IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 1 Ver. III (Jan. 2015), PP 14-16
www.iosrjournals.org

Interfamilial and Intrafamilial Polycystic Kidney Disease

[1]Swayam Jothi S., [2]Eswari A.K. Hemanathan, G., [3]Sujatha N.
Jacintha Antony, Sree Balaji Medical College and Hospital, SBMCH

Abstract: *Polycystic kidney disease is one of the most common life threatening genetic disease, affecting an estimated 12.5 million people worldwide. It is a congenital disorder due to failure of excretory tubules of the metanephros to establish contact with the collecting tubules. An alternative recent view about the formation of cysts in the kidney is that they are derived from abnormally developed collecting tubules. It is of two types, one is Autosomal dominant PKD (ADPKD) and the other Autosomal recessive PKD (ARPKD). The incidence of ADPKD is 1 to 2: 1000 live births unlike ARPKD which is 1:20,000.*
Autosomal dominant polycystic kidney disease (ADPKD) is generally a late onset multisystem disorder characterized by bilateral renal cysts; cysts in other organs including the liver, seminal vesicles, pancreas, and arachnoid membrane; vascular abnormalities including intracranial aneurysms, dilatation of the aortic root, and the dissection of the thoracic aorta; mitral valve prolapsed; and abdominal wall hernias.
Renal manifestations include and hypertension, renal pain, and renal insufficiency.Approximately 50% of individuals with ADPKD have end – stage disease (ESRI) by age 60 years.
Keywords: *Polycystic kidney, Autosomal dominant, Autosomal recessive*.

I. Introduction

Adult polycystic kidney disease is a hereditary disorder charecterised by multiple expanding cysts of both kidneys that ultimately destroy the renal parenchyma and cause the renal failure (Gabow PA1993, Grantham JJ 1996). There were three genetic mutations in PKD -1, PKD -2 and recently PKD – 3 also included but not yet proven. Gene PKD – 1 is located on chromosome 16p13.3, and encodes a large(460kD) protein named polycystin 1(The International polycystic kidney disease consortium 1995) for protein involved in regulation of cell cycle and intracellular calcium transport in epithelial cells and is responsible for 85% of the cases of ADPKD. Some voltage linked calcium channels are coded for PKD – 2 on chromosome 4 The major extra renal complications of ADPKD include cerebral aneurysms, hepatic cysts, pancreatic cysts, Cardiac valve disease, intestinal diverticula, Colonic diverticula and aortic root dilatation. Childhood type of polycystic kidney (CPKD) was termed as Autosomal recessive polycystic kidney disease (ARPKD) which was rare.

Diagnosis / testing: The diagnosis of ADPKD is established primarily by imaging studies of the kidneys. In 85% of individuals with ADPKD, mutuations in PKD1 are causative; in 15% mutuations in PKD2 are causative.

The Kidneys develop from two sources. The Excretory tubules are derived from the **Metanephros** and the Collecting part is formed by ramification of the **Ureteric bud.**

II. Materials & Methods

A patient, Mr. Loganathan who had polycystic kidney disease showing intrafamilial and interfamilial transmission of the disease

III. History

Mr. Loganathan a male aged 44 years came to our hospital for piles. While investigating him, the presence of polycystic kidney was observed. Ultrasonogram revealed presence of the polycystic kidney.(Fig.1) CVS and RS were normal. No evidence of cyst or diverticula elsewhere. In family history it was found that his father died due to kidney problem. His son,(Jayasurya)((Fig.2) his sister,(Gajalakshmi)(Fig.3)and one of the sister's son (Vignesh)(Fig.4) had polycystic kidney. Sister had cysts not only in the kidney but also in the liver.

IV. Discussion

Autosomal dominant polycystic kidney disease is potentially lethal, monogenic disorder. It is associated with large interfamilial and intra familial variability, which can be explained to a large extent by its genetic heterogencity and modifier genes. Autosomal dominant polycystic kidney disease (ADPKD) is the adult type of polycystic kidney disease and the most common of all the hereditary cystic kidney diseases. According to Bisceglia and Torres ADPKD is characterized by progressive cyst development and bilaterally enlarged kidneys with multiple cysts.

