

Research letters

Allergic reactions to the polymeric glucose-based peritoneal dialysis fluid icodextrin in patients with renal failure

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A new glucose polymer, icodextrin, related to maltose, is in increasing use as a peritoneal dialysis fluid. We report on adverse events seen in our unit during a 12-month period after the introduction of this reagent.

Peritoneal dialysis is the commonest form of renal replacement therapy in the UK. Conventional peritoneal dialysate uses glucose as an osmotic agent to assist ultrafiltration. This high glucose load has a plethora of undesirable consequences for dialysis patients, including dyslipidaemia and an increase of glycation end products. Icodextrin (Baxter Healthcare, Deerfield, IL, USA), a starch-derived glucose polymer that is metabolised to maltose, has been developed as an alternative to glucose to use in peritoneal dialysis for patients with ultrafiltration failure,¹ and has been in widespread use in the UK for about 18 months.

Allergic reactions to icodextrin have been rarely reported in the pregenal release phase; just six cases have been reported out of many hundreds of exposed patients, and all involved exfoliation of variable severity.²⁻⁴ We reviewed our departmental use of this new compound from October, 1998, to October, 1999. At that stage 102 patients had been exposed to icodextrin; exposure was maintained for 6 months or more in 80 patients. As a control group we looked at 120 patients on continuous ambulatory peritoneal dialysis, using conventional glucose-based dialysis over the same time.

Reported skin reactions in the patients exposed to icodextrin were of two types—exfoliative and blistering. Three exfoliative reactions were seen. Each was acute, generalised (torso, limbs, face, and extremities), very itchy, rapidly worsening, and all started very soon after first icodextrin exposure (on day 1, day 2, and day 4). One of these cases involved facial and limb oedema. Fever and eosinophilia were not seen in any patients. All responded to prompt withdrawal of icodextrin; symptoms improved in all three cases within 48 h of discontinuation of icodextrin dialysis, and all symptoms resolved within 3 weeks. Two acute blistering reactions on sun-exposed areas (hands, face, and neck) were seen (in the absence of raised blood/stool porphyrins, and persisted despite withdrawal of contemporaneous furosemide in one patient). These occurred at 3 and 6 months after commencement of icodextrin dialysis, and both started in July (which was unusually sunny and warm). Both patients again responded to icodextrin withdrawal, though taking 6 and 8 weeks, respectively, to resolve completely. Skin biopsy samples showed non-specific inflammatory changes. No patient had a history of exposure to dextrans.

No cases of erythroderma-like skin reactions were seen in the patients not using icodextrin. Two other patients on continuous ambulatory peritoneal dialysis had acute photosensitive skin blistering in the 12-month study period—one patient on icodextrin but with gross elevation of blood and stool uroporphyrinogen concentrations, diagnosed with chronic hepatic porphyria, and one patient

on conventional glucose-based dialysis on high-dose oral furosemide, with resolution of blisters 3 weeks after withdrawal of furosemide.

Questionnaires sent to the remaining patients on icodextrin noted that nine further patients had experienced skin problems (itching in nine, dryness in seven, rash in four, and blisters in two) temporally associated with icodextrin—in six patients these were de-novo skin complaints and in three patients these were exacerbations of previous symptoms. Icodextrin had not been withdrawn in any of these patients and in five patients resolution of symptoms had occurred during a period of weeks. Pruritus is a common complaint in patients on all types of dialysis. We did not rechallenge any of the patients in whom icodextrin had already been withdrawn.

The allergenic icodextrin epitopes responsible for these reactions are not known. The structure of icodextrin differs from that of the naturally occurring polymeric substance dextran, used as a plasma expander, only in the alpha-1,4 and alpha-1,6 linkages. The proportion of patients with pruritus can be 50% in those on long-term treatment with dextrans, and in whom dextrans can be deposited in the skin and peripheral nerves. Pre-formed antibodies to dextrans can be found in many of these patients, and the proportion of patients who have allergic reactions can be reduced substantially by use of hapten inhibition.⁵ We would be interested to try to find anti-icodextrin or anti-dextran antibodies in cases of allergic reaction to icodextrin, in case the cause is similar and potentially remediable using therapeutic techniques.

We conclude that up to 15% of patients on icodextrin may experience skin reactions, which may be serious in about a third of cases. Symptoms and signs resolve where icodextrin is withdrawn. Vigilance about this newly-introduced and otherwise effective and useful glucose polymer should be maintained. Caution should be exercised in patients with a severe dextran or icodextran allergy in case they receive the other compound and there is cross-reactivity.

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