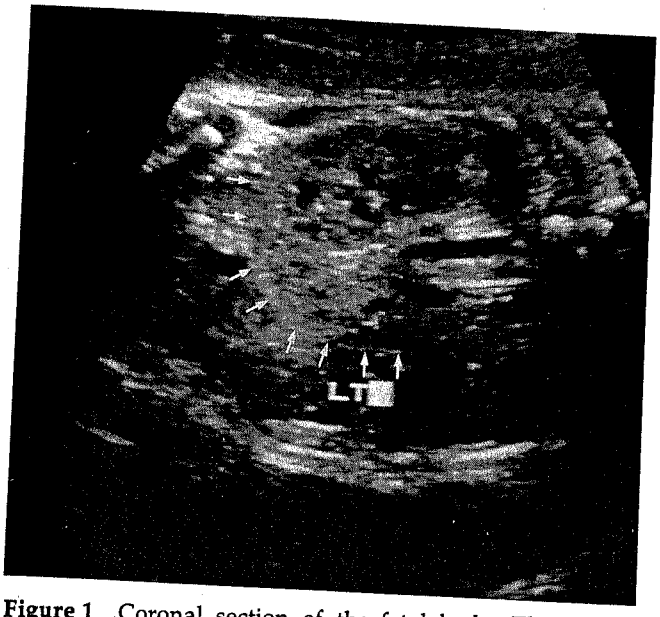

Figure 1 Coronal section of the fetal body. The arrows outline the renal parenchyma that connects the right and left kidneys. LT, Left side of fetal body.

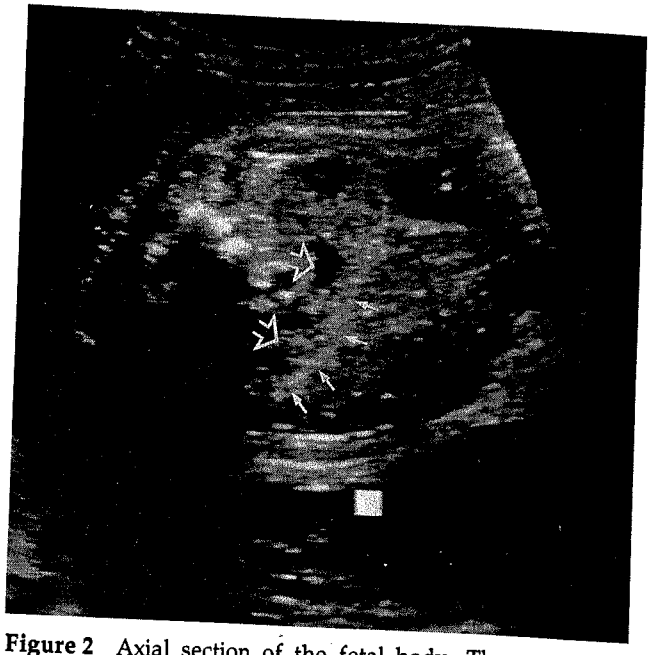

Figure 2 Axial section of the fetal body. The connecting renal parenchyma (*small arows*) and two collecting systems (renal pelves) (*open arrows*) are seen.

very likely most of the cases will be diagnosed antenatally during routine sonography.

Prenatal diagnosis of isolated horseshoe kidney should not affect the obstetrical management of the particular case. Knowledge of the condition however, should mandate appropriate urologic follow up during postnatal life to prevent significant renal morbidity.

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