Age-specific ultrasound criteria to confirm a diagnosis of ADPKD have been proposed for individuals who are at 50% risk for ADPKD because they have an affected first-degree relative (Pei et al., 2009).
Note: The positive predictive value of these criteria is 100%, regardless of the underlying genetic cause or the age of the individual at the time of initial evaluation. However, the sensitivity of the criteria depends on the underlying genotype and the age of the individual at the time of evaluation.

Criteria:

- The presence of three or more (unilateral or bilateral) renal cysts in an individual aged 15-39 years
- The presence of two or more cysts in each kidney in an individual aged 40-59 years

The diagnosis of autosomal dominant polycystic kidney disease in an individual with a positive family history relies on imaging testing. Counselling should be done before testing. Benefits of testing include certainty of diagnosis that could affect family planning, early detection and treatment of disease complications, and selection of genetically unaffected family members for living related donor transplantation. It is associated with large interfamilial and intrafamilial variability (Vicente E Torres et al 2007).

Patients with polycystic kidney disease also tend to have extrarenal congenital anomalies (Watson MC 1997). About 40% have one to several cysts in the liver (polycystic liver disease) that are usually asymptomatic as seen in the case of Mrs Gajalakshmi The cysts are derived biliary epithelium. Cysts occur much less frequently in the spleen, pancreas and lungs. Intra cranial berry aneurysms, presumably from altered expression of polycystin in vascular smooth muscle, arise in the circle of Willis, and subarachnoid hemorrhages from these (Griffin MD, et al 1997) account for death in about 4% to 10% of patients with polycystic kidney disease. Chronic renal failure is remarkable in those who survived for many years with azotemia slowly progressing to uremia. Dialysis prolongs life further. Ultimately about 40% of adult patients die of coronary or hypertensive heart disease, 25% of infection, 15% of ruptured berry aneurysm or hypertensive intra cerebral haemorrhage. In the present family Mr. Loganathan who came to the hospital was the proband.

- The risk of siblings of the proband depends on the genetic status of the parents.
- If a parent is affected, the risk to siblings is 50%. Mr. Loganathan father had four children of which, 50% their affected (Mr. Loganathan and his sister Mrs. Gajalakshmi)

Offspring of a proband: Every child of an individual with ADPKD has a 50% chance of inheriting the mutation. so also in our present case. Mr. Loganathan had two sons of which, Mr. Jayasurya has got this condition and Mrs. Gajalakshmi had two sons of which, Mr. Vignesh has got this condition.

Other family members of the proband: The risk to other family members depends on the genetic status of the proband's parents. If a parent is affected or has a disease – causing mutation, his or her relatives are at risk (Peter C Harris et al., 2011).

V. Conclusion

The present case is ADPKD-presenting vertical transmission – Autosomal dominant. Though karyotyping has not been carried out for want of time & expenditure, positive family pedigree is an evidence for this condition. An increased understanding of the disorder's underlying genetic, molecular, and cellular mechanisms and a better appreciation of its progression and systemic manifestations have laid out the foundation for the development of clinical trials and potentially effective treatments. Until effective treatments become available, the adverse effects from pre symptomatic diagnosis in children (removal of choice to know or not know, psychological, educational, and career implications, and insurability issues) outweigh the benefits.

Genetic Counselling: ADPKD is inherited in an autosomal dominant manner. About 95% of individuals with ADPKD have an affected parent and about 5% have a de novo mutation. Each child of an affected individual has a 50% chance of inheriting the mutation. Prenatal testing for pregnancies at increased risk is possible if the family specifiic mutation is known or if linkage has been established in the family (Peter C Harris et al., 2011).

References

[1]. Gabow PA; Autosomal dominant polycystic kidney disesase.NEngl J Med 329:332,1993.
[2]. Grantham JJ: The pathogenesis, etiology and treatment of autosomal polycystic kidney disease. Am J Kidney Dis 28:788, 1996.
[3]. Griffin MD, et al: Vacular expression of polycystin. J Am Soc Nephrol 8:616, 1997.
[4]. The International Polycystic kidney disease consortium, Polycystic kidney disease: the complete structure of the PKD1 gene and its protein.cell 81:289,1995.
[5]. Watson MC: Complications of APKD, Kidney Int 51:353,1997.
[6]. Peter C Harris, PhD and Vicente E Torres, MD. Polycystic Kidney Disease, Autosomal Dominant; NCBI Bookshelf – Initial posting: Januray 10, 2002; Last update: December 8, 2011.

