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Gasoline and vehicle-exhaust inhalation in an 11-year-old with autism spectrum disorder: a case report and management considerations

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Abstract

Background: Volatile substance abuse in children with neurodevelopmental disorders remains under-recognized, particularly in low-resource settings. Sensory-seeking behavior and environmental access can reinforce such patterns, posing medical and psychosocial risks.

Case presentation: We report the case of an11-year-old boy with attention-deficit/hyperactivity disorder (ADHD) presented with repetitive inhalation of gasoline and other volatile fuel vapors. The behavior, initially interpreted as enjoyment habit, escalated to habitual sniffing from fuel containers and vehicle exhaust. No acute intoxication condition was reported, but intermittent dizziness and cough were reported. Laboratory tests and electrocardiogram were within normal limits, whereas electroencephalography (EEG) is suggestive of ADHD. Multidisciplinary intervention was adapted including environmental modification, behavioral replacement strategies, psychoeducation, and referral to pediatric toxicology and psychiatry. Early follow-up showed reduced exposure frequency and improved parental management.

Conclusion: This case highlights the need for early recognition of solvent-related behaviors in neurodivergent children, emphasizing environmental control, behavioral therapy, and multidisciplinary coordination.

Keywords: Volatile Substance Misuse, ADHD, Gasoline, Inhalation, Behavior, Iraq

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Background

Volatile substance misuse (VSM) - the deliberate inhalation of solvents such as gasoline, toluene, diesel, or gasoline for psychoactive effects-remains a preventable cause of neurotoxicity and mortality among children and adolescents worldwide [1]. Globally, prevalence estimates range from 0.5–2% in school-aged populations, with peaks in marginalized or resource-limited communities [2]. Neurodevelopmental conditions, particularly attention-deficit/hyperactivity disorder (ADHD), may predispose children to sensory-seeking and repetitive behaviors that mimic substance-use patterns without intent for intoxication [3,4]. This report describes a rare instance of habitual volatile inhalation in a child with ADHD, emphasizing diagnostic challenges, risk mitigation, and behavioral management within a family and community context.

Case presentation

An 11-year-old boy, previously diagnosed with ADHD at age five, was brought by his mother to the outpatient clinic for repetitive sniffing of household solvents & fuels vapors. The behavior began six months prior and intensified over time. The mother reported that the child inhaled gasoline vapors from storage containers near the family home. When gasoline was unavailable, he substituted ' cocking gas' (local fuel) or vehicle exhaust fumes, demonstrating a pattern of sensory-driven, compulsive inhalation. At presentation, the patient was alert and cooperative with limited verbal communication. No features of acute intoxication were observed. Physical examination revealed mild nasal irritation but no hepatosplenomegaly, neuropathy, or cognitive deterioration. Intermittent dizziness, mild headaches, and non-productive cough were noted. Laboratory tests (CBC, liver enzymes, electrolytes) and ECG were normal, whereas EEG is still of ADHD pattern (Figure 1).

Therapeutic intervention

1. Adjustment of antipsychotic therapy recommended for ADHD cases & respiratory care medications.
2. Environmental Control: Removal of solvent containers and restriction of access to fuel storage areas.

3. Supervised Monitoring: Increased caregiver supervision during outdoor activities.
4. Behavioral Replacement: Introduction of safe olfactory and tactile sensory alternatives.
5. Parental Psychoeducation: Guidance on reinforcement techniques.
6. Specialist Referrals: Pediatric Toxicology and Child Psychiatry for behavioral management.

Follow-up and outcomes

At two-month follow-up, there was a marked reduction in the frequency and duration of solvent sniffing. The child showed improved engagement in structured activities and fewer respiratory complaints. Ongoing follow-up aims to assess long-term neurobehavioral adaptation.

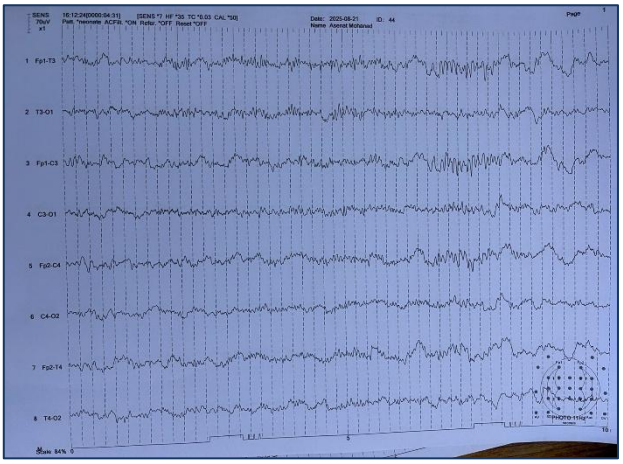

Figure 1: EEG record shows intermitted period of focal slowing mainly at frontal and central regions with clinical correlation highly suggestive of ADHD- No definite epileptiform discharge.

Discussion

This case highlights intentional inhalation of volatile substances in a child with ADHD, where the behavior appears driven by sensory reinforcement rather than substance dependence [5]. Volatile solvents such as gasoline influence central inhibitory and reward pathways and are known to produce neurological and hematological toxicity [6]. The lack of systemic complications in this patient emphasizes the importance of early detection and preventive intervention [7,8]. Conditions to consider in the differential diagnosis include obsessive–compulsive disorder, sensory processing abnormalities, and deliberate substance misuse [9]. Effective management requires a multidisciplinary approach incorporating behavioral interventions and structured family guidance [10,11].

Conclusion

Children with ADHD may engage in volatile inhalation due to sensory-seeking patterns rather than substance dependence. Early identification, environmental restriction, behavioral replacement, and multidisciplinary collaboration can prevent toxicity and improve outcomes.

Abbreviation

ADHD: Attention-Deficit/Hyperactivity Disorder; EEG: Electroencephalography

Declaration

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Availability of data and materials

Data will be available by emailing abdulnaser.abdulqader@tu.edu.iq

Authors' contributions

Abdulnaser Abdulqader Salih Al-Samarraae (AASA) is the lead author who reported the case, compiled the first draft and approved the final version of it. Fahem Alwan Bahlol (FAB) contributed in writing the case report draft. All authors read and approved the final manuscript.

Ethics approval and consent to participate

We conducted the research following the declaration of Helsinki. The ethical approval was obtained from the "Balad General Hospital, The Unit of Humanity Resources, Sala-Aldin Health Directorate, Salah-Aldin Governorate, Ministry of Health, Iraq [Ref. No. 427 on 22 September 2025]. Parents verbal and signed consent form was obtained.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

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