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Clinical Letter

Ischemic Stroke Following Ergotamine Overdose

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The use of ergotamine in the treatment of migraine has become disputed because of its significant side effects, such as arterial vasospasm particularly affecting the peripheral arteries.[1] However, there is conflicting evidence about the effect of ergotamine on cerebral blood flow.[2-4] At present, ergotamine continues to be utilized, albeit off-license, for the treatment of refractory migraine in pediatric patients.[5] Yet, there is a lack of evidence supporting ergotamine's utility and safety in migraine treatment.[5] We describe a cerebral infarction following an overdose of ergotamine in a seven-year-old boy, highlighting ergotamine's potential adverse effects on cerebral circulation.

Patient description

This seven-year-old boy presented with acute left-sided weakness and double vision with a preceding history of a mild illness, lethargy, and acute-on-chronic headaches, for which he had been prescribed dihydroergotamine (2 mg/mL). He was given 15 mL (30 mg) orally in total over three days at home, with no treatment precautions in place; this represents a significant overdose, as the suggested dihydroergotamine dosing regimens for inpatient migraine treatment in children younger than nine years is 0.5 mg every eight hours to a maximum of 20 doses (10 mg total).[6] He was not taking other migraine treatments in conjunction with dihydroergotamine.

On examination, he exhibited left hemiplegia and reduced power (Medical Research Council scale: 3 to 4/5) in the right arm and leg. In addition, left fourth, fifth, sixth, and seventh cranial nerve palsies were present. Reflexes were absent in the left leg and were brisk in the left arm. Peripheral pulses were palpable, and the patient was normotensive. A full stroke evaluation was completed and ruled out other causes of infarction, such as thrombophilia risk factors. Magnetic resonance imaging revealed bihemispheric white matter lesions localizing to cerebral watershed zones and the cerebellar hemisphere distributed in a parasagittal location (Fig).

Discussion

Migraine affects up to 10% children older than five years and can prompt visits to the emergency department for their severity.[5] Of these acute presentations, 7% children fail current first-line therapies and require inpatient rescue treatment, such as sodium valproate and ergotamine.[5-7] Historically, ergotamine was a first-line agent in migraine therapy, but its use has become restricted to inpatient treatment-resistant migraine. Despite being commonly utilized in refractory pediatric migraine, its use remains off-label largely owing to the lack of research supporting its utility and side effects, including nausea and importantly arterial vasospasm.[1,5,6]

However, the effect of ergotamine on cerebral blood flow remains unclear. The majority of studies have reported unchanged cerebral blood flow following ergotamine administration in both healthy controls and migraineurs[2,3]; this is contrasted by one study highlighting a reduction in cerebral blood flow.[4] Similar to our patient, a single case report linked high-dose, migraine-related ergotamine use to cerebral infarction in a 50-year old female.[8]

It is important to consider that migraine itself is considered an independent risk factor for stroke in adults.[9] In contrast, childhood migraine has not been linked to pediatric stroke, although there appears to be some increased risk of ischemic stroke in adolescents with migraine.[9,10] Therefore the main risk for cerebral infarction in our patient remains the use of ergotamine in the setting of a mild preceding illness, potentially associated with a degree of dehydration.

