CASE REPORT

Unusual case of anxiety: trichloroethylene neurotoxicity

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SUMMARY

I present an uncommon case of recurrent, intractable anxiety that was presented acutely and slowly evolved into a chronic debilitating condition. A young previously fit and healthy 24-year-old patient presents with somewhat atypical symptoms of anxiety. Full medical work-up including examination, blood, ECG, electrocardiogram, electroencephalogram and CT of the head was unremarkable. When the history was explored in detail, it was revealed he worked in the navy and was exposed to a neurotoxic solvent, trichloroethylene. This case highlights the importance of eliciting a detailed occupational history, particularly paying attention to patient demographics such as occupation and presenting symptoms that do not readily fit into diagnostic criteria.

BACKGROUND

This case highlights the importance of scrutinising presenting symptoms and careful consideration of patient demographics. A proportion of patients who suffer from chronic solvent neurotoxicity often present acutely during a peak exposure period. Early diagnosis and management of these patients could prevent a potentially debilitating, life-altering chronic disease.

CASE PRESENTATION

A 24-year-old man, previously fit and well, presented following a week-long binge of alcohol in the navy; he complained of feeling 'shaky', tight-chested, blurry vision and hyperventilation. He also reported a headache and tingling intermittent pain on the right side of his face. The headache was a mild intermittent occipital dull headache with no red flags or other associated features. He experienced an uncomfortable tingling, burning sensation on his face. There was no significant medical history or family history.

Social history revealed that apart from the week-long binge prior to his presentation, there had been no history of regular or excessive alcohol use. The patient denied any illicit drug use, and drug screens supported this. The patient was high-functioning, having graduated top of his naval classes and was then working as a naval engineer.

Physical examination showed a bilateral resting tremor but no other remarkable findings. Mental state examination revealed a young athletic man who appeared objectively anxious and restless. There was no thought or perceptual derangement.

The patient had normal cognition, orientated to time, place and person.

INVESTIGATIONS

Comprehensive investigations were carried out to rule out any cause of the symptoms including the following:

- ▶ blood tests: full blood count, clotting studies, urea and electrolytes, calcium, magnesium, iron, copper, B₁₂, folate, thyroid function tests, full autoimmune screen, haemoglobinopathies screen, and infectious disease screen including HIV, hepatitis B, hepatitis C, syphilis—NAD
- ▶ Physical exam—NAD
- ▶ CT and MRI Imaging—NAD
- ▶ Electrocardiogram (ECG)—NAD
- ▶ Electroencephalogram (EEG)—NAD
- ▶ drug and toxicology screen—NAD.

DIFFERENTIAL DIAGNOSES

- ▶ delirium tremens
- ▶ 'Panic disorder in an anxious personality'
- ▶ possible seizure/epilepsy.

OUTCOME AND FOLLOW-UP

The patient was initially diagnosed with delirium tremens. He was treated with a short course of chlordiazepoxide and discharged once symptoms resolved after 2 weeks. However, the symptoms of anxiety relapsed and became more and more frequent over the next few months, until they became persistent and debilitating. Treatment for anxiety was initiated as per the National Institute for Health and Care Excellence guidelines at the time; however, selective serotonin reuptake inhibitor (SSRI) paroxetine appeared to make the symptoms worse. After careful assessment of the patient by his psychiatrist, it was then decided to start the patient on clomipramine and diazepam and refer him to a clinical toxicologist and clinical neuropsychiatrist.

The clinical toxicologist and neuropsychiatrist conducted a full psychometric assessment and toxic exposure history, as well as blood tests and a thorough drug screen. The conclusion was that the symptoms could be explained by exposure to trichloroethylene (TCE) or 'trike' for short, a solvent used for cleaning and degreasing ships and aircrafts. Psychometric test revealed a full-scale IQ of 94, with particular impact on visual processing and executive function.

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The patient's presentation occurred as a result of 5 years of TCE exposure, and the navy accepted full liability of his condition. In his official statement he reported "we (the naval engineering crew) used Trichloroethylene for cleaning and degreasing almost everyday. We sprayed it from a can onto a cloth and every who used it (trichloroethylene) seemed to get 'high' from the fumes", "I was regularly overcome to the point of feeling dizzy by trike," and that there was no warning nor any protective equipment available.

Diagnosis was confirmed as organic anxiety secondary to solvent neurotoxicity (from prolonged TCE exposure).

Unfortunately, at present the symptoms still persist 20 years after initial presentation despite aggressive medical and psychological therapy. Due to the late presentation the patient developed a chronic intractable anxiety and depression, secondary to solvent neurotoxicity. The symptoms could only be eased by diazepam and other sedative medication. Currently, the patient is dependent on an ever-increasing dose of diazepam 10 mg four times a day, buspirone 5 mg three times a day, mirtazapine 30 mg once a night and pregabalin 100 mg three times a day, and has begun self-medicating with alcohol two to three bottles of wine a day.

DISCUSSION

The multisystemic effects of TCE exposure are well documented in the literature; neurological symptoms are well-established, including presenting symptoms of tremor, which were seen in this case. Other neurological symptoms include trigeminal nerve irritation, which could explain the facial pain during presentation. The patient and his colleagues described blurry vision when exposed to TCE, and psychometric tests exhibited a severe decline in visual processing domains. Literature has showed TCE leads to impaired visual-motor coordination and suppressed reaction to visual stimulus. However the psychiatric effects are less well-described or understood.¹⁻³ Recent studies have found evidence of alterations of functional brain metabolism in the frontotemporal areas in persons with a history of significant solvent exposure, and this could account for mood changes seen in this case.^{3,4}

Studies on solvent neurotoxicity showed that 16% of patients who were exposed to solvents presented to a physician with a 'peak exposure period' seeking medical treatment. Those who had longest exposure time or a peak exposure period had the highest proportion of psychiatric symptoms.¹

In this case, a diagnosis of organic anxiety was not initially considered, and potential treatment and avoidance of further exposure were not prompted. Management during an acute presentation includes reducing peak absorption following

exposure—emesis, activated charcoal, reducing body burden—stimulated diuresis, and interfering with the mechanism of action for toxic effects—propranolol.

Relevant points in this case and future cases that prompt consideration of an organic cause of anxiety include occupational history, lack of past medical history or family history, sudden onset of symptoms, and poor response to treatment.⁵

In summary, this case illustrates the importance of taking a thorough and meticulous history, including occupational and social history. It is necessary to consider organic causes of neuropsychiatric symptoms that cannot be fully explained by your differentials and the importance of early treatment and removal of insulting agent as early as possible to avoid long-term impact on the patient's health.

Learning points

- ▶ Always have a broad differential in patients presenting with unexplained neuropsychiatric symptoms.
- ▶ Have a suspicion of organic causes of anxiety in patients with occupational history and those who present acutely without medical or psychiatric history.
- ▶ Early detection and removal of organic exposure can mitigate symptoms and prevent residual disability.
- ▶ Trichloroethylene can have multisystemic effects, including psychiatric presentation.

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