13. Reducing Mortality for Diabetic Patients on Hemodialysis

Editor’s Comment: Truly simple and common sense measures translate into enhanced patient survival as Wordekal illustrates in what amounts to a patient care manual for hemodialysis patients with diabetes. Reading as if extracted from a nonexistent American Diabetes Association Dialysis Practice Guide, the lessons learned from supervising a large kidney program ring through as sound and appropriate. It took more than a decade of maintenance hemodialysis care before the question of adequate dose of dialysis was properly addressed. Today, there are Medicare standards for minimal dosage. The check points listed by Wordekal: dose, blood pressure control, blood glucose regulation, correction of anemia, reduction of hyperlipidemia, and provision of sufficient nutrition all appear reasonable but may be lacking in an individual patient unless a routine surveillance of progress is made. What needs to be added for completeness is a check list for periodic consultations with cardiology, ophthalmology, podiatry, and other services as indicated by the patient’s individual course.

Diabetic nephropathy is the leading cause of end stage renal disease (ESRD) in the United States, Japan, and most industrialized countries in Europe and Asia. The number of new diabetic patients accepted for renal replacement therapy (RRT) has been increasing steadily for the last decade. The United States Renal Data System (USRDS) reported in 1987 that the percentage of diabetics newly started on renal replacement therapy was 27%, but this number had increased to 44.5% by 1997 [1]. The great majority of diabetic patients starting RRT suffer from type 2 diabetes mellitus, and the increasing number of diabetic patients, particularly type 2, is explained by the increasing prevalence of type 2 diabetes in the general population, and partly because diabetic patients with nephropathy are now living long enough to develop end stage renal disease.

Although survival of diabetic patients on RRT has significantly improved over the last decade, it has remained shorter when compared to non-diabetics. USRDS 2000 reports higher mortality in diabetic patients than non-diabetics undergoing peritoneal dialysis (PD), hemodialysis (HD), or after kidney transplantation [1].

FACTORS AFFECTING SURVIVAL OF DIABETIC ESRD PATIENTS

I. Age

Age is the strongest factor associated with increased mortality. Since the majority of diabetics with ESRD are type 2 patients, the age of new diabetic patients accepted for RRT has been increasing steadily. Currently, the mean age of diabetic patients starting
RRT in the United States is 62.5 years [1]. As the age of the patients’ increase the number and severity of co-morbid conditions also increase [2]. Foucan et al. did survival analysis of 784 patients (22% diabetics) who began chronic dialysis between 1978–1997. Median survival was significantly lower in diabetic than in non-diabetic patients (3.5 years verses 6.9). The RR for death (95% CI) were 1.90 (1.10–3.22) and 3.43 (2.00–5.87) for diabetics began dialysis at age 55–64 years and 65–83 years of age respectively [3].

2. Co-morbid Conditions (Table 2)

The presence of preexisting diabetic complications such as cardiovascular disease, peripheral vascular disease, neuropathy, and retinopathy have significant impact on the survival of diabetics on hemodialysis [4, 5]. A study by Chantiel et al. evaluated 84 consecutive type 2 diabetic patients starting dialysis between 1995–1996. Cardiovascular disease was highly prevalent at initiation of dialysis, with a history of myocardial infarction in 26%, angina in 36%, and acute left ventricular dysfunction in 67%; 27 of 87 patients (32%) died after a mean follow-up of 211 days, mostly from cardiovascular disease [6]. Adding to the difficulty in management of diabetic nephropathy complicated by cardiac disease is the reality that extensive coronary artery disease is often asymptomatic in diabetic patients. Koch et al., evaluated all of their diabetic patients (71 type 1, 28 type 2) for coronary artery disease during their first six months of dialysis treatment. Coronary angiography was performed in all regardless of clinical symptoms of coronary artery disease, in 38 of whom (36%) coronary artery disease was documented (17 patients with single vessel, 6 patients with two vessel, and 15 patients with three vessels disease). Angina pectoris was present only in 9 (24%) of these 38 patients. In 11 patients cardiac intervention was felt to be indicated and was performed (3 patients underwent coronary artery bypass surgery, and 8 had angioplasty). In this study risk factors such as hypertension, smoking, and cholesterol and lipoprotein (a) level were not significantly different in patients with and without coronary artery disease [7]. Vascular disease is not limited to the coronary arteries in diabetics starting dialysis. According to a recent survey of 25,037 patients with diabetic nephropathy, 18% of them had amputation (above ankle) at the time of starting RRT [8].

3. Adequacy of dialysis

Numerous studies have demonstrated a correlation between adequacy of hemodialysis and patient survival [9–11]. Although the prescribed dose of dialysis is the same for both diabetic and non-diabetic patients, the delivered dose of dialysis is usually less for diabetic patients because of either insufficient blood flow secondary to malfunction of their vascular access or interruption of treatment due to intradialytic hypotension. Palevsky et al. studied 29 dialysis facilities whose average urea reduction rate was < 67%, and found that reduced treatment time and use of a catheter for angio-access to be the two barriers to the delivery of adequate dialysis [12]. Both of which are more frequently seen in diabetic patients.