The Study of Higher Origin of Facial Artery and its Surgical Significance

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Abstract Facial artery plays a key role in blood supply of the face. Facial artery one of the anterior branches of the external carotid artery originates within the carotid triangle. Variation in the origin of the facial artery was observed on two sides out of 60 sides in 30 cadavers. Facial artery was observed originating at the level just below the maxillary artery within the parotid gland. Facial artery may originate as linguo-facial trunk or thyro-linguo-facial trunk. Other developmental variations have also been described in the literature like, agenesis of facial artery, enlarged facial artery, hypoplastic facial artery. Variability in situation may complicate the surgery. Therefore maxillofacial surgeon, plastic surgeons and head & neck surgeon should be aware of such variation.

Keywords Facial artery · Higher division ·
Branches of external carotid artery · Arterial variations ·
Variations

Introduction

Knowledge of anatomy is a cornerstone for surgery. Face is richly supplied by facial artery and transverse facial artery. Rich vascularity of face permits the reconstruction of various flaps for closure of defects.

Facial artery arises as anterior branch of the external carotid artery within the carotid triangle. In its cervical course it runs upward and lying deep to the posterior belly of digastric and stylohyoid. Running upwards grooving between the medial surface of mandible and lateral surface of submandibular gland, it then hooks the lower border of mandible at the anteroinferior corner of masseter muscle and ascends on face. Facial artery may arise singly or in common with lingual artery. Many developmental variations have been described in the literature like, agenesis of facial artery [1], enlarged facial artery, hypoplastic facial artery [2]. In present study, higher origin of facial artery was observed and its surgical importance and relations were discussed.

Materials and Methods

The study was conducted in the department of Anatomy, Chirayu Medical College & Hospital Bhopal. Thirty cadavers were dissected for the study. Origin of the facial artery was observed on 60 sides of the 30 cadavers dissected. Facial artery was traced to its origin from external carotid artery. Parotid gland was also removed by piecemeal dissection to trace the origin of facial artery.

Observations

External carotid artery was exposed and origin of the facial artery was traced. In two cadavers higher origin of facial

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Fig. 1 Illustration showing higher origin of facial artery. ECA external carotid artery

Fig. 2 Illustration showing higher origin of facial artery. ECA external carotid artery

artery was observed on left side (3.33 %). Facial artery was found originating from the external carotid artery just below the origin of maxillary artery within the parotid gland. Facial artery was descending along the posterior border of the mandible. On further tracing, artery turns forwards and medially along the lower border of the mandible. It hooks the lower border of the mandible and turns upwards at the antero-inferior angle of the masseter (Figs. 1, 2).

Facial artery on left side was related anteriorly to the posterior border of the ramus of mandible and posteriorly to the sternocleidomastoid. Superficially covered by the cervicofacial trunk of facial nerve and its branches buccal, marginal mandibular and cervical (Fig. 3). It was also related to the retromandibular vein superficially.

Fig. 3 Illustration showing relations of facial artery. ECA external carotid artery, FN facial nerve

Discussion

Facial artery variants are not uncommon. It may arise in the form a single stem as linguo-facial trunk [3, 4] or thyro-linguofacial trunk [5]. In absence of external carotid artery, facial artery may arise from internal carotid artery [3] or from the common carotid artery [6]. On rare occasion facial artery may remain absent, the other branches may then takeover the blood supply of face [1]. Higher origin of facial artery may be mis-diagnosed as absence of facial artery.

In two cases facial artery on left side was branching off higher up from the external carotid artery within the parotid gland (intraparotid). Very few cases have been reported in literature about the higher origin of facial artery within the parotid gland (intraparotid) [7] and also within the digastric triangle [8]. In situation of higher origin of facial artery it is liable to damage during parotid surgeries. Control of bleeding may be difficult due to presence of terminal branches of facial nerve in close vicinity. In present situation facial artery may be mistaken for the external carotid artery and could be ligated instead of external carotid artery. Knowledge of facial artery is also important in raising the mayo-cutaneous flaps [9] and also to the plastic surgeons in mapping for facial reconstructive operations [10].

Facial artery may get damaged during radiation or by an iatrogenic injury during surgery. Pseudo-aneurysm of external carotid artery branch develops, following radiotherapy for nasopharyngeal carcinoma [11]. There may be rupture of irradiated arteries in cases with head and neck cancers. In case of pseudo-aneurysm of a branch from external carotid artery, management of hemostasis will

depends up on the site of external carotid artery. If the hemorrhage was in the proximal part then surgery would be preferred over the embolization therapy [12, 13]. Therefore the relation of site of origin of facial artery from external carotid artery is important in such cases.

In present case, facial artery was superficial along the posterior border of the mandible and also crossing posterior belly of digastric and stylohyoid superficially. In such situation facial artery is liable to be injured during incisions along the posterior border and angle of mandible. Artery may also get severed during mandibulectomy and during radical neck dissection in present situation.

Conclusion

Sound knowledge of vascular anatomy is essential during surgical procedures like mandibular ramus osteotomy, hemi-mandibulectomy, angle reduction, parotidectomy. Such situation may complicate the surgery. Therefore maxillofacial surgeon, plastic surgeon and head & neck surgeon should be careful in case of such variations.

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