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Case Report

RARE COURSE OF MAXILLARY ARTERY IN INFRATEMPORAL FOSSA: A CASE REPORT

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ABSTRACT

Maxillary artery, the large terminal branch of external carotid, enters infratemporal fossa passing medial to neck of mandible and then courses superficial or lateral to lateral pterygoid in majority of the cases to enter pterygopalatine fossa. In few cases the artery passes deep or medial to lateral pterygoid. The maxillary artery while passing medial to lateral pterygoid exhibits variable relationship with lingual and inferior alveolar nerves. During routine dissection we have observed a very rare variation of maxillary artery on the left side in a male cadaver. The second part of maxillary artery was passing deep to lateral pterygoid and both lingual and inferior alveolar nerves to enter pterygopalatine fossa. Such rare variation of the artery passing deep to the main branches of mandibular nerve is reported to occur in about 0.5% - 3% cases in the literature. The variant course of maxillary artery has clinical implications during infratemporal fossa surgeries, T-M joint surgeries and anaesthetic procedures.

KEY WORDS: Infratemporal fossa, Lateral pterygoid muscle, Variant Course, Maxillary artery.

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INTRODUCTION

Maxillary artery (MA) is the largest terminal branch of external carotid artery arising at the level of mandibular neck, in the substance of parotid gland. Conventionally, the course of the artery is studied in three parts divided by means of lateral pterygoid muscle (LP), the mandibular, pterygoid and pterygopalatine [1]. The first part, mandibular segment turns horizontally medial to neck of mandible, below the auriculotemporal nerve to reach lower border of LP in the infratemporal fossa. The second part, pterygoid segment runs in relation to lower head of LP, either superficial (lateral) or deep (medial) to emerge in between the two heads of the muscle. The third part, pterygopalatine segment turns transversely at the entrance to the pterygopalatine fossa and runs to the superior fossal region [2].

Maxillary artery variations in terms of origin, relations in infratemporal fossa or variations in branching pattern is a matter of research and surgical importance due to its great variability. Knowledge of MA relations and branching pattern variations is useful in surgical procedures of this region, in coagulation therapy, for resection of tumors of this region and in dental anesthesia.

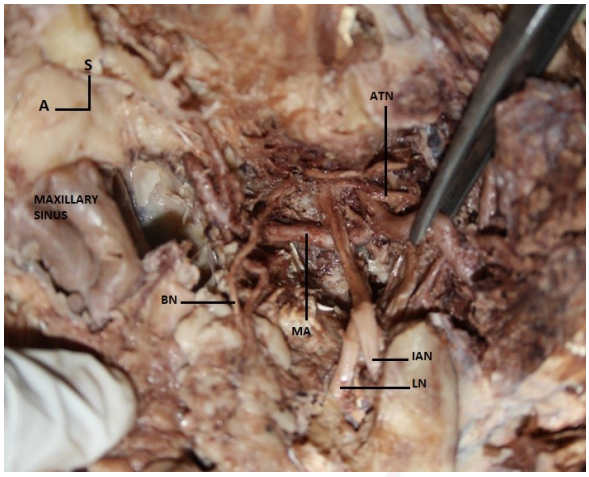

Fig. 1: Dissection of left infratemporal fossa in a male cadaver showing the course of second part of maxillary artery (MA) after piecemeal removal of lateral pterygoid muscle and head of mandible. Note the course of the artery medial to inferior alveolar nerve (IAN), lingual nerve (LN) and buccal nerve (BN). ATN – Auriculotemporal nerve; A – Anterior; S-Superior.

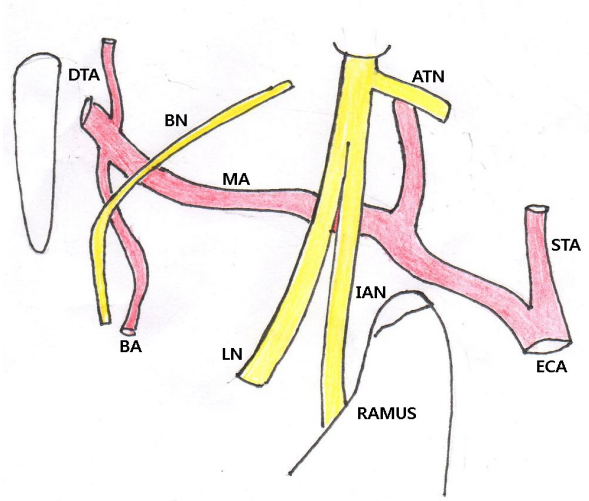

Fig. 2: Schematic diagram showing the variant course of second part of maxillary artery (MA) observed in the left infratemporal fossa after removal of lateral pterygoid muscle and head of mandible. Note the course of the artery medial to inferior alveolar nerve (IAN), lingual nerve (LN) and buccal nerve (BN). ATN – Auriculotemporal nerve; BA- Buccal artery; ECA- External Carotid Artery; DTA- Deep Temporal Artery; STA- Superficial Temporal Artery.

