

Partial Parotidectomy under Local Anaesthesia without Regional Block Assisted by Electromyographic Facial Nerve Monitoring - A Case Report

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Abstract

The Rationale: This study describes a partial parotidectomy (PP) under local anaesthesia (LA) without regional block (LAWRB) assisted by electromyographic monitoring of the facial nerve, to consolidate the feasibility, efficacy and safety of these procedures without general anaesthesia (GA). **Patient Concerns:** An 82-year-old with a lump in the left parotid gland suspected for non-Hodgkin lymphoma (NHL) needed a histological examination to start chemotherapy. **Diagnosis and Treatments:** Because of multiple comorbidities, the authors performed a PP under LAWRB electromyographically guided by the NIM Vital (Medtronic)TM. **Outcomes:** The procedure was quick and did not require conversion to GA. The histopathological examination confirmed the NHL. No haematoma, sialocoele, earlobe numbness and transient or permanent facial palsy were observed. **Take-Away Lessons:** The electrophysiologic monitoring of the facial nerve improves the efficacy, safety and feasibility of parotid surgery under LA, avoiding adverse effects of GA, need of regional block and reducing hospital stay.

Keywords: Electromyographic facial nerve monitoring, literature review, local anaesthesia without regional block, NIM, parotid gland surgery

INTRODUCTION

Parotid gland surgery includes different procedures to treat benign and malignant neoplasms, usually under general anaesthesia (GA), but this puts elderly patients more at risk because of reduced organs function and reserve. Post-operative facial nerve paresis and paralysis are the earliest complications.^[1] They are considerably reduced by intraoperative direct nerve stimulation and monitoring techniques to identify facial nerve and its branches but require no muscular relaxation.^[2]

In case of parotid lumps, fine-needle aspiration cytology provides diagnosis. Core-needle biopsy^[3] or surgical biopsies are necessary when histopathological diagnosis is mandatory, especially in lymphoproliferative disorders.^[4] Then, in order to reduce systemic and facial nerve injury risks, and to avoid risks of regional blocks, the authors present a successful partial parotidectomy (PP) for a parotid lump suspected to be a B-cell non-Hodgkin lymphoma (B-NHL) under local anaesthesia (LA) without regional block (LAWRB), instead of with regional block

(LAWRB). The novelty is that the procedure has been realised under LAWRB in combination with the electromyography facial nerve monitoring^[2] (EFNM), to further consolidate the feasibility, efficacy and safety of these procedures in LA.

CASE REPORT

In June 2021, an 82-year-old male was referred to the Division of Oral and Maxillofacial Surgery of the University Hospitals of Ancona (Italy) because of a swelling in the left parotid region, arisen about two months before. The magnetic

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resonance imaging (MRI) with contrast revealed two lumps in the left parotid gland, one pre-auricular, just under the capsule and another deeper and inferiorly. No facial nerve dysfunction was observed. The total body computed tomography with contrast revealed a 2.8 cm × 2 cm hyperdense lesion inside the pre-auricular portion of the left parotid gland [Figure 1a]; another intraparotid mass of 1.7 cm × 1 cm was localised deeper and more caudal in the gland, ascribable to a lymph node [Figure 1b]. Both of them were increased in comparison with the previous MRI. The positron-emission tomography/computed tomography did not reveal other lesions.

The patient also had a history of chronic atrial fibrillation, systemic hypertension, severe type 2 diabetes, prostatic hypertrophy, idiopathic angioedema and latex allergy. Considering the need of a definitive pathological examination to start a systemic treatment, taking into account the age and the comorbidities, we decided to perform a PP under LAwRB electromyographically assisted by the NIM Vital™ (Medtronic). The pre-auricular lump was the selected target. The operation was conducted with anaesthesiologist support: intravenous light sedation was administered (midazolam 1 mg). The surgical field antisepsis was realised before and after the NIM Vital™ needles insertion [Figure 2]: we proceeded to proper insertion of the needles into the appropriate muscle locations.

The left parotid region was infiltrated with LA consisting of a combination of 10 mL of ropivacaine 1% and 10 mL of mepivacaine 2%, long-acting onset anaesthetics, to reduce the systemic toxicity of mepivacaine^[5] and to ensure adequate pain control. Sensory block was achieved due to the selective block of the smaller pain fibres, leaving the larger motor, touch and proprioception fibres relatively unaffected. This is the principle of EFNM during the whole procedures. A truncated modified Blair incision (4–5 cm long) was realised; after dissecting in a subplatysmal plane towards the superficial tumour, the overlying layer was reached and a cruciform incision on the parotidomasseteric fascia was made. The mass had no cleavage with healthy tissue and was intimately attached to the buccal branches of the facial nerve. With the help of the ENFM and the stimulator probe, the neoplasm was gently and bluntly isolated from the nerves, leaving just a small cuff of pathological tissue which was not cleavable without damaging them.

Anaesthetic supplementation, regional nerve block and conversion to GA were not required. The surgical procedure took 50 min. The patient was discharged after one day. Facial nerve integrity was assessed at the end of operation using the stimulator probe of the equipment. Clinically, it was evaluated adopting the House–Brackmann Grading Scale immediately postoperatively, at one week and six months. No haematoma, no sialocele, neither earlobe numbness or transient/permanent facial palsy were observed or referred [Figure 3a and b]. The aesthetic outcome was optimal with an almost invisible scar hidden by the patient's own skin excess [Figure 4a and b]. The histopathological examination confirmed the B-NHL (diffuse large B-cell lymphoma): the patient was rapidly referred to the Haematology Clinic to start the proper medical therapies.

