

Original Article

Outcome of Urgent Hemodialysis in Chronic Kidney Disease in a Rural Tertiary Care Hospital

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Abstract

Chronic kidney disease is a worldwide public health problem with an increasing incidence and prevalence. Outcomes of chronic kidney disease include not only complications of decreased kidney function and cardiovascular disease but also end stage renal failure causing increased morbidity and mortality. The development of acute but serious uremic complications in advanced kidney disease may put the patient's life at risk requiring immediate dialysis. The objective of this study was to find out the outcomes of urgent hemodialysis in advanced kidney disease, the minimum number of hemodialysis required for satisfactory clinical improvement, and to detect uremic emergencies associated with those patients. Twenty two patients with end stage renal failure admitted in a rural tertiary care private hospital of Bangladesh for emergency and short term dialysis were included in this study. For each patient hemodialysis was done at one day interval three times in a week in a dialysis unit. Results show that two sessions of hemodialysis produced 72 % and three sessions, almost 100% clinical recovery at satisfactory level. Urgent hemodialysis was found to be life saving in observed uremic emergencies like acute pulmonary edema, cerebral encephalopathy, metabolic acidosis, hyperkalemia, gross fluid overload and pericardial effusion. Dialysis therapy ameliorates many of the clinical manifestations of renal failure and postpones otherwise imminent death and for these logical reasons it is recommended that dialysis should not be delayed in uremic emergencies for the best interest of clinical outcomes.

Keywords: Chronic Kidney Disease, End Stage Renal Failure, Hemodialysis.

Introduction

Chronic kidney disease (CKD) is under recognized and under treated in many countries including Bangladesh and now, is a growing public health concern worldwide. Outcomes associated with CKD are poor; which is also a state of high cardiovascular risk. Early intervention and appropriate measures may slow the progression to end stage renal diseases (ESRD), prevent the loss of kidney function, or ameliorate organ dysfunction and comorbid conditions (e.g., anemia, hypertension, left

ventricular failure, bone disease, malnutrition and secondary hyperparathyroidism). The majority of patients with CKD are usually unaware of their disease and present with ESRD having uremic emergencies. The incidence of ESRD in our country is not known, but would be much higher than that in developed countries because of high incidence of infection and environmental pollution¹. The treatment of ESRD is renal replacement therapy (RRT) that includes regular

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maintenance dialysis or renal transplantation. Dialysis therapy for ESRD is life-sustaining. Denial of therapy means death in days, weeks, or months². But most of the people in our country cannot afford the treatment cost as the dialysis or renal transplantation is very expensive. Comparatively transplantation is the most cost-effective therapy for ESRD and offers patients the highest possible quality of life². Hence, it is the treatment of choice for all medically suitable ESRD patients. But availability of kidney is very difficult. Except the nearest relatives, nobody wants to donate kidney. Ideally every ESRD patient should have access to RRT. The access to RRT in Bangladesh is restricted to few government and private hospitals. As a result of high cost, less than 10% of ESRD patients are able to maintain dialysis in private hospitals and governmental dialysis centers that are already overcrowded. The vast majorities of patients who are started on dialysis die or stop treatment within the first several months¹. Current evidence suggests that some of the adverse outcomes of CKD can be prevented or delayed by early detection, prevention and treatment which should be the most important issues for Bangladesh.

Chronic kidney disease is defined as either kidney damage or decreased kidney function persisting for 3 months or more^{3,4}. Markers of kidney damage include certain abnormalities in urine (proteinuria, hematuria), blood biochemistry, or imaging testing (anatomical or structural abnormality). Decreased kidney function means reduction of GFR < 60 ml /min/1.73m².

Stages 4 and 5 are sometimes called advanced CKD. When advanced, it carries a higher risk of mortality⁴. The common causes of CKD in Bangladesh include glomerulonephritis, diabetes, hypertension, nephrolithiasis, obstructive uropathy and interstitial nephropathy^{1,5}. Diabetes is the leading cause of CKD in developed countries^{2,6,7}.

