

RDX intoxication causing seizures and a widespread petechial rash mimicking meningococcaemia

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The cardinal signs of meningococcal septicaemia, a potentially lethal condition, is a widespread petechial rash, the development of which is a strong indication for immediate parenteral benzylpenicillin. Diagnostic confusion can occur, however. Reported here is a case of generalized petechial rash thought initially to be meningococcal in origin but ultimately found to be the result of a grand mal seizure induced by the ingestion of 'RDX', a plastic explosive constituent.

Case report

A male territorial soldier aged 19 years was admitted with a 6-hour history of frontal headache and two grand mal seizures. A progressively disseminating petechial rash suggestive of meningococcal infection had been noted immediately following the initial seizure by the attending doctor, who had administered intravenous benzylpenicillin prior to hospitalization.

There was no personal or family history of epilepsy. Prior health was good. He was on no medication and did not misuse drugs or alcohol. Physical findings were: apyrexial; normotensive; no photophobia; no neurological abnormalities; a florid petechial rash over the face and trunk; a lacerated tongue. Initial results included; leucocyte count $10.8 \times 10^9/\text{dl}$ (87% neutrophils); haemoglobin, platelet count, coagulation screen, serum and cerebrospinal fluid biochemistry all within normal limits; CSF and blood bacteriologically unremarkable. This was unresponsive of meningococcal disease but, in the absence of an alternative diagnosis, penicillin was continued. Shortly following admission, his headache and rash disappeared. There were no further seizures.

Diagnostic uncertainty led to the preliminary diagnosis being reviewed. He admitted chewing, as an act of bravado, a piece of 'Semtex' plastic explosive 4 h before his first seizure. Immediate enquiries revealed this to contain an epileptogenic substance called 'RDX'. Since the findings were now considered to be consistent with RDX toxicity, parenteral penicillin was discontinued. The patient made an uneventful recovery.

Discussion

RDX (cyclotrimethylenetrinitramine)¹, a highly explosive compound first used in World War II, is the principal

constituent (91%) of a plasticized preparation called Compound C-4 (CC4)² and of other similar compounds. It represents a rare example of a specific chemical being implicated as a cause of new onset of seizures. Intoxication can follow inhalation or oral ingestion in three types of settings:

Manufacturing exposure: Neurotoxicity was first documented in 1949 after munitions workers developed seizures secondary to dust inhalation³. The subject has been reviewed⁴.

Battlefront exposure: US field troops in Vietnam, finding that CC4 burnt easily and intensely without exploding, often used it to heat food, resulting in accidental ingestion or inhalation. Furthermore, ingestion of small quantities were found, rather like ethanol, to produce a 'high'. At least 31 intoxication cases were reported among these soldiers^{2,5-7}.

Non-wartime accidental exposure: In 1982, eight individuals developed seizures after accidentally ingesting RDX from cooking bowls used 3 years earlier to mix chemicals⁸. In 1984, a child of three, hospitalized twice with status epilepticus, had been chewing on pieces of plasticized explosive stuck to the garments of its mother, a munitions worker¹. The child's CSF RDX concentration to serum RDX concentration ratio was high¹.

The present case is the first reported in the UK and one of very few to have occurred anywhere outwith wartime. Fits occurring in a previously healthy individual in a military environment should strongly suggest the diagnosis, and the present case emphasizes the importance of eliciting a thorough social history with respect to seizure occurrence.

Finally, the widespread petechial rash so suggestive of meningococcaemia as the preliminary diagnosis had arisen from the tonic phase of a severe grand mal seizure, which incorporates a Valsalva-like manoeuvre. The importance of adding grand mal seizure to the differential diagnosis of a generalized petechial rash should accordingly be emphasized.

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