Interesting Case Series

High-Dose Epinephrine Injection into the Thumb

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DESCRIPTION

A 34-year-old woman presented to the emergency department approximately 45 minutes after accidentally discharging epinephrine (EpiPen, Dey Napa, Calif) into her dominant right thumb while attempting to administer it to her son. She was complaining of thumb numbness and a pale coloration that extended into her palm.
1. What is the concentration of epinephrine in a standard EpiPen?

2. What are the theoretical complications of epinephrine injection into the digits?

3. What is the half-life of epinephrine in soft tissue?

4. What are the treatment options for epinephrine injection into the finger?

5. What is the outcome of patients who have had an EpiPen discharge into their finger?
DISCUSSION

The use of epinephrine in the finger is an area of great controversy. Although dogma states that elective injection should be avoided, many recent studies have documented the safety of low-dose (1:100,000) epinephrine in the hand. Of even greater theoretical concern is the injection of high-dose (1:1000) epinephrine into fingers. Because of the increased use of the epinephrine autoinjector (EpiPen, Dey Napa, Calif) in self-diagnosed anaphylaxis, this phenomenon has become a fairly common occurrence. In theory, epinephrine used in this manner can result in ischemic necrosis of the finger. In practice, however, that has not been the case.

A recent review of the literature documented a total of 59 reported cases of accidental injection of high-dose epinephrine (0.3-mg epinephrine in 0.3 mL, 1:1000 concentration) into a finger. In 32 of these cases, no treatment was given. Twenty-seven patients received some type of treatment. Most commonly, treatment consisted of injecting phentolamine (an $\alpha$-blocker) directly into the finger. The dose of phentolamine varied from 0.5 to 4.5 mg; however, 1 mg in 1 mL of normal saline is currently recommended. Other treatment modalities included nitropaste and warm compresses, although their efficacy was not well described.

Among the 59 documented patients in the literature, there were no episodes of tissue necrosis. In fact, none of the patients developed any permanent sequelae from their injury. In the patients treated with phentolamine, complete reversal of digital vasoconstriction occurred significantly faster than it did in the untreated patients. In addition, several untreated patients reported severe reperfusion pain and a sensory loss that took up to 10 weeks to resolve. The phentolamine injection appeared to prevent reperfusion pain and prolonged neuropraxia.

The patient presented in this case received 1 mg of phentolamine injected directly into the affected finger. Normal color returned within minutes and no complications occurred.

REFERENCES

Fitzcharles-Bowe C, Denkler K, Lalonde D. Finger injection with high-dose (1:1000) epinephrine: does it cause finger necrosis and should it be treated? Hand 2007;2:5–11.
