Prolonged exposure to an epoxy resin leading to interstitial nephritis

A 51 year old administrator was transferred with a four week history of malaise and intractable vomiting. His creatinine had deteriorated over 10 days from 343 µmol/l to 524 µmol/l. There was no notable personal or family history. He was not taking any medications or herbal remedies. Further questioning showed that over the previous 18 months he had been building his own aeroplane in a large but enclosed aircraft hangar. This involved the use of a blended epoxy resin (SP Ampeg 20) and the associated SP Ampeg 20 standard hardener (3-aminoethyl-3, 5, 5-trimethylcyclohexylamine and 4, 4'- iso-propylidenediophenol) (Standard Polymer Systems). Six months previously he had developed severe contact dermatitis which resolved on use of occlusive hand protection.

Physical examination was unremarkable. Urinary analysis showed 850 mg protein/ 24 hours and negative microscopy. Routine immunological tests and ultrasound of the renal tract were normal. Histological examination of a percutaneous renal biopsy showed an interstitial nephritis with lymphocytes, plasma cells, and a few eosinophils. There was mild interstitial fibrosis.

The patient was started on oral prednisolone at 0.5 mg/kg/day. This was slowly reduced over eight weeks to 10 mg daily and the creatinine improved to 155 µmol/l six months later.

We think that this patient developed interstitial nephritis secondary to inhalation of volatile substances associated with the use of an epoxy resin. He had no contact with other chemicals. We would like to cause this disseminated allergic disease, experienced general malaise which cannot be accounted for by the degree of renal impairment, but is consistent with the systemic effects of resin exposure. Previous severe dermatitis which these symptoms had improved with the end of direct contact.

Epoxy resins are formed by the condensation of epichlorhydrin and a dihydroxy in the presence of a polyamine hardener. Allergic illnesses, particularly dermatitis, can be caused either by the resin or the hardening agents. Contact can be direct or by inhalation of volatile hydrocarbons.¹

Workers chronically exposed to volatile organic solvents have been shown to have significantly more protein in their urine than controls.² Cases of acute interstitial nephritis have been reported associated with volatile hydrocarbons. Two were related to chronic exposure in printing factories and one after a single episode of exposure to polyamide epoxy high gloss paint fumes.³

Interstitial nephritis is a pathological entity characterised by a mononuclear cell infiltrate of the renal tubular interstitium. Although lymphocytes predominate eosinophils can occur particularly when drugs are identified as the cause. Clinically the picture is of an acute decline in renal function which can be associated with heavy proteinuria and peripheral oedema. Improvement often occurs after removal of the offending agent, but uncontrolled observations suggest that moderate doses of corticosteroids hasten recovery. Recovery should be complete although evidence of interstitial fibrosis at biopsy is associated with a poorer outcome.

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