INTRODUCTION

Trigeminal neuralgia (TN) is a debilitating facial pain disorder characterized by severe paroxysmal facial pain that is usually unilateral and lasting seconds to a minute. The pain is characterized as sharp and electric in quality. Patients often experience remission and remission periods. Patients often describe a trigger zone or area along part of their face that may be triggered or stimulated with everyday activities such as brushing teeth, applying cosmetics or even speaking, eating and feeling a breeze.

Peripheral injections have traditionally played a role in treating patients who cannot tolerate oral medications and who are not appropriate candidates for surgery. These injections have always been performed using a blind technique. The effectiveness of peripheral alcohol injections has had debatable results. Studies report successful injections with a frequency ranging from 80% to 91% that showed evidence of 0-1 month of pain relief. Although the literature suggests a high degree of success, pain relief may have only lasted one month.

Were the injections inaccurate in the first place?

Developing an injection technique with a higher degree of accuracy would help to maximize the potential benefit of doing the injection and help to delineate the patients who are non-responders to this type of treatment.

The purpose of this investigation is to describe a technique for and assess accuracy of sonographically guided supraorbital, infraorbital and mental nerve injections in a cadaveric model. Prior studies have shown peripheral trigeminal nerve injections can be beneficial for a subgroup of patients for whom surgical treatments are not appropriate.

Materials and Methods

38 sonographically guided injections on 6 embalmed cadavers. Each cadaver received a total of 6 injections, 3 on each side of the face targeting the supraorbital, infraorbital and mental foramina. Three cadavers were injected with a long axis approach ("in-plane") and three cadavers were injected with a short axis approach ("out of plane"). All injections were completed with methylene blue dye. A hockey stick probe model 8809 with a frequency of 15 MHz with a Flex Focus Musculo skeletal Ultrasound System from BK Medical was used for all injections.

To identify the supraorbital foramen, the probe was placed transversely over the root of the orbit (figure 1A). The bone is scanned until a hypoechoic break in the bone is identified (figure 1B). To identify the infraorbital foramen, the probe was placed transversely over the inferior portion of the mandible at the level of the second molar (figure 2A) until a hypoechoic break in the bone is identified (figure 2B). To identify the mental foramen, the probe was placed transversely over the mandible (figure 3A) until a hypoechoic break in the bone is identified (figure 3B). A 22 gauge 1.5 inch needle with 1cc of methylene blue was advanced in plane in 3 cadavers directed at the supraorbital, infraorbital and mental foramen (figure 2A, 4A, 6A respectively) and out of plane in 3 cadavers directed at the supraorbital, infraorbital and mental foramen (figure 2B, 4B, 6B respectively) and out of plane in 3 cadavers directed at the supraorbital, infraorbital and mental foramen (figure 2A, 4A, 6A respectively).

The dissection was performed by the primary investigator within 72 hours of all injections. The skin and overlying tissue were disconnected only until the foramen and exiting nerve could be identified. Accuracy was based on accurate dye staining the target nerve as well as surrounding structures or inaccurate dye staining the target nerve.

RESULTS

The accuracy rate was 100% (18 of 18) for the long axis approach and 94% (17 of 18) for the short axis approach. Thirty five sonographically guided injections on 6 embalmed cadavers. Each cadaver received a total of 6 injections, 3 on each side of the face targeting the supraorbital, infraorbital and mental foramina. Three cadavers were injected with a long axis approach ("in-plane") and three cadavers were injected with a short axis approach ("out of plane"). All injections were completed with methylene blue dye. A hockey stick probe model 8809 with a frequency of 15 MHz with a Flex Focus Musculo skeletal Ultrasound System from BK Medical was used for all injections.

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