There are a number of clinical indications to initiate dialysis in patients with CKD^{6,8}. These include: (a) Acute pulmonary edema (b) Persistent metabolic disturbances that are refractory to medical therapy; these include hyperkalemia, metabolic acidosis, hypercalcemia, hypocalcemia, and hyperphosphatemia (c) Progressive uremic encephalopathy or neuropathy, with signs such as confusion, wrist or foot drop, or, in severe cases, seizures (d) Uremic pericarditis or pleuritis (e) Intractable fluid overload refractory to diuretics (f) Hypertension poorly responsive to antihypertensive medications and (g) Persistent nausea and vomiting due

to severe uremia. However, these indications are potentially life-threatening and the patient is generally known to have advanced CKD. As a result, most nephrologists agree that delaying initiation of dialysis until one or more of these complications is present may put the patient at unnecessary jeopardy⁹. The timing of initiation of maintenance dialysis for patients with stage-5 CKD is not clear-cut. Typically, it is started when the patient has symptomatic advanced disease but before the development of serious complications, often with an estimated GFR 8-10 mL/min/1.73m² or a plasma creatinine of 600-800 μmol/L (6.8-9.0 mg/dL)⁶. However, there is no evidence that early initiation improves survival or clinical outcome and the decision to start is usually driven by a combination of patient symptoms and biochemistry reports^{6,10}. There may be some problems related to hemodialysis⁶. These include: (a) Hypotension during dialysis (b) Cardiac arrhythmias (c) Hemorrhage (d) Air embolism (e) Dialysis disequilibrium (f) Dialyser hypersensitivity and (g) Infection.

Earlier detection of CKD allows more time for evaluation and treatment to prevent or delay the adverse outcome, but the majority of patients are usually unaware of their disease and present with ESRD having uremic emergencies, warranting immediate dialysis. There is lack of data regarding outcomes of urgent hemodialysis in our country. Therefore this study was done to find out the outcomes of urgent hemodialysis in advanced kidney disease, the minimum number of hemodialysis required for their satisfactory clinical improvement and to detect the uremic emergencies associated with those patients having CKD.

Materials and method

The study- a hospital based was carried out in the Indoor Department of Medicine and Hemodialysis unit of Khwaja Yunus Ali Medical College & Hospital, a tertiary care hospital having all modern dialysis facilities situated in a rural area 150 Km away from the capital city Dhaka, Bangladesh. A total 22 patients of both sexes suffering from CKD admitted during the period from 1st July 2010 to 31st December 2010 for urgent and short term hemodialysis were studied. CKD patients on regular maintenance hemodialysis were excluded from this study. But those patients who left maintenance hemodialysis and returned with acute uremic emergencies were also included in the study. Data were collected by face to face interview, appropriate physical examination and

relevant biochemical investigations just after admission, at each pre & post hemodialysis period and while discharging from the hospital. Hemodialysis was carried out for 3-5 hours at one day interval for three times in a week in dialysis unit. Most of them had dialysis by temporary access like jugular or femoral catheterization. At the end of each hemodialysis the outcomes were detected clinically by a competent physician by assessing the degree of improvement of the presenting emergencies. The outcome of interest were clinical improvement of the presenting emergency, quality of life, mortality, and complications of dialysis. The data were recorded in a semi structured data collection form for subsequent analysis.

Results

Table-1 shows distribution of patients according to age, sex, residence and economic status. The lowest age was 16 years and the highest age was 80. The mean age of presentation for urgent dialysis was 42 years. Most (59%) of patients in this study belonged to rural population. Socio economic conditions were found to be monthly income of less than 5000 taka in 32% of the samples. All the patients in this study were found to have stage 5-CKD.

