Status Epilepticus Possibly Caused by Hair Dye Exposure in a Diabetic Man

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Background: Permanent hair dyes are most commonly based on para-phenylenediamine (PPD) or derivatives of PPD. Although toxic effects of PPD ingestion develop severe complications such as rhabdomyolysis with renal insufficiency and cardiomyopathy, adverse effects of cutaneous PPD intoxication are various from contact dermatitis to severe anaphylaxis. On the contrary, there was no report of PPD induced severe neurologic complication such as status epilepticus.

Case Report: A 59-year-old diabetic man was admitted to an intensive care unit because of status epilepticus shortly after an hair dye exposure. Laboratory studies showed a very high serum glucose level (>400 mg/dL) and an elevated serum osmolarity (324 mOsmol/kg). His brain MRI was normal, and the EEG showed diffuse slow waves. The hair dye contained PPD and aminonitrophenol. He was patch-tested for PPD, which was positive.

Conclusion: To our best knowledge, this is the first report of fatal adverse event developed after the application of hair dye in a compromised person.

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Discussion

Most of permanent hair dyes are based on PPD or PPD derivatives. PPD has been shown to be one of the most potent contact-allergens in both animal studies and human clinical experiences. The number of patients suffering from PPD-induced allergy has grown over the past due to an increasing popularity of hair dye use. There have been many cases reporting adverse events of cutaneous intoxication such as itching, edema of the face, eyelids, and scalp, ulceration of the face or eczema. Cutaneous PPD intoxication can also induce severe anaphylaxis. Clinical manifestations of systemic PPD intoxication are associated with respiratory, muscular, renal, and hemodynamic syndromes such as cervicofacial edema, chocolate-brown colored urine, upper airway tract edema, oliguria, muscular edema, and shock. However, so far there has been no report on fatal neurologic complications such as status epilepticus induced by cutaneous PPD intoxication.

Status epilepticus could be explained in several ways after PPD intoxication. The laboratory findings were indicative of nonketotic hyperosmolar coma and acute renal failure, and these conditions might cause status epilepticus. That is to say the initial trigger was cutaneous intoxication of PPD and the complications including elevated blood glucose, acute renal failure, nonketotic hyperosmolar coma, metabolic encephalopathy and status epilepticus were secondary serial events of PPD intoxication.

We do not know the exact relationship between the exposure to hair dye and the subsequent development of status epilepticus in the present case. We presume that his diabetes mellitus could worsen the anaphylactic reaction caused by
PPD and might develop status epilepticus by metabolic encephalopathy. Therefore, chronically compromised patients should be cautious about using hair dye that contains PPD or PPD derivatives.

Even though we cannot explain the status epilepticus solely based on PPD cutaneous intoxication, this is the first case showing fatal neurological side effects developed after an application of hair dye in a compromised patient.

REFERENCES