A systematic review of the uses and contraindications of epinephrine in local anesthesia in the dermatologic setting

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March 23, 2015
Background

- Epinephrine is a hormone and neurotransmitter that non-selectively binds to the alpha and beta adrenergic receptors.

- Epinephrine can be added to a local anesthetic to decrease the amount of bleeding and prolong the duration of local anesthesia by vasoconstricting blood vessels.

- To our knowledge, there is no comprehensive review on the uses and relative contraindications of epinephrine in dermatologic surgery.
Methods

• A PubMed search of the National Library of Medicine database (http://www.ncbi.nlm.nih.gov/pubmed) was performed using the following search terms: **epinephrine**, **lidocaine**, **dermatologic surgery**, **complications**, **pregnancy**, **digital anesthesia**, **grafts**, **flaps**.

• Studies from the dermatologic, dental, and plastic surgery literature were used.
Results

• 14 papers detailing the use of epinephrine in digital or penile anesthesia

• 20 papers relating to epinephrine in flaps and grafts

• 7 papers about medical conditions in which epinephrine is contraindicated

• 2 papers about epinephrine in the pregnant patient

• 2 papers about patients with catecholamine hypersensitivity.
Epinephrine use on the digits or penis

- 0.5% lidocaine with 1:200,000 epinephrine is safe for digital or penile anesthesia and unlikely to cause necrosis (Firoz et al., 2009; Krunic et al., 2004).

- One exception is in patients with vasospastic or peripheral vascular disease (Ravindran et al., 2012).
Epinephrine use in flaps and grafts

- Epinephrine is generally safe to use for flaps and grafts but has resulted in lower survival when used in delayed flaps (Eley et al., 2012; Wu et al., 1978; Fazio et al., 1995; Wolfort et al., 1990).

- Epinephrine has been reported to cause flap necrosis if too high a volume of local anesthesia is injected.
Epinephrine in pregnant patients

- Generally the doses of epinephrine used in dermatologic surgery are safe in pregnant patients.

- Theoretically, higher doses of epinephrine can cause vasoconstriction of the uterine artery and decrease placental perfusion (Richards et al, 2002).
Epinephrine use in medical disease

- Caution recommended when using epinephrine in patients with severe cardiac disease, hyperthyroidism, or pheochromocytoma (Kaufman et al., 2002).

- Patients with autonomic neuropathy or severe spinal cord injury may require lower doses because of catecholamine hypersensitivity, a phenomenon known as denervation hypersensitivity (Frisbie et al., 2009; Bickel et al., 2002).
Medications that interact with epinephrine

- The following medications may also increase sensitivity to epinephrine by interacting with or potentiating the effects of epinephrine:
  - Nonselective beta blockers
  - MAO inhibitors
  - Tricyclic antidepressants
  - Phenothiazines
Conclusion

• In the scenarios mentioned above, epinephrine at a lower concentration (1:400,000 to 1:1,000,000) can still achieve effective vasoconstriction and may be safer for use in dermatologic surgery.
References

- Eley KA, Young JD, Watt-Smith SR. Epinephrine, norepinephrine, dobutamine, and dopexamine effects on free flap skin blood flow. Plast Reconstr Surg. 2012 Sep;130(3):564-70. Firoz B, Davis N,