Chronic Renal Failure Secondary To Polysubstance Misuse

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Citation

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Abstract

Chronic Renal Failure [CRF] is a progressive irreversible deterioration in renal function with a spectrum ranging from biochemical abnormalities [azotemia] to clinically evident abnormalities [uraemia] and end stage renal disease [ESRD]. The purpose of this paper is to highlight the significance of rare causes of CRF in the management of such patients. A case of a 26 year old male who had CRF with the only identifiable risk factor being abuse of recreational drugs alongside a review of relevant literature was studied. The patient presented with symptoms and signs in keeping with long standing impairment of renal function with causes traceable to his chronic abuse of cannabis and heroine. In the diagnosis, management, and follow-up of patients with chronic kidney disease, the importance of a detailed social history and life style modification cannot be overemphasized. We therefore recommend that appropriate diagnosis of CRF be made whenever it occurs and in the case of substance misuse, appropriate treatment given in that direction to relieve the disease.

INTRODUCTION

Chronic Renal Failure [CRF] is defined as either a level of glomerular filtration rate [GFR] less than 15 ml/min per 1.73 m^2, which is accompanied in most cases by signs and symptoms of uraemia, or a need for initiation of renal replacement therapy[1]. It ultimately results into end stage renal disease [ESRD]. It is an important cause of morbidity and mortality in Nigeria[1].

CRF refers to an irreversible deterioration in renal function classically developing over a period of years and manifesting initially as biochemical abnormalities [azotemia]. Eventually, loss of excretory, metabolic, and endocrine functions of the kidney leads to the development of the clinical signs and symptoms of renal failure referred to as uremia, eventually leading to end stage renal disease [ESRD], where creatinine clearance is <5ml/24hrs/1.73m^2 and death is likely without renal replacement therapy[2]. The social and economic consequences of chronic renal failure are considerable.

Important causes of CRF are diabetes mellitus, renal diseases [especially the glomerulonephritides], and hypertension[2]. Other causes include systemic inflammatory diseases, and congenital anomalies of the kidney [e.g. polycystic kidney disease].

Patients with CRF are usually asymptomatic during the early stages of CRF [hyperfiltration of the kidneys, azotemia] until GFR falls below 20 ml/min per 1.73 m^2, then overt features of CRF ensue due to loss of the three cardinal functions of the kidneys; metabolic, endocrine, and excretory. Loss of excretory function leads to nocturia, severe electrolyte imbalance, hypertension, proteinuria, and signs referable to uremia [pruritus, easy bruising, pericardial friction rub], and metabolic acidosis[2]. Loss of endocrine function leads to anaemia [with correlating severity to the CRF], and renal osteodystrophy [osteomalacia, osteitis fibrosa cystica, osteoporosis, and osteosclerosis]. Loss of metabolic function leads to neuropathies, myopathies, and recurrent infections.

Management of CRF is definitively by renal replacement therapy [RRT] through dialysis or renal transplantation. Lines of management include reversing modifiable factors [like hypertension, nephrotoxic medications, treating infections, relieving urinary tract obstruction], preventing further renal damage and limiting the adverse effects of renal function loss.

The objective of this study is to illustrate an uncommon case of CRF caused by abuse of alcohol, cannabis, nicotine, and heroine, and the need for consideration of this factor in the diagnosis and management of chronic kidney disease [CKD].

METHODOLOGY

We studied the case of Mr. N. A., a 26 year old student, who presented at the accident and emergency room on account of

a 7 month history of generalized body swelling and a 6 week history of abdominal pain. Body swelling started with the face, was worse in the mornings, regressed with day, and then progressed to involve his limbs and abdomen. There was a positive history of passage of frothy urine, chest pain and easy fatigueability. Abdominal pain was located in the right hypochondrium, dull in nature, non radiating, and unassociated with meals. Pain has no known aggravating or relieving factors. There is a history of anorexia, nausea, and vomiting, and diarrhoea. He hasn't had any prior admissions, operations, or transfusions. He isn't a known hypertensive, diabetic, renal or sickle cell disease patient with no known drug allergies.

He had taken about 12 grams of alcohol and 2 sticks of cigarettes daily for 4 years. He has a history of unprotected intercourse with multiple sex partners. There is a 4 year history of dependence on cannabis/Indian hemp [inhalational] and intravenous psychoactive substances [heroine], with misuse occurring every other day. There was no history of use of nephrotoxic drugs [non steroidal anti inflammatory drugs, amphoterisin B, aminoglycosides] or herbal medications. There was no history of insect stings, sore throat in the past, or use of medicated soaps or mercury containing soaps and creams.

Clinically, he was wasted, puffy, markedly pale, with grade 3 finger clubbing, significant peripheral lymphadenopathy [cervical and axillary], with pedal and sacral oedema. He had a bounding pulse, a blood pressure of 150/100 mmHg, but with no signs of long standing hypertension. He had epigastric tenderness with ascites and fine crepitations were auscultated on the lower lung bases bilaterally.