During routine dissection of left infratemporal fossa, after removal of coronoid process and part of ramus of mandible, the MA was not seen passing superficial to lower head of LP. But after piecemeal removal of LP muscle and the head of mandible we found the second part of MA passing deep to buccal, inferior alveolar and lingual nerves which is a very rare presentation of the artery. The pterygoid segment of the MA passes either superficial (lateral) or deep (medial) to lower head of LP muscle. When medial to the muscle, it usually courses lateral to lingual and inferior alveolar nerves, but the present case is a very rare presentation where it was running deep to these branches. (Figures – 1 & 2)

DISCUSSION

Maxillary artery variations in terms of origin, relations and branching pattern is not uncommon and different workers have evaluated its relationship with LP and mandibular nerve and its branches and classified these variations. According to Bergman et al. (1988) the MA was found medial to the LP muscle in 30.5% and lateral to it in 69.5% out of 180 dissections. Reporting another study, they stated that MA was medial to the muscle in 46% and lateral to it in 54% of 447 specimens [3]. Analyzing cumulative data of earlier reports Maeda et al (2012) concluded that in Mongoloids (Japanese) the MA was lateral to LP in 92.7 % cases and medial to LP in 7.3 % and in Caucasoids lateral position was noted in 61.6 % and medial position in 38.0 % cases [4]. In another study, MA was lateral to LP muscle in 94.6 % and medial to the muscle only in 3.6 % of Japanese cadavers [5]. In a study involving Turkish cadavers, the artery was lateral to LP in 57.1 % cases and medial to the muscle in 42.9 % cases [6].

In a Caucasian sample, Hussain et al (2008) noted lateral position of MA in 71% males and 65 % females and medial position in 29 % males and 35 % females [7]. Few Indian studies have also reported that MA more commonly passes lateral to lower head of LP muscle in about 75 % to 90 % cases [8, 9].

Maeda et al (2012) in a study involving 104 Japanese cadavers (208 sides) observed the relationship of MA with the LP muscle and lingual (LN) and inferior alveolar (IAN) nerves. They classified the relation of second part of MA with lower head of LP muscle into superficial (lateral to muscle), intermediate (passing through the muscle) and deep (medial to muscle). They further subdivided the superficial group into category A (MA superficial to LP and piercing through temporalis) and B (MA superficial to LP-90.4 %), the intermediate group as category C (1.4%) and deep group into D (MA medial to LP, lateral to LN & IAN – 5.8 %),

E (MA medial to LP but pass between LN and IAN- 1.9 %), F (medial to LP as well as LN & IAN 0.5 %) and G (MA medial to LP and passing through loop of auriculotemporal nerve) categories. The categories A and G were not observed in their study [4]. The category F described by them in one case (0.5 %) resembles our case where the MA was passing deep to LP, LN and IAN (Figure-2).

Pretterklieber et al (1991) studied topographical relations of maxillary artery with the lower head of LP and branches of mandibular nerve in 102 cadavers. They noted that in 55.4 % cases the MA was lateral to LP muscle and in 44.6 % cases medial to the muscle. According to relationship with BN, LN and IAN, the lateral position of the artery was divided into two subcategories and medial position into five subcategories [10]. Maxillary artery passing medial to LP muscle and medial to all the three nerves, similar to our case, was designated as type ME and observed in 3.9 % cases. The second part of MA passing medial to LP muscle and also lying medial to both IAN and LN was also reported recently by Sumalatha et al (2018) similar to our case [11].

CONCLUSION

The second part of MA is described and classified by different authors according to its relationship with LP muscle and mandibular nerve branches. Invariably most common variety noticed was second part of the artery passing superficial to LP. It was also observed that MA passing medial to LP was more frequent in Caucasoids in comparison to others. The present case is a rare type of presentation of second part of MA where it was passing deep to IAN, LN and BN that is the deepest structure in infratemporal fossa. In clinical practice chances of injury to mandibular nerve during embolization or damage to artery in order to approach to mandibular nerve block are more and exploration of the artery may be problematic in such kind of presentation.

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Conflicts of Interests: **None**

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