DRIPPED LIDOCAINE: A NOVEL APPROACH TO NEEDLELESS ANESTHESIA FOR MUCOSAL LACERATIONS

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Abstract—Background: Oral lacerations represent a unique challenge for anesthesia in the emergency department. Many options exist for local anesthesia, but these options are often associated with pain from injections or anxiety from anticipated needle injection. Case Series: We introduce a novel and needleless approach to achieving local anesthesia for oral mucosa repair by dripping injectable lidocaine directly onto mucosal wounds prior to repair. This method is well tolerated and achieves appropriate anesthesia without undesirable side effects. Why Should an Emergency Physician Be Aware of This?: Dripped injectable lidocaine may be an alternative method for mucosal anesthesia in the pediatric population.

Keywords—dripped lidocaine; pediatric emergency medicine; intraoral laceration repair

INTRODUCTION

Laceration repairs can cause significant anxiety for children and parents (1). Oral mucosal lacerations present a greater challenge than other types of lacerations due to more difficulty in access and achieving anesthesia. Traditionally, lidocaine is injected locally or as a nerve block for oral mucosal lacerations. Oral mucosa infiltration of lidocaine can be difficult and may require multiple injections, which may be both painful and frightening to the child. Nerve blocks represent an alternative to local injections but are more technically difficult. Prior studies have evaluated the use of topical agents to anesthetize oral mucosal lacerations, with mixed results (2–4). We present a novel and needleless approach to local mucosal anesthesia by dripping injectable lidocaine directly onto oral mucosal lacerations.

CASE SERIES

An 8-year-old boy was riding his bike when he fell and sustained a 1-cm laceration to the frenulum base extending into the gum. We dripped 3 mL of 1% injectable lidocaine onto the wound (Figure 1). The wound was then repaired with sutures without complications.

A 15-year-old boy sustained a 0.5-cm superficial laceration to the external lower lip after falling off his skateboard in the park. We dripped 4 mL of 1% injectable lidocaine onto the wound (Figure 2). This small wound crossed the vermillion border by 1 mm. The wound was then repaired with two absorbable sutures with adequate anesthesia and without complications. An absorbable suture placed at the vermillion border adequately approximated the wound.

A 2-year-old boy sustained a 5-cm laceration to the upper lip after tripping and falling forward into the sidewalk. We dripped 5 mL of 1% injectable lidocaine onto the laceration and then used sutures to repair the laceration without complications (Figure 3).
DISCUSSION

Mucosal lacerations are commonly anesthetized by local injection of lidocaine or by nerve blocks. Local injection of lidocaine is associated with pain from the needle as well as a stinging sensation from the lidocaine itself (5,6). Additionally, in large or complex mucosal lacerations, multiple injections may be necessary to achieve adequate anesthesia. Nerve blocks represent an alternative method for achieving anesthesia to the area. Experienced providers, however, are required to identify landmarks for injection for oral nerve blocks. A review showed a 20–25% failure rate in inferior alveolar blocks even by trained providers (7).

Common formulations such as LET (lidocaine, epinephrine, and tetracaine) are topical anesthetic options that are commonly used for lacerations and open wounds. LET, however, is contraindicated for use in mucous membranes (8,9). Viscous lidocaine is safe for use topically in the mucosa, but it has not been shown to achieve adequate anesthesia for laceration repair (10).

In this case series, we found that our pediatric patients tolerated dripped lidocaine and subsequent oral mucosa laceration repairs without complications. We filled a syringe with 1% injectable lidocaine and dripped the liquid drop by drop at a rate of one drop per second onto the mucosal wound until the wound was saturated with lidocaine solution. We dripped approximately 3–5 mL of solution onto each wound, depending on laceration size. Local anesthesia was achieved after approximately 5 min. Patients tolerated the laceration repair without discomfort or the need for additional lidocaine drips or injections. Due to the increased blood supply of the oral mucosa, we suspect that the lidocaine was readily absorbed by the wound and surrounding tissue to achieve local anesthesia. Patients were cooperative with the administration of the dripped lidocaine method as the procedure was quick and needleless.

We have also successfully performed a similar dripped lidocaine method on patients requiring tongue laceration repairs. Attempts were made to trial this method with viscous lidocaine in mucosa repairs with the idea that the higher viscosity would keep the lidocaine in place, and therefore, achieve greater anesthesia. We found that using viscous lidocaine was inferior to using nonviscous lidocaine on oral mucosa for anesthesia achievement, likely due to a higher concentration of lidocaine in nonviscous lidocaine in contact with the actual wound than the diluted lidocaine in the viscous formulation. However, we did not compare the methods with formalized pain scales, which would be important in future trials to evaluate this method.

Previous studies addressed the issue of injected lidocaine as compared with topical anesthesia in oral mucosa. One small randomized trial showed no difference in pain scores between lidocaine injection and a mixture of tetracaine, lidocaine, and phenylephrine topical anesthesia in mucosal lacerations in children (3). The study, however, did not account for the added discomfort of injected lidocaine. Another small randomized trial showed that pain...
reduction was inferior when using prilocaine-phenylephrine topical anesthesia compared with infiltrated lidocaine (4). A case series of 22 patients showed that tetracaine, adrenaline, and cocaine experienced painless suture repair after dripping the combination on oral mucosa (2). Topical cocaine is no longer favored as a topical anesthesia agent. The use of topical lidocaine spray for anesthesia was also explored with success in simple intraoral lacerations in children (11). Our literature search revealed no strong evidence for this method of achieving anesthesia.

In the pediatric population, needleless anesthesia is associated with reduced pain and anxiety (12). We find that the dripped lidocaine method may also reduce anxiety in both patients and their families during laceration repairs. Anxiety and pain during pediatric procedures contributes significantly to the entire family’s experience with laceration repair (13,14). Children who are too anxious to tolerate laceration repair can require distractions, oral midazolam, or even sedation (1). Injecting lidocaine adds pain and anxiety to the experience and should be avoided when possible, thus the reason topical anesthetics have become so universal (8).

The use of injectable lidocaine dripped into oral mucosal wounds appears to be safe, easy to administer, noninvasive, reduces anxiety, and achieves adequate anesthesia for oral laceration repairs. However, our study is limited in that it is a case series with a small sample size and a lack of control. Additional and larger studies are needed to prospectively evaluate the use of this method as compared with locally injected lidocaine or nerve blocks for oral mucosa laceration repairs to determine the efficacy and generalizability of this method.

WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

Dripping injectable lidocaine onto mucosal wounds for oral mucosa laceration repair is a novel and noninvasive approach in achieving adequate local anesthesia. This method is needleless, well tolerated, and may reduce anxiety in patients during repair.

REFERENCES