Table-1: Socio-demographic profile of the study samples (n=22)

Parameters		Number (n)	Percentage (%)
Age:	16-30 years	08	36
	31-50 years	07	32
	51 and above	07	32
Mean age	42 years		
Sex:	Male	09	41
	Female	13	59
Residence:	Urban	05	23
	Semi urban	04	18
	Rural	13	59
Economic status:	Taka <5000/month	07	32
	Taka 5000- <10,000/month	06	27
	Taka 10,000- <15000/month	06	27
	Taka 15,000 or more	03	14

Table-2: Associated conditions in stage 5 CKD (n=22)

Associated conditions/ co morbidities	Number (n)	Percentage (%)
Hypertension	14	64
Congestive Cardiac Failure	07	32
Diabetes	08	36
Ischemic Heart Disease	03	14
Cerebro Vascular Disease	02	09
Anemia	16	72
Urinary Tract Infection	10	45

Figure-1 shows the etiological factors responsible for advanced renal disease requiring dialysis in this study. Glomerulonephritis was found to be commonest cause (45%), and diabetes being the next (23%) common cause of ESRD.

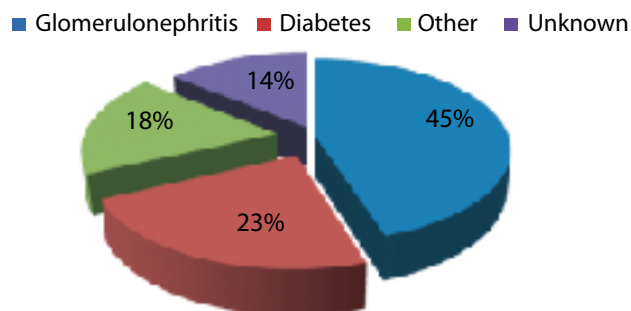


Figure-1: Etiology of stage-5 CKD (n=22)

Glomerulonephritis in relatively younger, whereas diabetes in the older age group of CKD. Emergencies (single and multiple) for which urgent hemodialysis was done is shown in Figure-2.

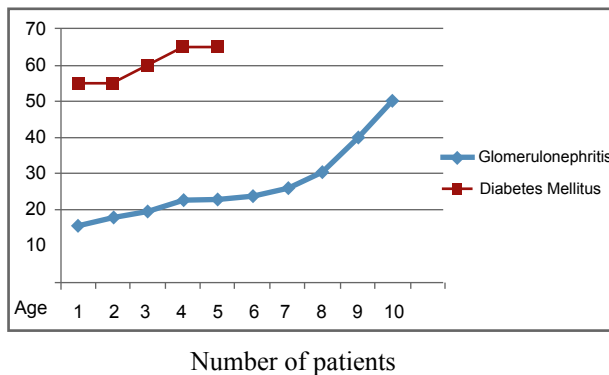


Figure-2: CKD due to GN* are younger than diabetic CKD (*GN= Glomerulonephritis)

Table-3. Percentage of individual uremic emergencies observed warranting hemodialysis is depicted in

Table-3: Emergencies for which hemodialysis was done (n=22)

Emergencies observed	Number (n)	Percentage(%)
Acute Pulmonary Edema+	02	09.0
Metabolic Acidosis+Hyperkalemia		
Acute Pulmonary Edema+Metabolic Acidosis +Uremic Encephalopathy	01	04.5
Acute Puulmonary Edema +Uremic Encephalopathy	03	14.0
Acute Pulmonary Edema +MetabolicAcidosis	02	09.0
Uremic Encephalopathy +Metabolic Acidosis	01	04.5
Acute Pulmonary Edema with fluid overload	09	41.0
Uremic Encephalopathy	02	09.0
Intractable edema alone not responding to diuretics	01	04.5
Pericardial effusion	01	04.5

The outcome of hemodialysis and the number of hemodialysis for satisfactory clinical improvement is shown in Figure-3.

