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A STUDY ON INCIDENCE OF CYSTIC KIDNEY DISEASE IN PATIENTS ON MAINTENANCE HEMODIALYSIS

Nephrology

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ABSTRACT

INTRODUCTION: Cystic kidney disease is a unilateral or bilateral cystic disease characterized by small cysts distributed throughout the renal cortex and medulla of patients with ESRD unrelated to inherited renal cystic diseases.

ACKD is a disease of chronic renal failure of any etiology and has to be differentiated from other types of cystic kidney disease. It is defined as more than three macroscopic cysts in each kidney of a patient who does not have a hereditary cause of cystic disease. It can be present at early stages of CKD or more commonly in patients on dialysis & to a lesser extent in native kidneys of renal transplant recipients. Most of them are asymptomatic but rarely complications like infection, rupture, bleeding, spontaneous perinephric hematoma may occur There is increased incidence of renal neoplasms in acquired cystic kidney disease that some authors consider ACKD pre-neoplastic.

Its prevalence and severity are higher in men than in women and increases with the duration of azotemia and duration of dialysis[1] as well.

With better health care facilities and penetration of nephrology services, the life span of patients on dialysis is increasing. The easy availability & application of imaging services to the above group has led to more frequent diagnosis of acquired cystic kidney disease.

AIMS: To study the prevalence of kidney cysts in patients on maintenance hemodialysis.

OBJECTIVES:

- To study correlation between duration of dialysis and cystic changes and complications arising out it.
- To study the impact of age and gender on cystic changes.

METHODS: The study was done in Maintenance hemodialysis unit of Gandhi Hospital, secunderabad. 140 patients were enrolled over a period of one year from May,2016 to April,2017. Patients who had past history of polycystic kidney disease and had acquired kidney disease on sonography prior to dialysis were excluded.

Radiological imaging was done using Computerized tomography KUB to look for acquired renal cysts. Cystic changes were considered as presence of one or more cysts in either or both the kidneys.

STUDY DESIGN: prospective cross-sectional observational study.

STATISTICAL METHODS: Data analysed using the Statistical Package for Social Science (SPSS) software version 19.

ANOVA test is applied for comparison variables. A P value of < 0.05 is taken as significant.

RESULTS: 22.8% of the incident MHD cohort were found to have cystic changes, of which 78.1% constitute males and 21.8% females.

Cystic changes were observed in 46.6%in patients on MHD between 4-5yrs, 57.6% in patients on MHD between 5-6 yrs and to 75%in patients on MHD greater than 6 yrs.

CONCLUSION: This study showed that Cystic kidney disease is an important complication of long term HD regardless of etiology of renal failure, more seen in males and relates to duration of hemodialysis. Hence renal surveillance with USG or CT every 3yrs in all dialysis patients and annually in patients with cystic changes.

KEYWORDS

Cyst, Hemodialysis, Azotemia

BACK GROUND:

Acquired cystic kidney disease (ACKD) was first recognized in 1847 by John Simon in patients with chronic Bright's disease. He described the development of cystic renal changes with cysts ranging from "mustard seed to as large as cocoa nuts" and also noted that they "run a slow and insidious progress during life, and often leave in the dead body no such obvious traces, as would strike the superficial observer."

ACKD was "rediscovered" by Dunnill and colleagues1 in 1977 in kidneys from dialysis patients[1]. The local intrarenal factors play a major role in the pathogenesis[5] of ACKD.as the chronic kidney disease progresses number of nephrons also loss progressively which stimulates intact nephrons. The intact nephrons, as the disease progress undergo initial hypertrophy and hyperplasia for compensatory growth for the loss of nephrons. Cyst develops when trans epithelial fluid secretion continues in hyperplastic tubules, and with anatomic distortion or obstruction, the distal outflow is impaired. Most cysts[3] are lined by a single layer of epithelium composed of flat nondescript cells, cells with abundant cytoplasm and hyaline droplets, or small cuboidal cells resembling those from distal tubules or collecting ducts[2]. Others argue that presence of a brush border on the luminal membrane and cyst fluid composition similar to plasma indicates proximal tubular origin[4,5]

Ischemia and uremic metabolites have been implicated in the pathogenesis of ACKD. The most important factor is slow, progressive parenchymal loss, which explains why the development or progression of ACKD is not influenced by the type of underlying renal disease or the choice of dialysis modality[9]. Activation of proto-oncogenes and release of renotropic factors like Epidermal growth factor, Hepatocyte growth factor over a period of time lead to tubular hyperplasia and cyst formation[7,8] The cysts may stabilize or regress following successful renal transplantation, a setting in which the level of growth factors is reduced due to the restoration of normal renal function. As a result, the outcome of acquired cystic disease is better in kidney transplant recipients than in patients maintained on chronic dialysis. In grafts with impaired or failing renal function, there may be further progression in the native kidneys as well as the development of de novo ACKD in the graft.

In one prospective study[10,11], the incidence of cystic disease was lower, the native kidneys were smaller and had lower cyst grades in transplant recipients when compared to patients treated with maintenance hemodialysis.[6]This benefit was limited to patients not receiving cyclosporine. Those treated with cyclosporine had an incidence of cystic disease similar to the dialyzed patients.

METHODES: 140 patients who presented to Gandhi hospital for maintenance hemodialysis between May 1st 2016 to April 30, 2017 who are satisfying inclusion and exclusion criteria are enrolled into the study after informed written consent and approval from institutional ethical committee.

Detailed history regarding the history of their chronic kidney disease and duration of dialysis and number of dialysis and complications are noted and ultrasonography done before dialysis was recorded

RESULTS & DISCUSSION:

Cystic changes in ACKD are typically bilateral but may vary between kidneys. Most ACKD kidneys are smaller than normal.

