A Minimally Invasive Endoscopic Approach to Midcheek Mass: Showcase for Technical Description

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Background: Surgical approaches to the midcheek area are challenging. This area is included between the lower eyelid above, and the upper lip below. The peculiar anatomical location makes it really important for attractiveness, thus the need to obtain a correct balance between the operation's safety and minimally invasive aspect. To the authors' knowledge, this is the first showcase and technical description of a novel minimally invasive endoscopic approach for midcheek mass removal.

Methods: Making 3 incisions in concealed area an endoscopically aided facial dissection was performed to remove a solitary venus malformation of the left midcheek region.

Results: After the surgical procedure was performed, no hematoma, no edema, or facial nerve paralysis were observed. To date, during the follow-up period, no recurrence of the lesion has been observed, and the quality of life of the patient was good with a minimally scar outcome. Magnetic resonance imaging, performed 2 weeks postoperatively, demonstrated a complete removal of the mass

Conclusion: The authors' finding experience suggests that the minimally invasive approach provides an excellent surgical window that achieves greater exposure for the dissection of the midcheek area. Further clinical applications are required to assess advantages and/or limitations of this procedure.

Key Words: Endoscope-assisted surgery, head and neck surgery, midcheek mass, minimally invasive approach, solitary venous malformation

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Surgical approach to the midcheek area is always considered challenging for surgeon.

This area, included between the lower eyelid above, and the upper lip below (Fig. 1), has a critical role in facial attractiveness. Due to these features, the best surgical management should consider both the aesthetic and clinical outcomes.

Thus, a correct balance between the creation of safety surgical approaches and the minimally invasive aesthetic aspects should be achieved. Therefore, the endoscopic procedure can be considered a good strategy to conciliate both the needs.

Many surgical approaches to the midcheek area have been described, but none of them completely fulfils the purpose of a complete tumor removal with low morbidity, minimal scars, and the preservation of the surrounding key anatomic structures.[1–3]

As already highlighted by Dell'Aversana Orabona et al[4] in their review in 2014, the use of the endoscopic approach based on anatomical studies may be effective when compared with traditional approaches.

Abbate et al[5] in 2016 identified, in their anatomical study, a safe surgical corridor to gain endoscopically the access in midcheek region.

Basing on these studies, in the following showcase we want to demonstrate how the use of minimally invasive endoscopic approach could be applied successfully for the treatment of well-selected midcheek mass.

To our knowledge, this is the first showcase descriptions of such a minimally invasive endoscopic approach for midcheek mass removal.

TECHNICAL REPORT

A 16-year-old male patient suffering for a solitary venous malformation (VM) of the left lateral midcheek area was admitted in March 2015 to our Department of Maxillo-Facial Surgery of the University of Naples "Federico II." The patient complains facial asymmetry for a left side facial swelling (Fig. 2A). Prior to surgical treatment a clinical and instrumental examination was performed.

Preoperative Preparations

A careful head and neck examination was performed to disclose other symptoms like difficulty in chewing, presence of enlarged node, and intraoral disease. On the clinical examination, the mass was soft on palpation, mobile, with clear boundaries. There was no facial palsy, no clinical sign of of Stensen duct obstruction.

The patient underwent ultrasound-sonography (US), and magnetic resonance (MR) imaging. These diagnostic tools revealed hyper-intense oval-shaped lesions with clear boundaries, an intact envelope, and a low-level echo with no uniform density (Fig. 2B). Twenty-four hours before surgery, endoarterial chemo-embolization was performed to reduce the risk of bleeding (Fig. 2C).

Surgical Procedure

The patient's head was placed on the operative table in lateral rotation. Three incisions have been performed: the first 1 cm long incision in the temporal area above the hairline, the second one 1 cm

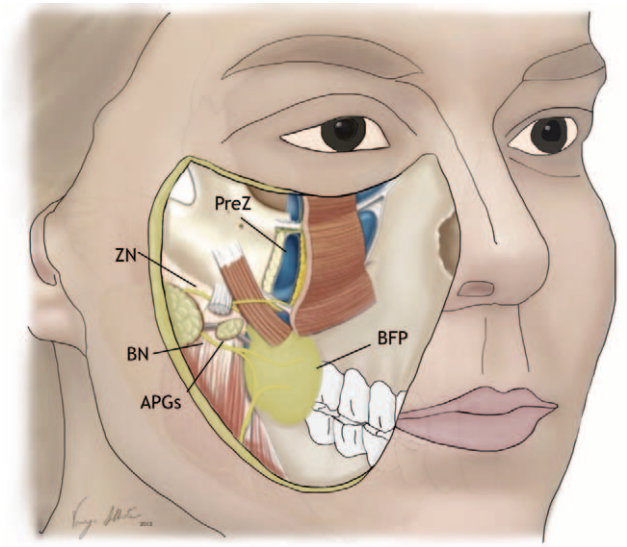

FIGURE 1. The midcheek has a trapezoidal shape, narrowing below because of the roundness of the cheek. Laterally the midcheek region is bounded by an anterior concavity line extending from the lateral canthus to the labial commissure. This line passes over the body of the zygomatic bone, the upper and anterior boundaries of the masseter muscle and the anterior portion of the buccinator muscle. PreZ, prezygomatic space; ZN, zygomatic nerve; BN, buccal nerve; APGs, accessory parotid glands; BFP, buccal fat pad.

long incision in a natural crease at the margin of the tragus, and the last one 1 cm long incision along the postauricolar crease (Fig. 3A). One optical and 2 operating corridors were created through the incisions just above the superficial musculo-aponeurotic system. Through the tragal incision, an optical dissector with a 30° endoscope (Fig. 3B) was inserted, the first structure encountered was the parotid cutaneous ligaments, easily removable by means of a blunt dissection with endoscopic scissors.

