Review article

Anterior Middle Superior Alveolar Nerve Block

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Introduction

Injection of local anesthetic is commonly used to archive painless procedure during periodontal treatment. Achieving adequate local anesthesia in the maxilla requires the administration of postero-superior alveolar nerve block, anterior superior alveolar nerve block, middle superior alveolar nerve block, greater palatine, and nasopalatine nerve block. Anterior and middle nerves are collateral branches of the infra orbital nerve in the homonymous canal and part of the maxillary nerve [1,2,3]. The anterior superior alveolar (ASA) nerve originates approximately 5-8 mm posterior to the infra orbital foramen. It is responsible for the innervation of the central incisor, lateral incisor, and canine [1,2,3]. Meanwhile, the middle superior alveolar (MSA) nerve originates approximately 10 mm posterior to the infra orbital foramen. It is responsible for innervations of the premolars and the mesiobuccal root of the first molar [1,2,3]. The disadvantage is that it requires multiple injections to cover more than one tooth and causing concomitant anesthesia of the lip and facial muscles [4]. Most problems with maxillary anesthesia can be attributed to individual variations of normal anatomical nerve pathways through the maxillary bone [1]. Infiltration anesthesia in the maxillary anterior region is associated with collateral anesthesia of the upper lip, side of the nose and lower eyelid [5]. Which leaves the patient with a numb lip, side of the nose and lower eyelid?

The AMSA injection derives its name from the injection’s ability to supposedly anesthetize both the anterior and middle superior alveolar nerves [6].

The AMSA nerve block offers several advantages like single injection, less injection of adrenaline, adequate anesthesia, avoids collateral anesthesia of face, haemostatic control at donor site, no effect on blood supply of maxillary recipient sites and esthetic procedures like evaluation of smile line during crown lengthening can be performed after anesthesia [7].

Literature Review

Mark J et al 1998 described The AMSA injection site is located at a point that bisects the maxillary first and second premolars and is midway between the crest of the free gingival margin and the mid palatine suture. The use of a 30- gage extra-short needle is ideal for the administration of the AMSA block [8].

Mark J et al 1998 suggested patients who have experienced an AMSA injection describe a slight sensation upon needle penetration and thereafter a mild feeling of pressure that is not unpleasant. Seconds after needle penetration, a definite blanching of the soft tissue surrounding the injection site is observed, indicating that the anesthetic is actively suffusing through the connective tissues, periosteum, and cancellous bone. It is imperative that the operator visually monitor the level of tissue blanching. If excessive blanching occurs, indicated by a loss of all pink color to the tissues, a momentary pause is indicated to allow the anesthetic to dissipate and blood supply to return. In the unlikely event that marked ischemia develops, an ulcerative lesion may result within 24 to 48 hours of the injection. The lesion will resolve itself in 7 to 14 days [8].

Malamed 2004 suggested rapid delivery of LA solution may result in pain and palatal ulceration [5]. Lee S et al 2004 stated the onset of anesthesia ranged from five to twelve minutes. The duration of anesthesia was 55–65 minutes, which was similar to pulpal anesthesia [9].

Holtzclaw D et al 2008 suggested that good hemostatic control during the retrieval of free mucosal grafts from the palate has been reported with the AMSA nerve block [7]. Similar results were observed during the retrieval of free gingival graft, wherein the retrieval time was considerably reduced (Jugal J et al 2012) [10].

Nazish .M. Alam2011 explains multiple injection technique used for maxillary arch treatment is usually stressful hence the single block for treatment purpose has offered greater advantage and treatment acceptance. The benefit of palatal AMSA injection is that it reduces the number of injections, and also the amount of anesthetic solution compared to conventional buccal infiltration anesthesia that applies multiple injections to each tooth. In addition, more teeth can be anesthetized with a single injection .The AMSA injection anesthetizes the buccal tissues from the palatal aspect, no vasoconstrictor affects the buccal gingiva, and outstanding blood supply is maintained for nourishment of the connective tissue graft [11].

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the buccal tissues from the palatal aspect, no vasoconstrictor affects the buccal gingiva, and outstanding blood supply is maintained for nourishment of the connective tissue graft. The reduction in vasoconstrictor proves beneficial for cardiovascular-compromised patients, it may lead to less than desirable hemostatic control.

The long administration time is one of disadvantages of AMSA. Some patients may find it disconcerting to have an injection last 4 minutes, and attempts to speed up the AMSA injection may lead to increased patient discomfort at the injection site [11].

Jugal J et al 2012 demonstrate that AMSA nerve block can be administered using the conventional syringes or the automated local anaesthetic delivery devices like the Wand. With the computer controlled local anesthetic delivery systems, the operator discomfort is reduced and the rate of local anesthetic delivery is controlled [10].

Jugal J et al 2012 mention there are no comparative studies that have evaluated the efficacy, pain at administration, and duration in non-surgical and surgical periodontal procedures under AMSA nerve block and conventional nerve blocks [10].

Discussion

Many dental patients tend to avoid treatment because of fear of local anesthesia by needle injection. It is thought to be one of the most painful procedures among the dental practices [12]. Although infra-alveolar nerve (IAN) block is commonly used for multiple-tooth anesthesia of the mandible, efficient maxillary block, especially of premolar teeth, has not been utilized. Anterior and middle superior alveolar injection has the advantage that one injection anesthetizes multiple teeth but no collateral anesthesia occurs in the mucobuccal fold. As a result, the smile line is not distorted. No collateral anesthesia of the facial tissues including the upper lip by using AMSA technique [13].

This technique is described by its authors as a nerve block. Malamed [5] defines a nerve block when the solution is deposited in the vicinity of the main nerve trunk, so that the anesthetic should be placed close to the ASA or MSA nerves, resulting in high rates of anesthetic success, but in Nazish study [11] he saw that this did not happen because the solution is deposited on the palatine process of the maxilla for its diffusion, searching the terminal branches of the alveolar nerves. So based on his clinical observations, it is more of an infiltrative technique than a nerve block.

Fukayama et al suggest that lateral incisors, canines, and first and second premolars are better anesthetized by AMSA injections than central incisors and first molars [13].

Based on Sculean et al study results [14], the AMSA-technique can be regarded as an alternative to conventional local anesthesia for non-surgical periodontal therapy (scaling, root planning) for maxillary posterior teeth.

AMSA nerve block is a relatively new technique that can be easily mastered. In periodontal therapy it can be administered in clinical situations like SRP, flap surgery in localized defects involving the premolars, canine, and the lateral incisor in which the reflection is not beyond the mucogingival junction and in the harvesting of the free mucosal grafts from the palate. It is helpful in reducing the patient apprehension by avoiding anesthesia of the lips and the number of injections [10].

The use of a computer-assisted injection system is recommended as the best method for administering AMSA injections. The added cost of this anesthetic delivery system is one potential drawback of the AMSA injection. The reduction of cumulative anesthetic vasoconstrictor may also prove to be problematic for certain surgical procedures. The AMSA eliminates the need for multiple injections; less vasoconstrictor enters the buccal tissues, and a subsequent decline in Hemostasis may obscure portions of the surgical field [11].

References