[7]. Pei Y, Obaji J, Dupius A, Paterson AD, Magistroni R, Dicks E, Parfrey P, Craner B, Coto E, Torra R, San Millan JL, Gibson R, Breuining M, Peters D, Ravine D. United Criteria for ultrasonographic diagnosis of ADPKD. Jam Soc Nephrol. 2009; 20: 205-12. (PMC free article: PMC2615723) [PubMed: 18945943].

Fig.1-Ultrasonogram.of **Loganathan** revealed presence of bilateral polycystic kidney

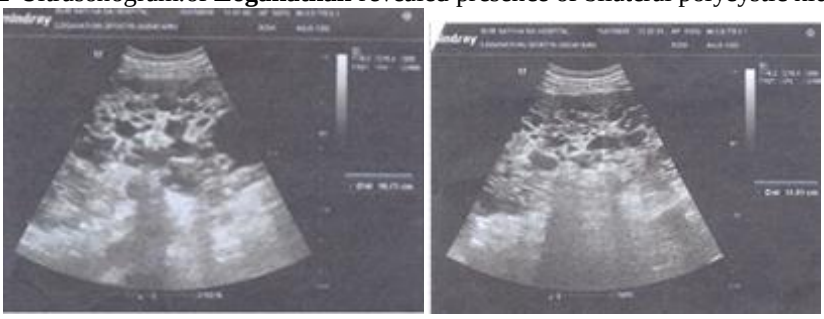

Fig.2-Ultrasonogram.of **Jayasurya showing** bilateral polycystic kidney

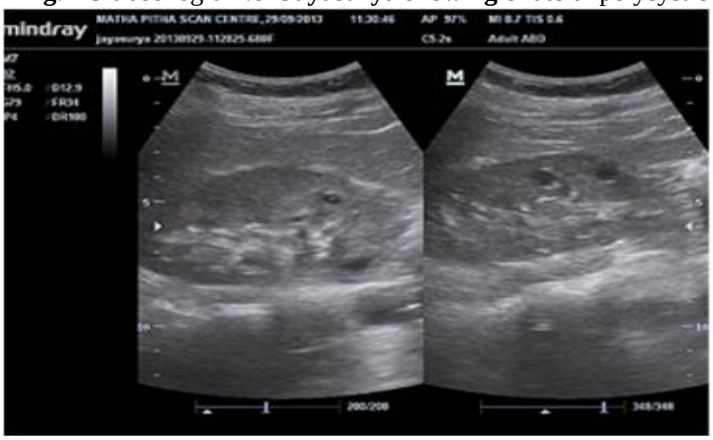

Fig.3-Ultrasonogram.of **Gajalakshmi** revealed presence of bilateral polycystic kidney

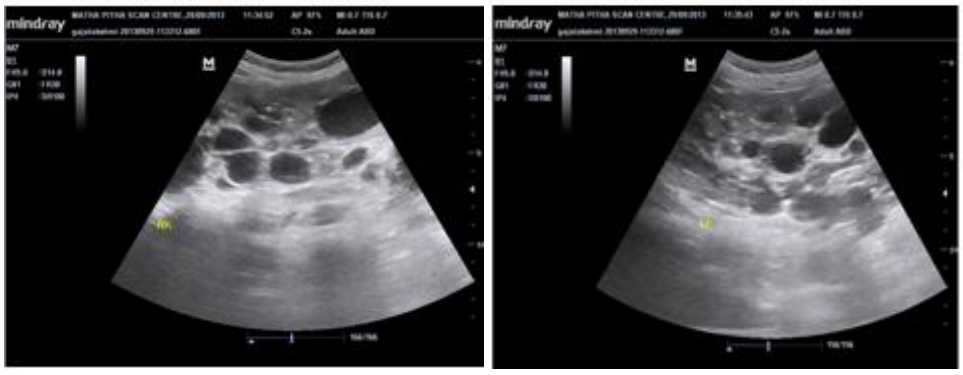

Fig.4-Ultrasonogram.of **Vignesh showing** bilateral polycystic kidney