ORIGINAL RESEARCH

Radiogrpahic findings in chronic kidney disease patients

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Received: 03 March, 2013 Accepted: 28 April, 2013 Published: 13 May, 2013

Abstract
Background:CKD is commonly associated with significnatmorbiditiy and mortality. Hence; the present study was conducted for assessing radiogrpahic findings in chronic kidney disease patients.
Materials & methods:A total of 100 CKD patients were evaluated. Inclusion criteria for the present study included. Inclusion criteria for the present study included newly diagnosed chronic kidney disease patients. Demographic particulars, Clinical history and detailed physical examination, ECG, Chest- Xray, ultrasound and biochemical investigations. Blood samples were obtained and GFR levels were evaluated. Categorization of all the patients according to severity stages of CKD. SPSS software version 22 was used for evaluation of level of significance. Fishers exact Chi-square test and student t test were used.
Results:USG showed scarred and smaller findings in 32 percent and 60 percent of the patients respectively. Echogenecitiy showed increased findings in 88 percent of the paitents. Significant X-ray findings were seen in 54 percent of the patients. Cardiomegaly, Pulmonary edema, Bilateral pleural effusion and Pericardial effusion were seen in 32 percent, 8 percent, 6 percent and 8 percent of the patients respectively.
Conclusion: Conventional education posits that the length of the kidneys is associated with their functionality in CKD.X-rays serve multiple functions in patients with CKD, such as assessing renal function, evaluating bone health, and identifying complications such as calcifications. They are frequently incorporated into a comprehensive imaging approach that may also involve ultrasound.
Key words: Chronic kidney disease, Ultrasonogrpahy

Introduction

A decade of research after the publication of the first internationally accepted definition and classification of CKD led the Kidney Disease: Improving Global Outcomes (KDIGO) organization to develop an updated Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. The updated guideline applied to all persons with chronic kidney disease (CKD) who were not receiving renal replacement therapy and included aspects related to both adults and children. Within the guideline, implications for clinical practice, public policy, and international considerations were highlighted, along with areas of controversy, confusion, or nonconsensus.[1-3]

As CKD has a heritable component, Köttgen et al.4 have conducted genome-wide association studies to identify susceptibility loci for glomerular filtration rate (GFR), estimated by serum creatinine (eGFRcrea), cystatin C (eGFRcys), and CKD (eGFRcrea<60 ml/min per 1.73 m2) in European ancestry participants of four population-based cohorts (2388 CKD cases). They tested for replication in 21,466 participants (1932 CKD cases). Uromodulin (which encodes Tamm–Horsfall protein in the urine) mutations were associated with differences in renal function.Another identified mutation is related to APOL1.5 An autosomal recessive pattern of inheritance is demonstrated and associated with a substantially higher risk of ESRD (10-fold higher risk of ESRD due to focal glomerulosclerosis and 7-fold higher risk of ESRD due to hypertension). APOL1 mutations are found exclusively among individuals of African descent and make them more prone to CKD.[4,5]Hence; the present study was conducted for assessing

radiogrpahic findings in chronic kidney disease patients.

Mateirals& methods

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Results

Mean age of the patients was 52.3 years. 80 percent of the patients were males. Breathlessness, Reduced urine output and pedal oedema were the most common findings found to be present in 85 percent, 84 percent and 83 percent of the patients respectively. Other manfestations included generalized weakness, facial puffiness, abdominal pain, vomtining, fever, pallor, raised JVP, chest pain and palpitations. 58 percent, 39 percent and 3 percent of the patients belonged to stage 5, stage 4 and stage 3 respectivley. USG showed scarred and smaller findings in 32 percent and 60 percent of the patients respectively. Echogenecitiy showed increased findings in 88 percent of the paitents. Significant X-ray findings were seen in 54 percent of the patients. Cardiomegaly, Pulmonary edema, Bilateral pleural effusion and Pericardial effusion were seen in 32 percent, 8 percent, 6 percent and 8 percent of the patients respectively.

Table 1: Distribution of patients according to clinical profile

Symptoms	No. of cases	Percentage %
Breathlessness	85	85
Reduced urine output	84	84
Pedal edema	83	83
Generalized weakness	56	56
Facial puffiness	52	52
Abdominal pain	51	51
Vomiting	43	43
Fever	42	42
Pallor	32	32
Raised JVP	32	32
Chest pain	32	32
Palpitations	30	30

Table 2: Distribution of patients according to eGFR

eGFR	No of cases	Percentage %
<15 (stage5)	58	58
16-30 (stage4)	39	39
31-45(stage3)	3	3
Total	100	100

Table 3: Distribution of patients according to USG findings

Variable		No. of cases	Percentage %
USG	Normal	8	8
	Scarred	32	32
	Smaller	60	60
Echogenicity	Increased	88	88
	Normal	12	12