Along a line that is projected from the tragus to the ala nasi, the superior branch of the transverse facial artery (TFA) was encountered. When TFA was highlighted, the operators led dissection cranially, and visualized the zygomatic retaining ligaments and the zygomatic branch of the facial nerve. Once these structures were released, we safely entered in the prezygomatic space. An embolized vascular nidus has been localized close to the prezygomatic space (Fig. 3C). The lesion was peripherally isolated and enucleated, any vascular debris was coagulated to avoid recurrence (see Supplemental Digital Content, Video, http://links.lww.com/SCS/A295).

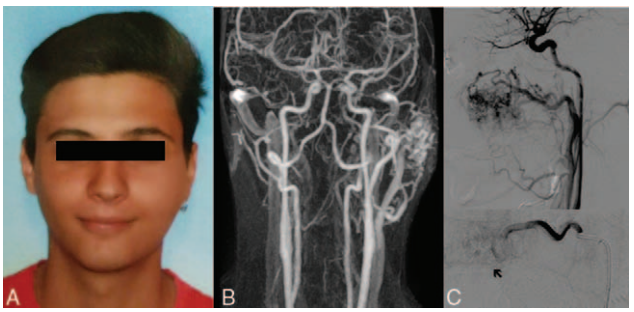

FIGURE 2. (A) Facial asymmetry in the left midcheek area. (B) Angio magnetic resonance showing a solitary venous malformation in the left midcheek area. (C) Endoarterial chemo-embolization before (upper picture) and after (arrow).

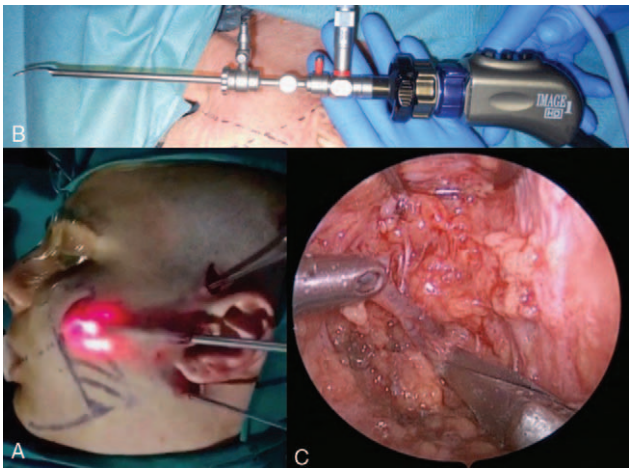

FIGURE 3. (A) Intraoperative external view showing the positioning of surgical incisions. (B) Optical dissector, with distal spatula, fenestrated, large, sharp, for the use with HOPKINS II telescope. (C) Endoscopic view: embolized vascular nidus close to the prezygomatic space.

Postoperative Finding

After the surgical procedure was performed, no hematoma, no edema, or facial nerve paralysis were observed. To date, during the follow-up period, no recurrence of the lesion has been observed, and the quality of life of the patient was good with minimally scar outcome (Fig. 4A–C). Magnetic resonance imaging, performed 2 weeks postoperatively, demonstrated a complete removal of the mass (Fig. 4D).

FIGURE 4. Postoperative view showing facial symmetry restoration: (A) frontal aspect; (B) submental projection; (C) left side projection; (D) postoperative angio magnetic resonance that demonstrates a complete removal of the mass.

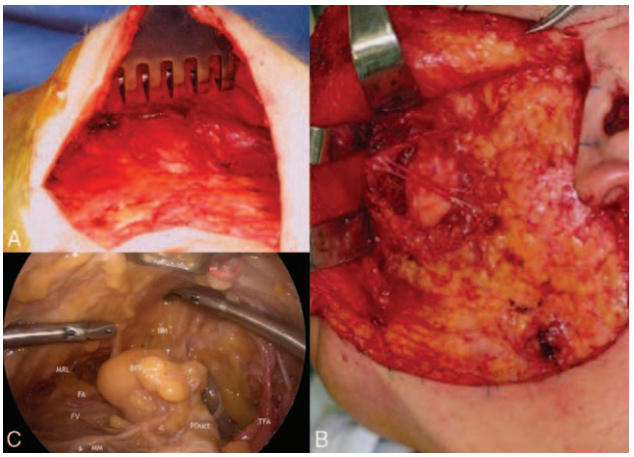

FIGURE 5. (A) Surgical field exposure by standard parotidectomy approach (Blair incision or Facelift-like incision). (B) Midcheek area exposure by Blair incision approach extended in the submandibular area. (C) Cadaveric image showing the magnification of the main structures located in the midcheek area obtained through the endoscopic approach proposed. MRL, mandibular retaining ligament; FA, facial artery; FV, facial vein; MM, Masseter muscle; BFP, buccal fat pad; BM, Buccinator muscle; PDuct, parotid duct; TFA, transverse facial artery.

