CASE REPORTS

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Dyclonine Hydrochloride for Airway Anesthesia: Awake Endotracheal Intubation in a Patient with Suspected Local Anesthetic Allergy

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DYCLONINE hydrochloride (Dyclone; Astra Pharmaceuticals, Westboro, MA) is a topical anesthetic that was first introduced in 1952.[1] It very effectively produces topical airway anesthesia for laryngoscopy and awake endotracheal intubation. This 40-yr-old drug is not consistently included in many of the anesthesia community's published lists of local anesthetics. Brief references may be found in some anesthesia texts.[2,3] In other recently published anesthesia texts, we could not find any reference to dyclonine.[4-6] A unique local anesthetic agent, this ketone is structurally distinct from the two major classes of local anesthetic agents (aminoesters and aminoamides).[1,7,8] We report the use of dyclonine for topical anesthesia of the airway to facilitate awake intubation in a patient with a stated allergy to bupivacaine and procaine.

Case Report

A 41-yr-old woman (American Society of Anesthesiologists physical status 2; height, 175 cm; weight, 77 kg) was scheduled for a laparoscopic nissen fundoplication. Her medical history included infantile bulbar polio, hypercholesterolemia, gastroesophageal reflux, and multiple drug allergies including bupivacaine and procaine. When questioned specifically about her allergy to local anesthetics, she reported positive skin testing by an out-of-state allergist several years before but could not recall the physician's name or provide additional information for verification. Her medications consisted of omeprazole, gemfibrozil, enteric-coated aspirin, and estrogen. Her surgical history included several abdominal procedures with documentation of difficult endotracheal intubation and at least one canceled procedure after failed intubation. She stated that her last endotracheal intubation had been performed awake without the use of airway anesthesia, which required physical restraint during the procedure. As a result, the patient was apprehensive about having another awake tracheal intubation.

Examination of her airway anatomy revealed a Mallampati class I oropharynx, but relatively small mouth opening, very limited neck extension, and a short mental-hyoid distance. After counseling the patient regarding the need for awake endotracheal intubation, and the plan to use intravenous sedation and airway anesthesia, she agreed to the procedure. Preoperative medications consisted of intravenous metaclopramide, hydrocortisone, glycopyrrolate, and 1 mg midazolam. In the operating room, the patient was positioned with the back elevated to 30 degrees and routine noninvasive monitors were placed, followed by another 1 mg midazolam administered intravenously. The patient was given a total of 25 ml 1% dyclonine in two divided doses to gargle and swallow. An intravenous propofol infusion at 50 $\mu g \cdot kg^{-1} \cdot min^{-1}$ was begun. The remaining 5 ml 1% dyclonine from the 30-ml bottle was administered using a nebulizer for 5 min with coached deep breathing. After waiting another 5 min for the onset of topical anesthesia, a fiberoptic bronchoscope was advanced into the trachea *via* an intubating oral airway, and the endotracheal tube was positioned appropriately. The patient tolerated the procedure well without significant gagging or coughing. General anesthesia was induced and the case proceeded without incident. The patient had no recall of the awake intubation experience.

Discussion

Our search of the MEDLINE and EMBASE databases revealed that dyclonine used for topical airway anesthesia has been reported in the anesthesia literature only rarely in the past 40 yr.[7-10] In 1956, Harris *et al.*[7] published the first clinical evaluation of dyclonine, using the "laryngeal activity" technique, which was described just 2 yr before by Clark *et al.*[11] The authors concluded that dyclonine

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produced good to excellent airway anesthesia in all cases. Regarding toxicity, reference is made to case reports in which adults were given 200–500 mg intravenous dyclonine during a 5-min period without significant side effects. Some of the guidelines for dosage and administration of dyclonine in the 1997 *Physician's Desk Reference* are taken from the original study by Harris *et al.*[7,12] Dyclonine was one of two topical anesthetic agents used in a study that focused on the process of awake intubation and the use of intravenous amnestic agents.[9] A 1983 review article closed with the statement, "most anesthesiologists are not aware of the safety and effectiveness of dyclonine and continue to use lidocaine or tetracaine which are more hazardous."[8] Clark and Pond's[10] case report described the effectiveness of dyclonine for awake bronchoscopy. Dyclonine is available in 0.5% and 1% solutions. When applied to mucus membranes, the onset of topical anesthesia is 2–10 min and lasts for 20–30 min.[7,12]

Optimal use of this technique depends somewhat on patient cooperation (gargling, deep breathing). Excellent airway anesthesia had been achieved with dyclonine alone in a series of more than 50 endotracheal intubations performed in awake patients at the National Naval Medical Center, Bethesda, Maryland (oral communication, Paul Pudimat, M.D.). Use of injectable techniques (transtracheal, superior laryngeal nerve blocks, and so on) are helpful adjuncts to produce airway anesthesia but are not necessary with the technique we describe. This may be particularly useful in patients with coagulation problems, local infection in the neck, or who want to avoid needles.

This report describes the use of dyclonine for topical anesthesia of the airway in a patient with stated allergy to bupivacaine and procaine. Allergy to amide or ester local anesthetic agents is rare. However, when we encountered this patient with a difficult airway on the day of surgery and she provided a detailed history, including specific drug names and using the term *skin testing*, we proceeded using dyclonine. We are not aware of any published information regarding allergy crossover between amide or ester local anesthetics and dyclonine. Because of its distinct chemical structure and its effectiveness as a topical anesthetic, dyclonine deserves a place in our armamentarium of useful anesthetic agents. Clearly opportunities for further investigations exist.

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