He was managed initially for HIV associated nephropathy, and was subsequently investigated.

Results of investigations revealed anaemia [PCV=18%], markedly elevated urea and creatinine levels [urea; 44 mmol/L, creatinine; 989 mmol/L] overt proteinuria with haematuria, seronegativity for HIV 1 and II, HBV, HCV, and severe bilateral renal parenchymal disease. He had no renal artery stenosis and was not diabetic.

He was later managed for Chronic Renal Failure secondary to polysubstance abuse and was reviewed by the psychiatrists and was also evaluated by the clinical psychologist. He had a session of haemodialysis, and was placed on subcutaneous erythropoietin. His clinical features and laboratory parameters got progressively worse and had two more haemodialysis sessions. He later opted for a discharge against advice a month after admission owing to financial constraints.

DISCUSSION

The exact prevalence rate of CRF in Nigeria is not known. Hospital based data in Nigeria have reported prevalence rates expressed as ratios of hospital admissions of between 1.6 and 8%[3], with male preponderance[3].

The average age of CRF patients among Nigerians lies between the third and the fourth decade[3]. In the US, diabetes mellitus and hypertension are the two leading causes of CRF[4], accounting for more than 60 % of cases of kidney failure[5]. Chronic Glomerulonephritis, Hypertension [Hypertensive Nephrosclerosis] and Diabetes Mellitus [Diabetic Nephropathy] top the list in the tropics[6], accounting for over 80% of cases[7].

Although it has been recommended that patients with chronic kidney disease be referred early to nephrologists[8] to reduce complications, generally many patients are still referred late[9], requiring dialysis within a few months of presentation. Such complications include pulmonary oedema, severe hypertension, severe anemia, and septicemia[9].

An alarming fact is that there is an increasing incidence in indulgence and subsequent addiction at younger ages[10], as up to 9% of secondary school students and 33% of university undergraduates in Nigeria abuse cannabis[11], with abuse of cannabis progressing from abuse of legal substances such as alcohol and cigarettes[12].

Studies done in Nigeria have shown that the main drugs abused in Nigeria are alcohol, cannabis, and amphetamines[13]. Cannabis the second most abused drug in Nigeria, in spite of its illegality[14]. Smoking has recently been discussed as a risk factor for progression of renal insufficiency[15]. Smoking increased the risk for end-stage renal failure [ESRF] in men with inflammatory and non-inflammatory renal disease[15]. Two new reports suggest smoking [especially when multi substances like nicotine, cannabis, and heroine are misused] as an independent and important risk factor for renal damage in other categories of non diabetic patients[16].

The possible importance of smoking for progressive renal damage seems to be less clear and further prospective data are needed to determine its role in CKD in relation to other well-documented progression factors such as hypertension,

proteinuria and dyslipidemia[17].

Due to the seeming overwhelming 'advantage' chronic glomerulonephritis, hypertensive nephrosclrosis, and diabetic nephropathy enjoy in the causation of chronic renal failure, it is so easy to assume that all causes of chronic renal failure are synonymous with these three, with literature encouraging a presumptive diagnosis of Chronic Glomerulonephritis[2].

There are in fact other established causes of chronic renal failure[17], with smoking being thoroughly investigated[15-17]. Heroin [diacetylmorphine] is the most commonly abused opiate[18], often injected in combination with cocaine[19]. Heroin has a half-life of 3 min and is rapidly metabolized to morphine, which is mainly responsible for the pharmacological actions of heroin. Heroin is excreted in the urine as free and unconjugated morphine[3]. There are several renal complications from its abuse[20]. Secondary amyloidosis has increased in frequency as a cause of renal disease in chronic parenteral drug users, particularly among those who inject heroin subcutaneously[21]. With continued abuse, the majority progress to end-stage renal failure. Complete resolution following abstinence from subcutaneous drug abuse has been reported[22]. Heroin-associated nephropathy [HAN] has been described, presenting as nephrotic syndrome and progressing rapidly to end-stage renal failure. Occasionally the process reversed with abstinence from further heroin use[20]. Renal biopsy usually showed a focal segmental glomerulosclerosis[23]. The pathogenesis of this is unclear; earlier studies suggested that heroin, or one of its adulterants, acted as antigen leading to renal deposition of immune complexes in the kidney[20]. More recent animal studies have shown that morphine may have a direct effect on the glomerulus, causing proliferation of fibroblasts and a decrease in degradation of type IV collagen.

The common absence of a holistic approach to the diagnosis, management and follow up of patients with early CKD may account for late referral[17].

CONCLUSION

The financial and emotional strain, management of chronic renal failure has on the patient and relations are best imagined. Since the major causative factors [hypertension and diabetes mellitus] are preventable by lifestyle modification, the importance of holistic management especially with relation to a detailed social history cannot be overemphasized.

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