Emergency Admissions of Chronic Renal Failure Patients for Acute Hemodialysis: Incidence Rates, Causes and Outcome

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Introduction

Patients on maintenance dialysis have a lower overall survival that is only slightly better than those with lung cancer. Based upon the United States Renal Data System 2002 report the long term survival of dialysis patients when compared to that of general Population is expected four to five times lower and range 7 to 11 years (varies with race) for dialysis patients aged 40 to 44, and 4 to 5 years for those 60 to 64 years of age (1). Although renal replacement therapy prevents death from uremia, electrolyte disorders and fluid overload there are several factors which are associated directly or indirectly with the dialysis procedure and affecting patient overall survival (1, 2, 3, 4, 5).

In order to contribute to better knowledge of these conditions of end stage renal disease (ESRD) patients under maintenance dialysis, the present study was undertaken to determine the frequency, incidence causes and outcome of emergency admissions requiring acute hemodialysis (AHD) due to a potential life treating condition and to analyse the factors which may contribute to there prevention.

Subjects and Method

For a total time of 36 Months (7/97-7/2000) we performed a retrospective study of our regular haemodialysis patients at the Haemodialysis Unit of the district Hospital at Serres/Greece serving a population of over 700.000 inhabitants. Data from a total of 113 ESRD patients under maintenance dialysis were computer assisted collected and analysed. A total of 29.853 haemodialysis treatments among our regular patients were performed. An AHD was defined as an unscheduled admission of one of our Patient at the emergency unit of our hospital due to one of the following life treating conditions:

Severe fluid overload characterised by increasing weight (over 2kg per day), pleura effusion and raised Blood Pressure; Cardiovascular Complications such as cardiac failure by known functional ventricular impairment with low Blood Pressure at the time of presentation; Hyperkaliemia characterised by potassium levels over 6.5mmol/l with marked EKG abnormalities; Under other causes we summarise the remaining cases leading to life treating conditions such as sepsis, severe uremic encephalopathy, etc.

Results

Among 113 Patients a total of 323 AHD relating to 103 (91%) patients were performed. Three groups were created, Group (I) 92 patients needed 1-5 AHD (1,65/pt), Group (II) 6 patients needed 6-15 AHD (7,3/pt), Group(III) 5 patients needed >16 AHD(25,4/pt). The most frequent causes of admissions were severe fluid overload (63%), myocardial dysfunction (19%), hyperkalemia (17,6%) and other causes (0,4%) in all three groups. During the period of study mortality was 100% in group III, 50% in group II and 18% in group I.

Discussion

Before discussing the several different factors underlying mortality in dialysis patients, it helpful to briefly preview the major cause of deaths and comorbid conditions in this pats population.

The most frequent cause of death among dialysis patients is cardiovascular disease, accounting for approximately 50% of deaths (1,6). Congestive heart failure (CHF) at onset of dialysis and progressive myocardial dysfunction within the first year of dialysis are common findings among those patients and the presence of CHF is strong associated with early mortality in ESRD(7,8,9). Hypertension and coronary heart disease are also important causes of myocardial dysfunction (10,11).

Infection the second major causes of death among dialysis patients arise mostly from infected vascular access but also from septicaemia and pulmonary infections and is for 15 to 20 percent of deaths responsible (12,13,1,14,15).

Withdrawal from dialysis is also a significant cause of death (20%)(1,16) but due to the growing worldwide population of geriatric ESRD patient an a high quality of life on dialysis many such patients the therapeutic option of hemodialysis treatment is nowadays widely given despite complex comorbid and psychosocial factors in the elderly (16,17). Except these 3 major causes of deaths among ESRD patients there are several risk factors which are either directly associated to the dialysis procedure and others not related to dialysis that have a great impact on mortality. The adequacy of dialysis reflected by the frequency and length of dialysis and not only upon the Kt/V index and urea kinetic modelling improves survival rates as in many studies reported. (18,19) The biocompatibility of hemodialysis membrane is also related with dialysis adequacy and survival (20).

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Risk factors not related to dialysis but high associated with mortality among dialysis patients are comorbid conditions such as hypertension, metabolic abnormalities, particular hyperphosphatemia (21,22), hyperlipidemia, diabetes mellitus, underlying renal disease and age (1,22,23,24). Several other factors such comparison among different countries in which the dialysis procedure is been held and ownership of dialysis facilities seems to play also an important role. An analysis of the American health care system found that mortality was 20 percent higher among dialysis patients treated in for profit rather than not-profit facilities (25,26,27). There are also less likely to receive kidney transplants (26). This study provides important data about the financial influence and commercial ownership on the quality of renal care. Nutritional status, since presence of malnutrition prior to the initiation of dialysis is strongly predictive of increased mortality (28,29). Psychosocial factors such as compliance and social support seem to play also an important role in the outcome (30).

During our 3 years retrospective study 103 (91%) out of 113 patients were at least once admitted due to a potential life threading condition. The total number of AHD performed in 3 years were 323, meaning almost 9 (8.97) AHD per month. In view of the unscheduled and unexpected nature of these procedures, the intensive care of this patient from the medicine personal during dialysis as well as the following in-hospital admission afterwards, there are significant personal and financial resources implication resulting to expensive and complicated treatment for the provision of an adequate renal care (31). On the other hand even the intensive dialysis treatment in group I und group II needing at least 6-15 and over 15 AHD pro person had no positive impact on life expectancy. Mortality of 100% and 50% respectively may reflect the severe comorbid factors of these two groups for example diabetes mellitus and cardiovascular diseases, and the advanced age of these patients.

Although renal replacement therapy can prevent death from uremia, electrolyte disorders and fluid overload, the three major reasons for the acute admission were severe fluid overload (63%), myocardial dysfunction (19%) and hyperkalemia (17.6%) in all three groups. The control of fluid balance and hypertension is crucial because fluid overload leads to persistent volume expansion, hypertension and possible deterioration in ventricular function. Both fluid intake and dietary potassium intake, the most common cause of hyperkalemia, depends mostly on patient habits and compliance. Under these circumstances is crucial to promote prevention strategies and optimise the dietary behaviours in order to minimize the risk that arises from such conditions.

Conclusions

A large number of hemodialysis patients required acute hemodialysis treatments due to a potentially life-threatening condition resulting to even higher costs of haemodialysis treatment per month per case. Also high incidence of emergency admission increases the risk of mortality. The major causes of emergency admission are severe fluid overload, myocardial dysfunction and hyperkalemia. It is crucial to promote prevention strategies, particularly to optimise the control of fluid balance and dietary potassium intake, in order to decrease the number of these admissions which are placing high demands upon health care resources and to minimize the risk that arises from such conditions for our patients.

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