22.8% of the incidence in MHD cohort [figure-2].were found to have cystic changes, of which 78.1% constitute males and 21.8% females. ACKD seen in 25 males and 7 females[figure-5] and 83 males and 25 females have no cysts in their kidneys, the cysts are more commonly seen in renal cortex, though they can be present anywhere.

Five patients of the age group 19-39 constitutes 15.6%, seven patients of the age group between 40-49 constitutes 21.8%, twenty patients of the age group >50 yr which constitutes 62.5%. had cystic changes Cystic changes in the kidneys were increased in relation to the duration of hemodialysis, as observed in this study seven patients between 4-5yrs, fifteen between 5-6 yr, nine patients greater than 6 yr had cysts which amounts to 46.6%,57.6%,75% respectively [Figure-3]as the age increases.

The causes for end stage renal diseases in ACKD are 22 CGN,8 CIN, and 2 obstructive uropathy [Figure-4].

The average number of cysts in males is 3.64 and 2.57 in females. the size of the cysts varies from microscopic to 2 to 3 cm in diameter that are diffusely distributed. 60% of the cysts are smaller than 0.2 cm^2.

Mean size of cysts is 1.5 +- 1.7 cm. An increase in size above normal can be observed in cases of cyst hematoma formation or malignant transformation.

Up to 25% of kidneys with ACKD harbor tumors, about one third of which are carcinomas. Renal cell carcinomas arising from ACKD are multicentric in about 50% of cases, bilateral in about 10%, and papillary as well as clear cell carcinoma by histology.

Transitional cell carcinoma has been reported in ACKD, occasionally in addition to the presence of renal cell carcinoma. However, ACKD does not seem to increase the risk for transitional cell carcinoma. Its development may be related to analgesic nephropathy as the underlying renal disease.

Most weigh less than 100 gm and about 30% weigh less than 50gm.On the other hand, about 25% weigh more than 150gm and a few exceptional specimens weigh more than 1000 gm.

CONCLUSIONS:

- Cystic kidney disease is an important complication of long-term HD regardless of etiology of renal failure more seen in males.
- Cystic kidney disease is explained primarily by the duration on maintenance hemodialysis. Age of the patient also correlated with cystic changes.
- Complications arising from cysts, including renal cell carcinoma were not seen in any patient.
- We suggest renal surveillance with USG or CT every 3yrs in all dialysis patients and annually in patients with cystic changes

LIMITATIONS:

1. small sample size.
2. sequential ultrasonography has to done in the patients to identify the cystic changes.
3. follow up has to done to know the fate of cysts

FIGURES:

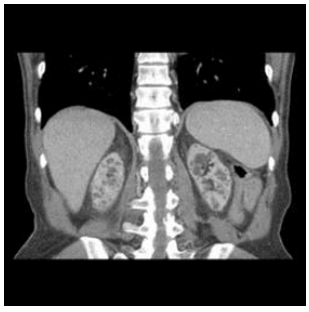
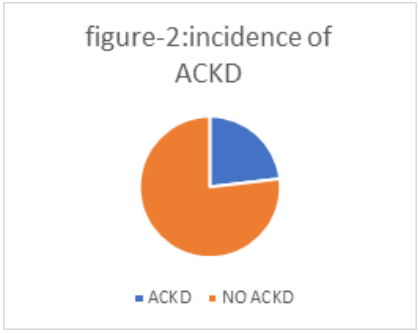
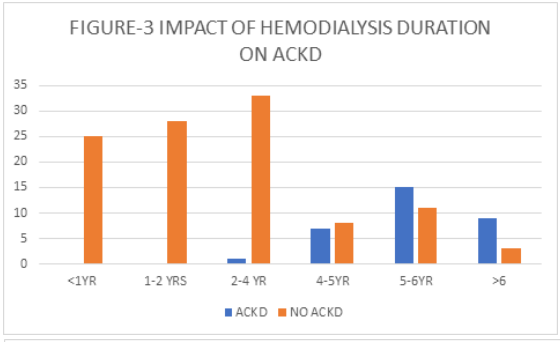
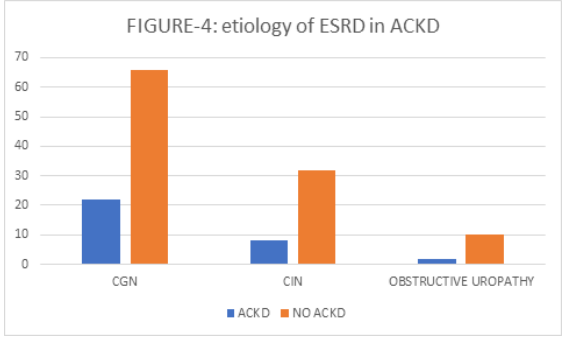
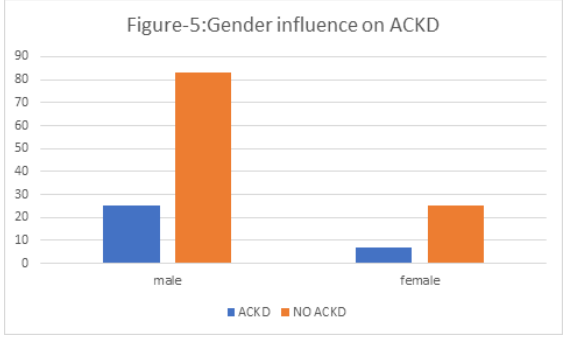


FIGURE-1: CT Image Suggestive Of Cysts In Both Kidneys









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