DISCUSSION

Benign or malignant neoplasms may affect parotid glands, requiring different surgical treatments, traditionally performed under GA. Often these patients are aged and affected by systemic comorbidities, especially cardio-cerebrovascular and metabolic diseases. Moreover, elderly patients are vulnerable and particularly sensitive to the stress of anaesthesia, surgery and hospitalisation. Thus, the scientific literature shows an increasing trend of operations under locoregional

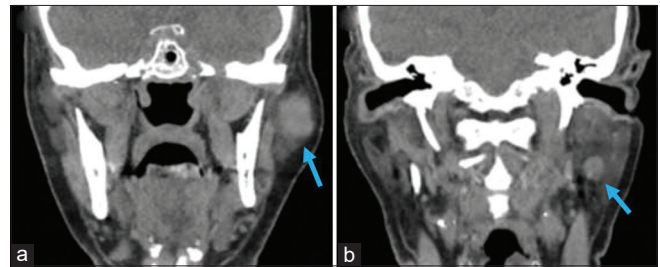


Figure 1: The total body computed tomography with contrast highlighted two hyperdense lumps in the left parotid. (a) One in the pre-auricular region, which was the target (long arrow) of partial parotidectomy electromyographically guided under local anaesthesia without regional block (b) another in the deep lobe (short arrow)

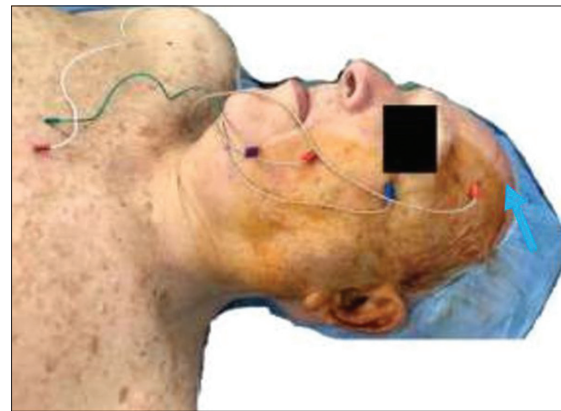


Figure 2: Pre-operative picture showing surgical field antisepsis and needle insertion for intrasurgical electromyographical nerve monitoring with the NIM Vital™

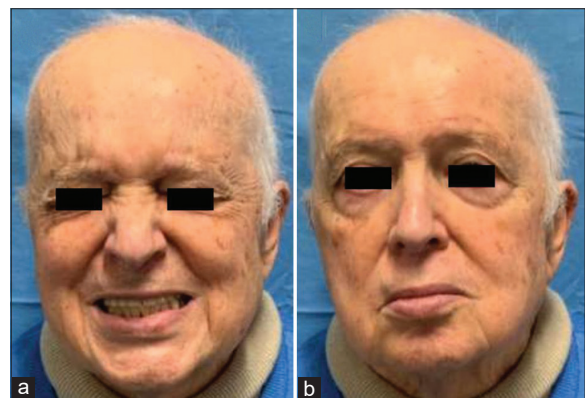


Figure 3: (a and b) Postoperatively no complications neither transient nor permanent facial palsy were observed



Figure 4: (a and b) The aesthetic outcome was optimal with an almost invisible scar hidden by the patient's own skin excess (blue arrow)

anaesthesia (peripheral anaesthesia with regional nerve block), usually named inaccurately as LA, to overcome these issues.^[6,7] However, regional anaesthesia implies deep cervical plexus nerve block, a procedure with important hazards: intravascular injection in large vessels of the neck, systemic toxicity, epidural, subdural or subarachnoid injection, blockade of the phrenic nerve, ecchymosis and haematoma. Some of these complications can be fatal due to the systemic effects.^[8]

Furthermore, parotid gland operations are susceptible to facial nerve injuries which can result in transient or permanent paralysis. Using intraoperative facial nerve monitoring and direct nerve stimulation techniques to identify facial nerve branches may decrease the risk of nerve damage in primary parotid surgery.^[9] Naturally, these techniques require no muscular relaxation.

This article describes a case of PP under LAwRB assisted by EFNM using the NIM Vital™: to our best knowledge, this is a novelty. Electromyography (EMG) measures muscle response or electrical activity in relation to a nerve's stimulation of the muscle. EFNM systems consist in monitoring EMG activity from facial muscles after a change in the related nerve function, as happens after mechanical (dissection of tissues) or thermal (bipolar forceps) stimuli dangerously close to the nerves during surgery. It is characterised by real-time visual and audible notifications that help surgeons in maintaining safety and predictability in facial nerve procedures. The operation was needed to confirm histologically the diagnosis of B-NHL in an aged patient affected by multiple systemic comorbidities, at high risk for GA. He was discharged after one day of recovery, without any complication and with an optimal aesthetic result [Figures 3a, b and 4a, b].

Parotid surgery may benefit from avoiding GA,^[10] especially in the elderly because of comorbidities and reduction of organ function. In this sense, retrograde nerve dissection helps move towards a LA because it skips the identification of the deep-seated facial nerve trunk^[11] (as in orthograde nerve dissection) and decreases the chances of major functional defect by injuries of the main trunk. In literature, many papers have already shown the feasibility of performing these treatments under LAwRB, but regional block also has some risks.^[9,10] Instead, the LAwRB considerably reduces the adverse

systemic effects and does not require any expertise in managing regional block techniques and its complications.

CONCLUSION

These results expand the possibility and the safety of performing parotid surgery under LA, reducing the operating time and avoiding long hospital stay for carefully selected patients, decreasing the risk of facial nerve damage, improving the comfort of surgeons, and facilitating younger surgeons to perform these procedures. These findings encourage further clinical research with more cases to support and standardise the procedure.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal his identity, but also acknowledge that anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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