Icodextrin Hypersensitivity in a CAPD Patient

Icodextrin, a maltodextrin glucose polymer, is increasingly being used as an alternative to glucose as the active osmotic agent for peritoneal dialysis. It has improved ultrafiltration properties (1, 2) due to the reduced absorption of icodextrin compared to glucose. It may also lead to improved diabetic control, although this has not been clinically proven (1). Previous studies into its use have shown that it is generally well tolerated with very few side effects (1, 2). We report here a case of severe cutaneous hypersensitivity reaction to icodextrin.

CASE

REPORT

This 48-year-old woman with a 37 -year history of insulin-dependent diabetes developed end-stage renal failure secondary to diabetic nephropathy in August 1995. Her medical history included ischemic heart disease, mitral valve disease (requiring a mitral valve replacement in 1993) and diabetic retinopathy. She was started on continuous ambulatory peritoneal dialysis (CAPD) (3 x 2.0 L 1.36% glucose exchanges during the day, 1 x 2.0 L 3.86% glucose exchange overnight). Dialysis went well initially although her diabetic control was suboptimal with a HbAlc of 8.1% (NR 3.8-6.0). Her peritoneal equilibrium test (PET) at three months from the start of CAPD showed that at four hours her creatinine *(DIP)* was 0.79 and her glucose (D/Do) was 0.27, indicating

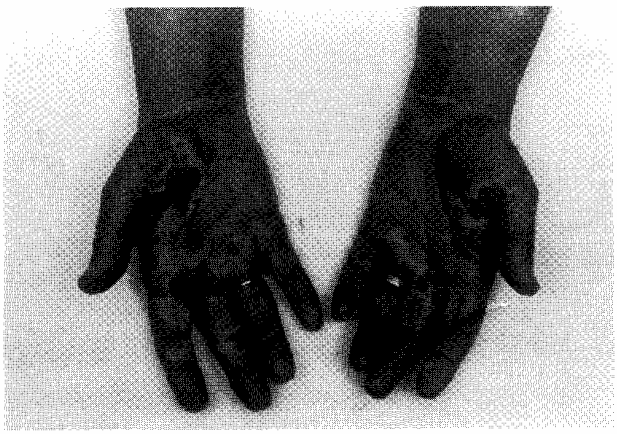
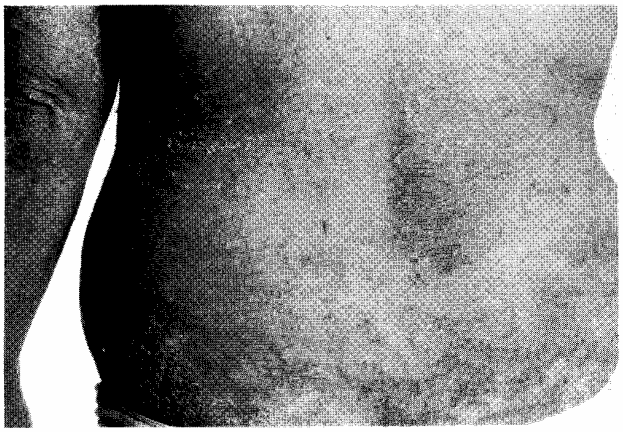


Figure 1.—Photograph of the palmar aspects of both hands



a high transporter status. Despite this, her drain volume was 2,650 mL over four hours on a 2.0 L exchange. Her adequacy of dialysis, as measured by *KTN,* was 1.49 (local target > 1.7). After six months, she started having problems with fluid balance. She was found not to be ultrafiltering on a 2.0 L 1.36% glucose dialysate over four hours and she required 2 x 2.0 L exchanges of3.86% glucose dialysate per day. On these exchanges she was only filtering about 400600 mL per day.

Nine months into her dialysis, it was decided to change herto a night-time exchange of7 .5% icodextrin to improve ultrafiltration. Ten days later, she developed a widespread maculopapular rash over her abdomen, arms, hands, legs, and lower back. Her face and upper trunk were spared. She complained of marked pruritus over the rash, severe enough to interfere with her sleep at night. Over the course of the following days the rash spread, and at day 13, it became exfoliative and erythrodermic (see Figures 1 and 2). When she was seen in our outpatient department on day 15, a diagnosis of exfoliative dermatitis secondary to an allergic reaction was made. An anti-histamine and aqueous cream were prescribed. She had not had any change in medication during the past three months and her medication included porcine insulin, sodium valproate (for a diagnosis of epilepsy), warfarin, fludrocortisone (for autonomic postural hypotension), ferrous sulphate and human recombinant erythropoeitin.

