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# Accurate admixture of local anesthetic containing lidocaine and epinephrine using a pistonless syringe



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**Key words:** anesthetic; epinephrine; lidocaine; syringe.

*Abbreviation used:*

G: gauge

## SURGICAL CHALLENGE

Lidocaine containing epinephrine is often used for local anesthesia. However, not all hospitals stock commercialized epinephrine-containing lidocaine, which results in the need for onsite preparation of a preoperative admixture. When epinephrine is extracted with a syringe and added to lidocaine, the dose can be challenging to control.

## SOLUTION

We developed a method to rapidly and accurately admix local anesthetics that contain various definite concentrations of epinephrine. In this method, a Becton Dickinson (East Rutherford, NJ) syringe with a 22-gauge (G) needle is used to extract the epinephrine injection. The piston is then removed, and the syringe containing epinephrine is suspended vertically, leading to a uniform drip of the droplets (Fig 1). Each drop was measured to be approximately 10  $\mu$ L. We tested 1-, 2-, 5-, 10-, and 20-mL syringes with 18G, 22G, 25G, and 30G needles and found that, regardless of the size of the syringe, an appropriate droplet size (10  $\mu$ L) was obtained only with the use of 22G needles.

For example, when configuring a 0.5% lidocaine solution with 1:200,000 epinephrine, we first extracted a 2% lidocaine solution (5 mL) and 0.9% NaCl solution (15 mL) into a sterilized cup. Using this method, 10 drops of epinephrine (original concentration, 1:1000) can be obtained with a 22G needle syringe and added into the sterilized cup. The resulting lidocaine solution would contain 1:200 000 epinephrine. Through this method, we can quickly and accurately prepare any amount of lidocaine with a determined epinephrine concentration.

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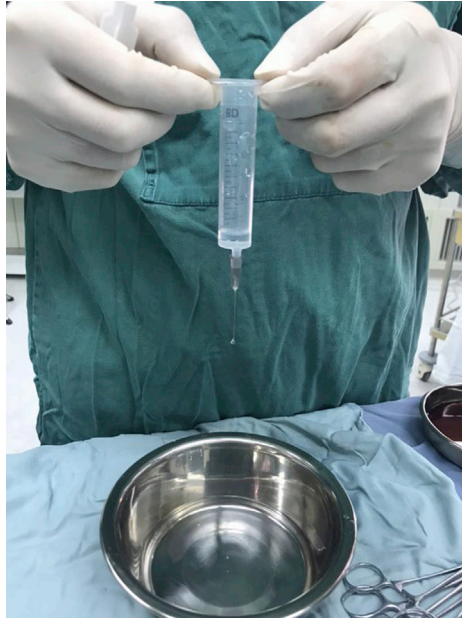
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**Fig 1.** Droplets form naturally after removal of the piston.