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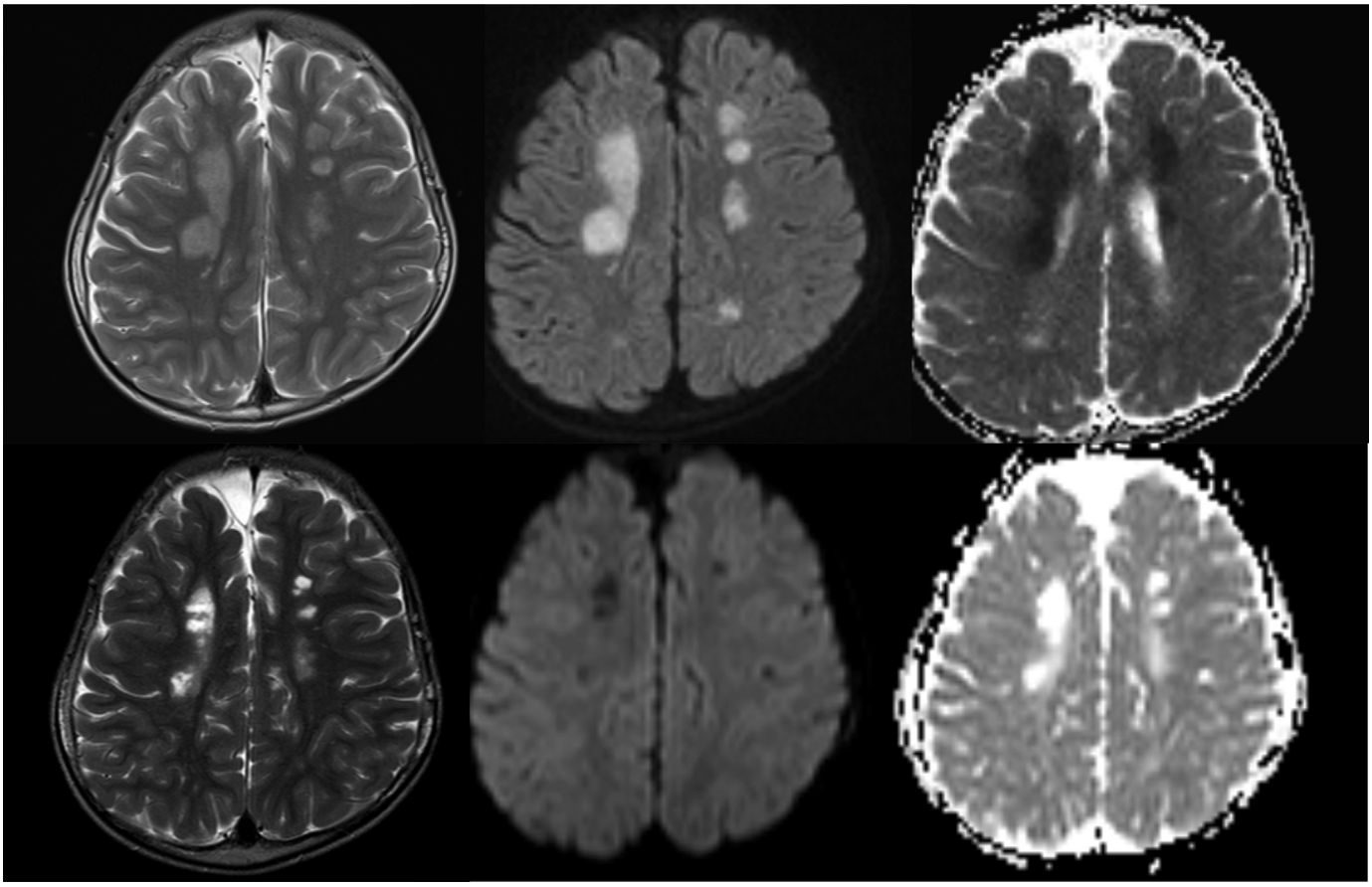

FIGURE. Top row: Axial T2-weighted, diffusion-weighted images (DWI) and apparent diffusion coefficient (ADC) maps showing acute infarcts in the deep white matter of the centrum semiovale in the parasagittal watershed and borderzone territories of the cerebral hemispheres demonstrating high signal on T2-weighted DWI images and corresponding low signal on the ADC map. Bottom row: Follow-up magnetic resonance imaging done three months later showing expected evolution of the infarcts with volume loss and encephalomalacia.

Conclusion

We suspect that the powerful vasoconstrictive effects of ergotamine,[1] possibly confounded by dehydration, resulted in a significant reduction in cerebral blood flow and consequently infarction in our patient. Clinicians should be aware of the potential risks associated with ergotamine use. These risks can be minimized by ensuring appropriate pretreatment precautions, such as adequate hydration, patient monitoring during treatment, and prompt management of associated side effects such as nausea and vomiting.[5]

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