

Debunking a myth: the use of lidocaine with epinephrine for digital anesthesia

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I remember distinctly on my surgery rotation as a third-year medical student, we were in the ED about to sew up a finger laceration when the resident, about to inject the patient's finger, was scolded by his attending....” What do you think you are doing?!?! NEVER use epinephrine with lidocaine in the fingers, toes and nose!”

It is a common teaching to avoid the use of lidocaine with epinephrine for anesthetizing fingers and toes. This dates back to the early 1900s when there were reported cases of gangrene following the use of anesthetic with epinephrine. Back then, physicians had the choice of procaine and procaine with epinephrine. Around 1940 there were reportedly 48 cases of gangrene following injection of procaine. However, upon delving further into these reports, it turns out that the culprit was in fact the **procaine itself**, not the epinephrine. You see, procaine is quite acidic, with a pH of 3.6. When it sits on the shelf in storage for a long period of time, it can become even more acidic, with a pH as low as 1. Injecting something with such an acidic pH was most likely the culprit for these cases of finger necrosis. Also, the fact that people developed necrosis even when injected with plain procaine, further supports this hypothesis.

Enter lidocaine with epinephrine, whose pH is roughly 4.4. Reviews of the literature from 1880 to 2000 revealed **no documented cases** of finger necrosis after injection. Still not sold? In a review of the world literature published between 1990 and 2005, Fitzcharles-Bowe found 54 cases of accidental injection of high-dose epinephrine (1:1,000) into patients' own fingers and added 5 cases of their own. This dose of epinephrine is 100 times more potent than the regularly used lidocaine with epinephrine (1:100,000). Even though only 13 of these patients received phentolamine, **none** of the 59 patients went on to develop necrosis. Enter another paper, published by Muck et al. They looked at patients from 6 Poison Control Centers in Texas where patients were accidentally injected with 1:1,000 epinephrine. Of the 213 patients who were injected into the digits, 127 had complete follow-up. **None** of these patients developed necrosis.

The simple fact that this many patients have been injected with a concentration of epinephrine into their digits that is 100 times more potent than the usual local anesthetic used today, it is **EXTREMELY unlikely that lidocaine with epinephrine (1:100,000) could ever be the causative factor in the progression of digital necrosis.**

References

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