DISCUSSION

The term ''midcheek'' refers to a part of the midface on the anterior aspect of the face, between the lower eyelid above, and the upper lip below (Fig. 1).

The peculiar anatomic location, and the presence of such different structures in limited spaces, makes this region a formidable challenge for surgeons.

Pathology of this district is rare, and the clinical evaluation of masses in the midcheek region can be difficult. Benign or malignant lesions in this area may arise from any number of the soft tissues of the face, including skin, lymphatic, neurogenic, and salivary structures.[6]

The differential diagnosis for midcheek soft tissue masses includes vascular malformations (cavernous hemangioma of the accessory parotid gland, intramasseteric hemangioma, vascular leiomyoma, solitary venous malformations [VMS]), benign or malignant lymphadenopathy, masseter muscle hypertrophy, lipomas, neurofibromas, schwannomas, neurilemmomas, fibromas, malignant tumors arising from the muscles, buccal fat pad, or other structures, sialoceles, sialolithiasis and all benign and malignant tumors arising from accessory parotid gland (APG). Benign or malignant tumors originating from the APG or parotid gland proper are among the most frequent diagnoses.

Dell'Aversana Orabona et al[4] in their review in 2014 reported a total of 59 cases of masses of midcheek. Fifty-nine percent depart from the accessory parotid gland, the other arise from the remaining structures of this area; VMS are the most frequent. Actually, these lesions may be intramuscolar, may arise from APG, or may originate from midcheek vessels in general.

Most common surgical approaches are intraoral, external (modified Blair incision, facelift-type incision), or direct skin surgeries.[3]

The intraoral approach, first described in 1979, was soon rejected because it provided inadequate exposure for the control of bleeding and preservation of facial nerves. In 2007, Schmutzhard et al[7] re-evaluated this method introducing actively monitored nerve stimulation and bipolar cautery, but unsatisfying bleeding control and Stensen duct injuries still remained problems related to the procedure.

Direct skin incision over the mass was an ill-advised procedure. Johnson and Spiro[2] reported an incidence of 40% of facial nerve injuries for tumors approached via a direct skin incision over the mass.

Most of the authors believe that the surgical approaches of choice for APG pathology are the standard parotidectomy incisions [Blair incision or facelift-like incision (Fig. 5A)].[8–10]

These approaches, though easy to execute, do not allow a good exposure of the midcheek region.

To obtain adequate surgical exposure of the anterior compartment of the face it is necessary to prolong the Blair incision in the submandibular region.

An incision of 10 to 15 cm long, a large wound, and visible scars on the visible facial areas are common disadvantages of these parotidectomy approaches (Fig. 5B).

None of the surgical approaches previously described can be considered reliable for the complete excision of tumor masses from the midcheek associated with low morbidity. None of these approaches is optimal to obtain the maneuvering space required for the preservation of noble structures, such as vessels and nerves, ensuring at the same time an acceptable scarring. Because of the particular features of this district, the best surgical management should consider both the aesthetic and clinical outcomes. Thus, the endoscopic procedure can be considered a good approach to conciliate both the needs. Recent reports have proposed minimally endoscopic approaches again, with the aim of obtaining a correct balance between the procedure's safety and the cosmetic and minimally invasive aspects.[11,12]

Abbate et al[5] in their anatomical report emphasized the role of the facial retaining ligaments and in particular of the TFA to guide the endoscopic anatomical dissection to midcheek area safety.

The authors have shown how the nervous and vascular structures arise from the deep layer closely related to the retaining ligament outside the loose areolar space. Thus, the preservation of the facial retaining ligaments, by the use of an endoscope, is mandatory to allow a safety access and complete mass removal in this area.

A longer learning curve could be considered the main disadvantages of the mininvasive approach compared with the traditional Blair modified approach. The endoscopic approach needs to acquire visual-spatial abilities to operate in a two-dimensional environment. Despite this, the proposed approach allowed ensuring an optimal visualization of all the facial nerve branches and nobles structures located in the midcheek area (Fig. 5C). The traditional Blair type approach even easier to perform does not allow a full surgical display of the midcheek region if the incision is not extended in the submandibular region (Fig. 5B). In this case, we will be able to get a good surgical field exposure, but it may result in a poor aesthetical outcome.

To our knowledge, this is the first showcase description of a novel minimally invasive approach for midcheek mass removal. Our finding experience suggests that the minimally invasive approach provides an excellent surgical window that achieves greater exposure for the dissection of the mid-cheek area, encouraging a more extensive use of a minimally invasive approach for this district. Further clinical applications are required to assess advantages and/or limitations of this procedure.

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