Prenatal Diagnosis of Pierson Syndrome Caused by a LAMB2 Variant in a Fetus with Bilateral Enlarged Hyperechoic Kidneys

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Dear Editor,

Increased echogenecity of fetal kidneys is identified in the second or third trimester of pregnancy when renal parenchymal echogenecity is greater than that of the liver beyond 17 weeks of gestation. It is a multifactorial response to various alterations in the structural development of the kidney. We here report the fetal case of Pierson syndrome who presented with bilateral renal enlargement with hyperechogenicity and was confirmed by using prenatal exome sequencing (ES).

This was the first pregnancy of an otherwise healthy nonconsanguineous couple of Chinese origin. Both partners had a nonsignificant medical or family history. The first trimester ultrasound was normal with a nuchal translucency measurement of 1.0 mm. The cell-free DNA screening test was negative. The routine second trimester ultrasound at 20 weeks showed bilateral enlarged kidneys with hyperechogenicity of the parenchyma similar to the bone tissue [Figure 1]. Corticomedullary differentiation was noticed, and no cystic features or pyelectasis were seen. The urinary bladder and quantity of amniotic fluid were normal. Differential diagnosis of autosomal dominant or recessive polycystic kidney disease was discussed. Amniotic fluid cytomegalovirus (CMV) polymerase chain reaction and chromosomal microarray were both negative. Rapid trio ES revealed a homozygous variants c. 5135_515343del, p. (Thr1712SerfsTer103) (variant of uncertain significance, but leaning toward likely pathogenic) of the *LAMB2* gene in the fetus, inherited from both parents. Null variants in *LAMB2* cause Pierson syndrome, a severe congenital nephrotic syndrome with ocular and neurological defects.[1]

The pregnancy was terminated at 24 weeks with the ES result availability. The aborted female fetus showed normal appearance. Only a postmortem kidney biopsy was allowed by the parents. The histopathological diagnosis was glomerulosclerosis, tubular dilatation, and diffuse mesangial sclerosis [Figure 1], in concordance with classic histopathologic findings of Pierson syndrome.

Isolated bilateral hyperechoic kidneys (HEK) on prenatal ultrasound presents diagnostic, prognostic, and counseling challenges.[2] Prognosis ranges from normal outcome to lethal postnatally. However, isolated HEK combined with renal volume enlargement is highly suggestive for kidney diseases. The most commonly identified etiologies are autosomal recessive and autosomal dominant polycystic kidney disease and microdeletions at 17q12 involving *HNF1B*.[3,4] Positive family history are the useful indicators of etiology. Kidney involvement is an indispensable finding in patients of Pierson syndrome. Notably, it has the same prenatal renal features as that of common polycystic kidney disease, as evidenced by our case. Pierson syndrome should thus be included in the differential diagnosis in fetuses with bilateral enlarged HEK despite that it is rarely reported prenatally.[5]

Because of its prognostic relevance, it is important to diagnose Pierson syndrome in utero. Renal sonographic findings are not specific for underlying etiology. Our case report suggests that while fetuses with large HEK and severe oligohydramnios are likely to have a poor outcome, the prognosis is not necessarily good when amniotic fluid volume is normal. A workup including diagnostic genetic testing on a fetal sample is indicated following an ultrasound diagnosis of fetal HEK. The present report is the first description of a fetal presentation of Pierson syndrome with a *LAMB2* cause detected by prenatal exome investigation.

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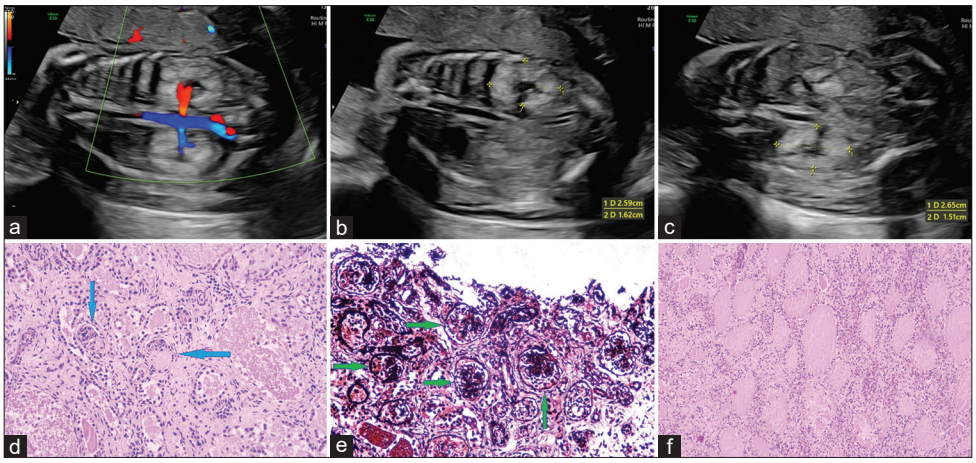

Figure 1: A case of Pierson syndrome diagnosed in utero. Prenatal ultrasound showed bilateral enlarged hyperechoic kidneys (a-c) at 20 weeks of gestation. Renal pathologic studies show focal segmental glomerulosclerosis with hyalinosis (arrow) (H and E., ×40) (d), increased basement membrane and mesangium (arrow) (Silver stain, ×40) (e), and tubular ectasia (H and E., ×40) (f)

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent form. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

References

1. Minamikawa S, Miwa S, Inagaki T, Nishiyama K, Kaito H, Ninchoji T, *et al.* Molecular mechanisms determining severity in patients with Pierson syndrome. J Hum Genet 2020;65:355-62.
2. Yulia A, Napolitano R, Aiman A, Desai D, Johal N, Whitten M, *et al.* Perinatal and infant outcome of fetuses with prenatally diagnosed hyperechogenic kidneys. Ultrasound Obstet Gynecol 2021; 57:953-8.
3. Shuster S, Keunen J, Shannon P, Watkins N, Chong K, Chitayat D. Prenatal detection of isolated bilateral hyperechogenic kidneys: Etiologies and outcomes. Prenat Diagn 2019;39:693-700.
4. Digby EL, Liauw J, Dionne J, Langlois S, Nikkel SM. Etiologies and outcomes of prenatally diagnosed hyperechogenic kidneys. Prenat Diagn 2021;41:465-77.
5. Mardy AH, Chetty SP, Norton ME, Sparks TN. A system-based approach to the genetic etiologies of non-immune hydrops fetalis. Prenat Diagn 2019;39:732-50.