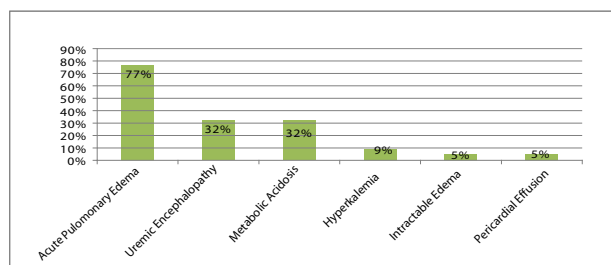


Figure-3: Uremic emergencies in percentage warranting urgent hemodialysis

The study revealed that the clinical outcome was satisfactory in 72% after 2nd dialysis and almost 100% after 3rd hemodialysis. Figure-4. There was only one fatality related to cardiovascular event (ischemic heart disease) during peridialysis period. Otherwise no immediate hemodialysis related complications observed.

- No improvement
- Partial Improvement
- Satisfactory improvement

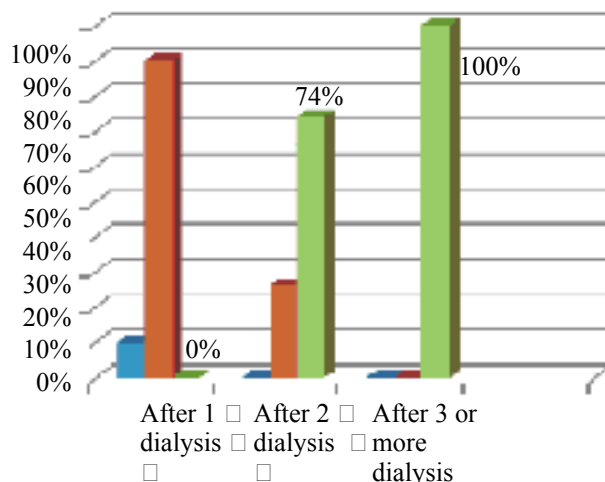


Figure-4: Outcomes of Hemodialysis

Discussion

The mean age of the patients with stage 5 CKD warranting hemodialysis was found to be 42 years which is similar to a study carried out by Harun Ur Rashid in Bangladesh¹, and it was found to be similar in India and Pakistan; but the ages are much less and the patients are relatively younger than that of the developed countries (61 years)^{11,12}. Glomerulonephritis was found to be the commonest cause (45%) in stage 5 CKD in this study. Harun Ur Rashid found glomerulonephritis (40%) to be the commonest cause of CKD in Bangladesh followed by diabetes (31%)¹³. Another recent study in patients with maintenance hemodialysis revealed glomerulonephritis (42%) as the commonest, then diabetes (32%) followed by others (25%) as the etiology of ESRD⁵. In our study patients having ESRD with glomerulonephritis were younger than diabetic renal failure. The majority of the patients present late in the course of their disease having potentially life threatening situations like acute pulmonary edema, metabolic acidosis, hyperkalemia, encephalopathy, pericardial effusion, oliguria and fluid overload as revealed in this study. Three or more short term hemodialysis at one day interval has shown to produce satisfactory outcomes in those patients in terms of survival and symptomatic relief of emergencies. Renal replacement therapy, either maintenance dialysis or transplantation are costly. Maintenance hemodialysis for ESRD, 4 hours three times per week is usually adequate⁶. But in our country most patients are only able to afford two times per week treatment^{1,3}. Due to the overcrowd government hospital dialysis unit, usually

provides hemodialysis for 4 hours, twice a week. One third of patients on dialysis abandon treatment within three months after the start of dialysis as their family resources are depleted¹. In one study the survival rates for the patients on three times per week dialysis schedule were 77% and 57% at 3 and 5 years, whereas those on twice per week dialysis had survival rates of 55% and 40% at 3 and at 5 years, respectively¹.

It is very interesting to find the dramatic response of hemodialysis with miraculous recovery. Dialysis therapy ameliorates many of the clinical manifestations of renal failure and postpones otherwise imminent death¹⁴. The success of dialysis therapy is undeniable and should not be delayed in uremic emergencies.

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