EFFECT OF INTRODUCING HAEMODIALYSIS FLUID CONTAINING GLUCOSE ON THE CARE OF DIABETIC PATIENTS AND THE WORKLOAD OF NURSING STAFF

K Baharvand, C Garratt, A Hardy, E Lindley, D Littler, S Stephenson & E Will
St Jame's University Hospital, Leeds

PROBLEM: Dialysis fluid concentrates are available with and without glucose. Glucose passes easily through the dialyser membrane, so the use of a glucose-free fluid can lead to hypoglycaemia, especially in diabetic patients. However, the presence of glucose in the fluid has been associated with a higher risk of bacterial contamination. Historically, our centre chose to use a glucose-free fluid and treat hypoglycaemia with IV dextrose or oral glucose. Introduction of dry powder bicarbonate and more effective machine disinfection programmes has reduced the risk of bacterial growth, leading many centres to switch to glucose containing dialysis fluids. Our multidisciplinary Haemodialysis Service Team agreed that moving to a dialysis fluid containing 5.5 mmol/l (1 g/l) glucose could be beneficial, but the team felt that a change that would affect over 400 patients in 8 locations should be approached cautiously.

PURPOSE: The first step made by the HD Service team was to evaluate the effect of changing to a fluid with 5.5 mmol/l glucose on the number of nursing interventions required for diabetic patients during dialysis.

DESIGN: Thirty diabetic patients (19 male, 11 female, aged 35 – 88, mean time on dialysis 2.2 years) dialysing in nurse-led satellite units took part in the study, which was approved by the Chairman of the Local Ethics Committee. The group included 18 insulin dependent diabetics, 7 patients managed with oral hypoglycaemic drugs and 5 diet-controlled diabetics. All patients were dialysed thrice weekly. Nursing staff used a standard form to record interventions for hypoglycaemia during the 4 weeks before and after converting the patient from glucose-free fluid to the fluid with 5.5. mmol/l glucose. These interventions were based on the patient's individualised care plan which specified the type of intervention (IV dextrose infusion, PolyCal, sweets or Lucozade) and the blood glucose action level (4.0 to 7.5 mmol/l in these patients). The proportion of sessions with one or more interventions for hypoglycaemia with each fluid was compared using the Chi-squared test.

FINDINGS: The proportion of sessions where the patient required any intervention for hypoglycaemia dropped from 20.3% to 2.2%. This 89% reduction in interventions is highly significant ($p<0.0001$). The proportion of sessions where the interventions included a dextrose infusion fell from 13.6% to 0.8% and has fallen further, as staff have found that patients who arrive for dialysis with a low blood glucose can now be managed with sweets or biscuits. In most locations, the staff now monitor glucose levels at the start and end of dialysis (and when patients are symptomatic) instead of hourly. The patients are less anxious about their glucose levels and can now sleep during dialysis without being disturbed. The reduction in dextrose infusions was greatly appreciated by insulin-dependent patients. Two patients who enjoyed sweets complained that the new fluid was 'giving them high glucose levels' so that staff had to explain how it actually affected them. With this exception, the change has significantly reduced nursing workload.

CONCLUSION: This study showed that changing to a dialysis fluid with 5.5 mmol/l glucose improved the well-being of diabetic patients and dramatically reduced the need for interventions to correct hypoglycaemia in diabetic patients.

RELEVANCE: Our centre now plans to assess the effect of converting all patients to the new fluid. We feel that it is valuable to publicise the results of this study as a survey of five nearby centres in January 2003 showed that three were using glucose-containing fluid almost exclusively, while the other two were dialysing all their patients with glucose-free dialysis fluid.