CASE REPORT

Autosomal Recessive Polycystic Kidney Disease with Congenital Talipes Equinovarus - A Rare Autopsy Case Report

Shobini Vishali VM, Neelayadakshi B, Dhanya Menon, Sudha Vasudeva

Abstract

ARPKD is a rare, infantile form of PCKD. It's a Ciliopathic disorder with multi-organ involvement. The pathognomonic features are predominately seen in the kidneys and liver. We herein report a case of ARPKD that presented in an antenatal mother whose prenatal screening ultrasonogram revealed enlarged, echogenic kidney with severe oligohydramnios. ARPKD was suspected and due to its poor compatibility with life, patient underwent MTP. Fetal autopsy confirmed ARPKD with potter's sequence - oligohydramnios and CTEV. This extremely rare ARPKD associated with CTEV was seen in only one other published case in India

Keywords

ARPKD, CTEV, Potter's sequence, Ciliopathy

Introduction

Autosomal recessive polycystic kidney disease (ARPKD) is a rare, infantile form of polycystic kidney disease. It is a Ciliopathic disorder with multi organ involvement like the kidneys, liver, pancreas. In Autosomal recessive polycystic kidney disease, the pathognomonic features are seen predominately involving the kidney as well as liver due to ductal plate malformation, which can lead on to congenital hepatic fibrosis. Autosomal recessive polycystic kidney disease (ARPKD) is a severe form of polycystic kidney disease with a pleiotropic PKHD1 gene defect and multisystem involvement characterized by enlarged kidneys with diminished renal function that prenatally may result in Potter's oligohydramnios sequence. Autosomal recessive polycystic kidney disease is a hepatorenal fibrocystic disorder associated with the presence of congenital hepatic fibrosis. It is associated with poor prognosis and is generally not compatible with life. We present an extremely rare case of Autosomal recessive polycystic kidney disease associated with congenital hepatic fibrosis and Congenital Talipes Equino Varus. Only one other similar case was published in India.[1] Our case report highlights autosomal recessive polycystic kidney disease and related Congenital Talipes Equino Varus .

Case Report

A 24-year-old female with a consanguineous marital

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Fig 1. Shows fetus with distended abdomen and potter's facies, inset shows right sided CTEV.

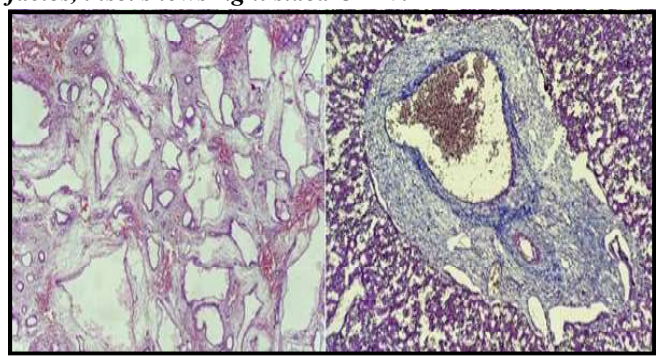

Fig 3 A- Showing H & E section from kidney. Numerous cysts of varying sizes. Cysts are lined by a single layer of cuboidal cells. B - Section from liver showing portal fibrosis following masson trichrome stain.

history with 18 weeks and 3-days of gestation arrived at the hospital with a fetal anomaly scan report of severe oligohydramnios and enlarged, echogenic kidneys. The prenatal screening ultrasonogram findings raised a suspicion of autosomal recessive polycystic kidney disease (ARPKD), and due to its poor compatibility with life the patient underwent a medical termination of the pregnancy (MTP) following which the fetus was sent for fetal autopsy. Grossly, the fetus had a distended abdomen, flat nasal bridge, hypertelorism, prominent epicanthic fold, low set ears, micrognathia, typical of Potter facies and right sided Congenital Talipes Equino Varus (CTEV), secondary to oligohydramnios. Both the kidneys were enlarged and lobulated but maintained their reniform shape and measured 3.7x2x2 cm. On cut section, about 95 % of the renal parenchyma was replaced with

