STUDENTS' CORNER
LETTER TO THE EDITOR

The dual nature of paraphenylenediamine: Beauty product or suicidal weapon?

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Dear Editor, Paraphenylenediamine (PPD), referred to as "Black Stone" in Arabic-speaking regions and "Kala Pathar" in South Asia, is a derivative of para-nitroaniline that is produced industrially synthesised.[1] Its chemical properties make PPD a popular choice for beauty products such as henna and hair dyes.[1] However, it is a highly toxic compound that can result in harmful effects in cases of acute poisoning, thereby becoming a commonly used household poison and agent of suicide.[1]

A study conducted at Sheikh Zayed Hospital in Pakistan documented 103 patients with PPD poisoning in a single year, 88 of whom were female and from lower socio-economic backgrounds. In most cases, PPD was intentionally ingested with suicidal intent.[2] In a clinical trial conducted in Bangkok, PPD was identified as the most common allergen causing hand contact dermatitis among hairdressers, thereby triggering hypersensitivity reactions.[3] However, oral consumption can lead to serious complications such as cervicofacial angioedema, tongue swelling, and rhabdomyolysis, resulting in acute kidney injury, fatal arrythmias, and acute hepatitis.[2] There is no specific antidote for PPD poisoning, prompt clinical intervention is critical. Interventions such as maintaining airway patency, performing timely tracheostomy with proper postoperative care, and administering intravenous treatments such as antihistamines, and renal dialysis become important for patients for survival.[2]

Since the majority of the cases have suicidal intent, community-based virtual programmes can act as an early intervention tool in providing psychological support. In addition to symptomatic treatment, we can administer enzyme therapy capable of metabolising PPD into less toxic substances could mitigate its harmful effects on the liver and kidneys. This also emphasizes the need for early detection of complications like hyperkalaemia or rhabdomyolysis, Biosensors can play a vital role, especially for patients who arrive late or are unable to communicate. An amperometric electrode utilising perovskite oxide is both cost-effective and highly sensitive, making it an excellent choice for widespread application.[4] Furthermore, a ratiometric electrochemical sensing platform can effectively detect PPD in cosmetic products.[5] Additional clinical trials with larger sample sizes are warranted to assess the efficacy of diverse treatment strategies across different populations.

Paraphenylenediamine (PPD) poses a dual threat while it is a widely used cosmetics, its accessibility and toxicity render it a dangerous agent for self-harm.

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