Her icodextrin dialysate was stopped and she reverted back to conventional glucose peritoneal dialysate. Over the course of the next five days her rash rapidly improved and there were no further evidence of new desquamation. However, she developed *Staphylacaccus epidermidis* CAPD peritonitis, which responded to the usual treatment of intraperitoneal antibiotics. The likely source of this episode was felt to be from the affected skin around the exit site of the peritoneal catheter, which became weepy through most of the duration of the rash. During this episode, her biochemistry remained stable, with a potassium of 4.2-4.9 mmol/L, a urea of 20-23 mmol/L, a creatinine of 446-560 μmol/L, an albumin of 25-31 g/L, and a bicarbonate level of 24-27 mmol/L.

DISCUSSI

ON

The diagnosis in this patient is an exfoliative dermatitis secondary to an allergic reaction to the icodextrin. We can comfortably exclude her other medications as the cause, since she had been on them for at least five months with no dermatological complications noted. We also considered the hand cleansing spray [Frekaderm®, containing ethanol, 2benzyl-4-chlorphenol, o-phenylphenol and alkyl-dim-ethylbenzylammonium chloride] as a possible cause of the allergic reaction. However, the rash was generalized and did not start at sites exposed to the spray, i.e. , the hands. Moreover, she continued to use the spray for her conventional CAPD until the time ofher peritonitis, by which time there was already a marked improvement in her skin condition. There was also no other change in the patient's diet or lifestyle during that time.

This case report also highlights the potential danger of superimposed infection following an allergic reaction with significant skin involvement. Although not proven, we feel that the breakdown in the skin caused by the allergic reaction would have contributed to the CAPD peritonitis in this patient. She had previously not had any episode of CAPD peritonitis or exit-site infection. The isolated organism from the *peritonitis,Staphylococcus epidermidis,* is part of normal skin flora and would

by the rash and exfoliation.

Hypersensitivity to the icodextrin is the most likely explanation for her severe cutaneous reaction. Three cases of dermatological reactions to icodextrin have been reported (3), with patients presenting with vesicular rash on their palms. In those cases the patients were able to continue on the icodextrin and the vesicular rash spontaneously resolved. Icodextrin is a polymer of glucose with a mean molecular weight of20,000 D, but is broken down as maltose (4). It is also similar in structure to another naturally occurring glucose polymer, dextran. The difference between dextrin and dextran is the polymer link (α-1,4 and α-l,6Iinkages, respectively). The latter, used as plasma expander or as an anticoagulant, is well known to cause allergic type reactions including anaphylactoid reactions (5,6). Although the epitope(s) for the allergic reaction have not been identified, there have been studies that have confirmed the immunogenicity of dextrans (7, 8). It is plausible that either the same or a similar epitope may also be responsible for the hypersensitivity reaction seen with icodextrin.

Michael K.-L. Lam-Po-Tang
Michael R. Bending
Jonathan T.C. Kwan

South West Thames Renal Unit
St. Helier Hospital
Carshalton, Surrey, England

REFERENCES

1. MistryCD, Gokal R, Peers E. A randomized multicenter clinical trial comparing isosmolar icodextrin with hyperosmolar glucose solutions in CAPD. MIDAS study group. Multicenter Investigation of Icodextrin in Ambulatory Peritoneal Dialysis. *Kidney Int* 1994; 46(2):496-503.
2. Mistry CD, Gokal R. The use of glucose polymer (icodextrin) in peritoneal dialysis: an overview. *Perit Dial Int* 1994; 14(Suppl 3):S158-61.
3. Wilkie ME, Plant M, Edwards, Brown CB. Indications and outcomes for the use of icodextrin -experience of 60 patient years (abstract). In *XXXIIIrd Congress of the European Renal Association -European Dialysis and Transplant Association*, June 1996. Amsterdam, Netherlands; 355.
4. Alsop RM. History, chemical, and pharmaceutical development oficodextrin. *Perit Dial Int* 1994; 14(Suppl 2):S5-12.
5. Berg EM, Fasting S, Sellevold OF. Serious complications with dextran 70 despite hapten prophylaxis. Is it best avoided prior to delivery? *Anaesthesia* 1991; 46(12):1033-5.
6. Ring J. Anaphylactoid reactions to plasma