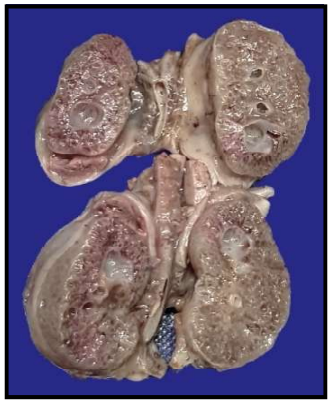

Fig 2. Grossly, bilateral kidneys were enlarged and measured 3.7x2x2 cm. On cut section, the renal parenchyma was replaced with multiple cysts ranging in size from 0.1 to 0.6 cm arranged perpendicular to capsule.

multiple cysts ranging in size from 0.1 to 0.6 cm,and arranged perpendicular to the capsule. Liver measured 6x4x2 cm and on cut section, liver appeared normal. All the other organs grossly appeared unremarkable. Microscopically, bilateral kidneys showed numerous cysts of varying sizes lined by single layer of cuboidal epithelium with few primitive glomeruli and liver showed portal fibrosis with mason trichrome stain which warranted a diagnosis of autosomal recessive polycystic kidney disease (ARPKD).

Discussion

Autosomal recessive polycystic kidney disease (ARPKD) is a rare ciliopathy disorder with an incidence of 1 per 20,000 live birth & an estimated perinatal mortality of 30-50%. [2] It is caused by the mutation of a single PKHD1 gene (polycystic kidney and hepatic disease 1 gene) present in the chromosome region 6p21-p23, whose related protein - Fibrocystin/ Polyductin is expressed in high levels in the epithelial cells of collecting ducts and the thick ascending loops of Henle , low levels are seen in the liver (epithelial cells of bile duct) and the pancreas. [3] The defective protein localizes to the renal tubular epithelial cells, which contain 1- 2 primary cilia and has a role in the pathogenesis of the disease hence ARPKD is a ciliopathic disorder.[4]

The kidneys and liver are the principal organs affected,

but renal symptoms predominate in the neonatal period. Etiopathology involves fusiform dilatation of the renal collecting ducts and hepatoportal dysgenesis.[5] The fetus usually presents with large abdominal masses, 'potter phenotype' secondary to oligohydramnios that result in the characteristic facies, contracted limbs (CTEV) and pulmonary hypoplasia. [6] The patients who survive the perinatal period require long-term care as they develop chronic renal insufficiency, hypertension and its sequelae, portal hypertension, hepatosplenomegaly, and esophageal varices. [7]

Prenatal diagnosis is done with ultrasonogram. It is often unreliable early in pregnancy, but when serial ultrasonogram is done, it can be used as a screening method. Genetic survey using mutational analysis and linkage analysis can be done for these patients. Mutational analysis is done by obtaining sample through chorionic villous sampling or amniocentesis and linkage analysis requires the sample to be taken from the affected fetus as well as the parents. [8] The more recent, Pre-implantation Genetic Diagnosis (PGD) involves taking single cells from an in vitro fertilized embryo and its analysis by multiplex PCR for several polymorphic markers linked to the defective gene, which can detect the specific genetic abnormality. Embryo free of disease can be implanted for delivery, eliminating the chance for ARPKD in the child. [9]

The recurrence risk of Autosomal recessive polycystic kidney disease for subsequent pregnancies is 25%. Hence antenatal diagnosis of this polycystic kidney disease with associated fetal anomalies is important, so that proper counselling and appropriate management can be extended. [10]

Conclusion

Despite the advances made in the fields of neonatal supportive care, respiratory & dialysis care, the prognosis remains uncertain in patients with autosomal recessive polycystic kidney disease (ARPKD), and so a multidisciplinary approach is required in its diagnosis and management.

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