



Case of the Month

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Horsetail

Case Summary

A 7-year-old male was being followed up at the pediatric clinic after 1 week of upper respiratory Infection (URI). Found to have acute onset of excessive vomiting and diarrhea with lethargy for 2 hours. He was referred to the Emergency Department for further evaluation and management. The father reported no recent sick contact. Last meal was regular home cooked lunch.

On examination the child looked pale, sweating and lethargic. Vitals showed Tachycardia: 126 beat\minute. Blood Pressure: 100\62 mmHg. Respiratory rate:16 breath\minute. Oxygen Saturation: 98% in room air. Temperature: 36.4C. Delayed capillary refill time: >2secodns. Dry oral mucosa, and cool extremities. Chest was clear to auscultation and abdominal exam revealed mild epigastric tenderness and active bowel sounds.

Patient symptoms were initially attributed to his recent viral syndrome. Intravenous rehydration initiated with 20ml\kg bolus of Normal Saline and ondansetron. On reassessment after one hour, patient was still tachycardic, vomited once with 2 episodes of diarrhea. Workup showed mildly decreased CO₂ (18meq\L), with otherwise normal blood count, electrolytes and blood gases. COVID-19 and Influenza both negative.

Upon updating the father about the decision of admission for supportive management of acute gastroenteritis and dehydration, the father stated that these symptoms means that the herbal remedy “Horsetail” that he gave him to help “Clear his chest of phlegm” has worked and is now clearing out the infection of his body.

Discussion

Horsetail (*Equisetum arvense*) is a popular herbal remedy in folk medicine for its use as natural diuretic, anti-microbial, weight control and hemostat. Its usage is actually dated back to ancient Roman when it was being applied topically for bleeding control, wound healing and treatment of tuberculosis. Nowadays, it is commonly used in cosmetics to promote hair growth, nail health and weight loss. ⁽⁸⁾

The above-mentioned benefits are attributed to its rich composition of: ⁽⁵⁾

- Silicic acid: promotes hair growth and skin healing
- Sterols (including ascorbic and phenolic acids): Decreases cholesterol levels and poses anti-inflammatory effects
- Flavonoids: Anti-oxidative

However, despite its widespread use as anti-microbial, anti-inflammatory and anti-oxidant remedy, there is not enough evidence or studies about its safety and efficacy. In fact, it is listed as “herb of undefined safety” by the Food and Drug Administration (FDA). ⁽⁴⁾

Toxicity, on the other hand, is highly potential due to its content of: Thiaminase, nicotine and potassium salts.

Thiaminase enzyme metabolizes thiamine (Vitamin B1) into inactive metabolite resulting in severe vitamin B1 deficiency, which is essential in generating energy to central nervous system. This manifests as; muscle cramps, anorexia, paresthesia and in severe deficiency can lead to Beriberi. In 2011, a case report was published about 38-year-old lady who developed sudden collapse and generalized twitching consistent with thiamine deficiency after prolonged use of Horsetail for weight control. The patient unfortunately developed anoxic brain injury and expired after terminal withdrawal of life support. ⁽²⁾ Another case report was about 84-year-old-lady lower limb convulsions after 6-months use of Horsetail as a diuretic (Miro et al, 1996).

Due to its nicotinic composition ⁽¹⁾, Horsetail is highly unsafe for use in pediatrics should also be used in caution with individuals who consume Tobacco, or nicotine replacement therapy. It binds and activates nicotinic acetylcholine receptors, resulting in cholinergic syndrome. Manifesting as gastrointestinal distress, hypothermia, sweating, hypersalivation and risk of airway blockage.

Finally, it might result in severe hyponatremia and hypokalemia if used with diuretics because of its high diuretic effect. While if used with potassium sparing agents might result in worsening hyperkalemia as it is already rich in potassium salts.

Management of Horsetail toxicity is unlikely to be required in the majority of cases and consists of symptomatic management depending on clinical manifestations.

In symptomatic patients check CBC, U&Es, LFTs, blood glucose and CK. Monitor urine output. Keep the patient monitored and following an ABCD approach, ensure the following:

- A. Maintain clear and protected airway, if intubation is needed Succinylcholine is absolutely contraindicated.
- B. Use Atropine + Pralidoxime if signs of nicotinic toxicity with hypersalivation and pulmonary secretions.
- C. Keep adequate IV rehydration and electrolyte replacement as required.
- D. Single brief convulsions do not require treatment. Use Benzodiazepines for recurrent or prolonged seizures.

Others:

The benefit of gastric decontamination is uncertain. Consider activated charcoal (charcoal dose: 50 g for adults; 1 g/ kg for children) if the patient presents within 1 hour of ingestion in symptomatic patients, providing it is safe to do so and the airway can be protected. Efficacy declines rapidly with time since ingestion but there may be some potential benefit from later use, especially following large ingestions.

Disposition: All patients who require assessment should be observed for at least 4 hours after exposure. Asymptomatic patients can then be considered for discharge with advice to return if symptoms develop.

Conclusion

Not every gastroenteritis in pediatrics is a viral syndrome. In this patient the actual reason “Nicotine Toxicity” as a result of “Horsetail” ingestion was almost missed. However, patient safety was not compromised thanks to “assessment-Intervention- reassessment” based practice, regardless of the initial diagnosis.

References

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