Table 4: Distribution of patients according to radiographic findings

Chest X-Ray findings	Number of cases	Percentage %
Cardiomegaly	32	32
Pulmonary edema	8	8

Bilateral pleural effusion	6	6
Pericardial effusion	8	8
No significant findings	46	46
Total	100	100

Discussion

Renal function decreases with age in both men and women. Among the elderly population, more than one-half of the subjects screened had CKD stages 3–5 (GFR<60 ml/min per 1.73 m2) according to the National Kidney Foundation Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines. Thus, the elderly population is more prone to develop CKD after various renal insults. In the CREDIT study the odds ratios of CKD ranged from 1.45 to 2.18 for every 10-year increase in age among subjects older than 30 years of age in Turkey.[7- 10]A meta-analysis by the CKD Prognosis Consortium demonstrated associations of eGFR <60 ml/min/1.73 m^2 with subsequent risk of all-cause and cardiovascular mortality, kidney failure, AKI, and CKD progression in the general population and in populations with increased risk for CVD.[11, 12] Hence; the present study was conducted for assessing radiogrpahic findings in chronic kidney disease patients.

Mean age of the patients was 52.3 years. 80 percent of the patients were males. Breathlessness, Reduced urine output and pedal oedema were the most common findings found to be present in 85 percent, 84 percent and 83 percent of the patients respectively. Other manfestations included generalized weakness, facial puffiness, abdominal pain, vomtining, fever, pallor, raised JVP, chest pain and palpitations. 58 percent, 39 percent and 3 percent of the patients belonged to stage 5, stage 4 and stage 3 respectivley. USG showed scarred and smaller findings in 32 percent and 60 percent of the patients respectively. Echogenecitiy showed increased findings in 88 percent of the paitents. Significant X-ray findings were seen in 54 percent of the patients. Cardiomegaly, Pulmonary edema, Bilateral pleural effusion and Pericardial effusion were seen in 32 percent, 8 percent, 6 percent and 8 percent of the patients respectively. Ultrasound (US) with Doppler US examination of intrarenal vessels is the imaging modality of choice to be employed in patients with renal failure and is commonly performed early in the clinical course. Chronic renal failure manifests with a reduction of renal dimensions that develops over months or years. US reveals a reduced renal length and reduced renal cortical thickness with an increased renal cortical echogenicity often associated with poor visibility of the renal pyramids and the renal sinus, marginal irregularities, parenchymal cysts and also papillary calcifications. Colour Doppler US reveals a reduced renal vascularity and increased RI values measured at the level of the segmental and interlobular arteries according to the stage of chronic renal failure. The capability of renal RI to aid in the prediction of renal dysfunction progression has been demonstrated. US follow-up of native scarred kidneys is indicated in patients with chronic renal failure treated with dialysis or renal transplantation because they develop the acquired cystic kidney disease (ACKD) with a significantly increased risk of solid and cystic renal malignancies. CT confirms the US findings by revealing reduced renal length and cortical thickness.[13-15] Beland et al determined whether there is a relationship between renal cortical thickness or length measured on ultrasound and the degree of renal impairment in chronic kidney disease (CKD).25 patients (13 men and 12 women, mean age 73 years) were identified who had CKD but were not on dialysis. The patients were from a single institution and had undergone renal ultrasound and at least three serum creatinines within 90 days. The lowest creatinine was used for estimated glomerular filtration rate (eGFR) calculation using both the Cockcroft-Gault (CG) and the Modification of Diet in Renal Disease Study (MDRD) equations. Ultrasounds were consensus reviewed by three radiologists (2 attendings and a resident) blinded to specific renal function. Cortical thickness was measured in the sagittal plane over a medullary pyramid, perpendicular to the capsule. Length was measured pole-to-pole. Mean cortical thickness was 5.9 mm (range, 3.2–11.0 mm). Mean length was 10 cm (7.2–12.4 cm). Mean minimum serum creatinine was 2.1 mg/dL (1.1–6.1 mg/dL). Mean eGFR using CG was 34.8 mL/min (10.6–99.4 mL/min) and 36 mL/min (8–66 mL/min) using MDRD. There was a statistically significant relationship between eGFR and cortical thickness using both CG ($p < 0.0001$) and MDRD ($p = 0.005$). There was a statistically significant relationship between CG and length ($p = 0.003$) but not between MDRD and length ($p = 0.08$).Cortical thickness measured on ultrasound appears to be more closely related to eGFR than renal length.[16]

Conclusion

Conventional education posits that the length of the kidneys is associated with their functionality in CKD.X-rays serve multiple functions in patients with CKD, such as assessing renal function, evaluating bone health, and identifying complications such as calcifications. They are frequently incorporated into a comprehensive imaging approach that may also involve ultrasound.

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