

Magnitude of Infectious Complications in haemodialysis Patients

Deep Shikha* and Sunita Mishra**

*Research Scholar and **Professor

* * Corresponding Author : Prof. Sunita Mishra*

Department of Food and Nutrition, BabasahebBhimraoAmbedkar University (A Central University), Vidya Vihar, Raebareli Road, Lucknow-226025(U.P.), India

ABSTRACT

Introduction

Chronic Renal Failure (CRF) is a gradual worsening of renal function in which the body is unable to maintain metabolic and fluid resulting in uraemia which further leads to cardiovascular diseases which is the major cause of mortality in haemodialysis patients. Haemodialysis is an alternative way of treatment in chronic renal failure patients. In haemodialysis process, blood is removed from the body and filtered through a membrane known as dialyzer, and then filtered blood is returned back to the body.

Objective

To explore the knowledge of magnitude of infectious complications in haemodialysis patients such as uraemia, cardiovascular diseases, hyperphosphatemia and hyperuricemia and oxidative stress, pneumonia, UTI, etc.

Conclusion

Over the past few years, the complications mentioned above are associated with haemodialysis. The major cause of death is uremia and cardiovascular disease. Other than this the morbidity and mortality in haemodialysis patients is viral and bacterial infections. Parents, dietitian and caregivers should be aware of infectious disease. There are several other factors such as high serum phosphate concentrations, oxidative stress are also the major complications which arises in haemodialysis patients in the duration of the process.

Keywords: *Magnitude, complications, haemodialysis, cardiovascular disease, uraemia.*

INTRODUCTION

Chronic Kidney Disease (CKD) is currently a most common problem related to health(1,2). It is slow, progressive and irreversible loss of kidney function(3). According to the National Kidney Foundation, 4.5% of the United States population (more than 14 million people) suffer from CKD(4). New classification systems standardize categories for the various stages of kidney damage. Now a days, haemodialysis is the most common treatment for CKD patients. Despite the benefits of haemodialysis in increasing the life of patients, the therapy results in serious organic changes(5). It has many complications which are infectious and life threatening too. The mortality in patients on haemodialysis remains higher in general

population. Patients treated with hemodialysis (HD) have a high incidence of infectious complications that contributes to morbidity and mortality.

As patients have disruption of the cutaneous protective barrier by the vascular access used in haemodialysis patients is main factor contributing to the increased risk of infection. Biochemical parameters investigations give the evidence that patients receiving haemodialysis have defects in cellular immunity, neutrophil function etc.(6-10). Various reports implicate the vascular access is up to 48-73% of all bacteraemia in haemodialysis patients. High proportions of infections related to the vascular access are caused by staphylococcal organisms, which carry high rates of mortality.

The United States Renal Data System(USRDS) showed that for the years of 91 and 92, have 12% of deaths in haemodialysis patients in US(11).

From National Registries(12-14), there are various reports of data, cohorts of haemodialysis patients(15,16) and previous other studies reviewed by Khan and Catto(17) gives the percentage of deaths attributed to infection. These all studies suggested that infection is the main cause of death. Data taken from USRDS in 1995 Annual Data Report(18) indicate that 12% of haemodialysis patients died due to infection.

The National Data from USRDS of 1991 and 1992(19) indicate that HD patients age of 20,76% of deaths caused by Septicaemia, 16% were by pulmonary infections and 4% were by AIDS. The cause of septicaemia or sepsis is due to Vascular access and it was 12%, peritonitis in 5% etc.

Keane et.al (20) reviewed that, 851 HD patients were observed over a total of 15,486 treatment methods between 1982 and 1985(21). The study found that 25% of deaths primarily caused by infections. Infections may present as blood -borne in other organs.

Sarnak and Jaber (22) compared annual mortality rates caused by sepsis in patients with End Stage Renal Disease(ESRD) with that in general population.

Among the most common complications are infectious endocarditis, septic arthritis, epidural abscess, septic pulmonary emboli and osteomyelitis(23-25,26-29).

The large group of CKD patients are affected by cardiovascular disease as well as infectious complications. Infection is an inflammatory state and as such may be implicated in the development of atherosclerotic disease(30-32) and the risk of the developing CVD is increased in the 6 months after an infection.

The CKD patients having infections because of Uraemia and increases the risk of bacterial infections. Factors contributing to neutrophil dysfunction include malnutrition, trace elements deficiencies, iron overload, impaired glucose metabolism, hyperparathyroidism and uremic retention solutes.

The studies suggest that ESRD patients have a higher risk of bacterial infections and that the three most common infections complications are Urinary Tract Infection(UTI), pneumonia and sepsis.

Infectious Complication of Haemodialysis Patients

There are many factors that cause infections in haemodialysis patients. But the most common are three of them that is UTI, pneumonia and sepsis. The higher UTI infection in CKD patient is incidence of urinary obstruction(33). Patients with ESRD treated by dialysis have higher annual mortality rates caused by sepsis compared with the general population(34). Increasing age (RR=1.17) per 10 years P=0.7) was associated with an increased risk of infectious death.

The evaluation of controlling demographic and co-morbid factors, dose of independent effect was measured in Kt/V, where K is dialyzer clearance of urea, t is dialysis time and V is volume of distribution of urea, approximately equal to patient's total body water.

Analysis found that each 0.1 higher Kt/V the risk of death due to infection was 8% lower (RR=0.92, P=.05), it suggests that higher dose of dialysis may decrease death caused by infection(35).

Patients on HD are exposed to several infectious risk as majority of patients went for hospitalization at least once in a year(36). Sepsis patterns are quite different when comparing the non-CKD, CKD and dialysis patients(37). The hospitalization rate is 10 times greater in dialysis patient than in non-CKD patients.

CONCLUSION

As HD itself is a complicative procedure because of biochemical parameter. It should be monitored by regular follow up. During dialysis process Sodium, Potassium and Phosphorus should be monitored with a strict dietary recommendation. Therefore, in HD process infectious complications are also risk factors for mortality.

The major cause of morbidity and mortality among patient who are on HD for long time is bacterial and viral infections.

The main infectious complications are three of mentioned above that is UTI, Pneumonia and Sepsis. The other factors are uraemic toxicity, Protein Energy Wasting(PEW), Oxidative stress.

The patient himself and his family should be provide awareness on infectious complications time to time as it was major cause of mortality in HD patient.

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COMPETING INTEREST

All author confirms that there was no conflict of Interest.

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