

A Complication of Intraoperative Facial Nerve Monitoring: Facial Skin Burns

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Objective: To report on three cases of severe facial skin burns resulting from intraoperative facial nerve monitoring in patients undergoing parotidectomies.

Study Design: This study is a retrospective case review.

Setting: A tertiary referral center.

Patients: This study includes three patients who underwent parotidectomies with concurrent facial nerve monitoring.

Results: Facial skin burns were proven to result from a technical defect of the intraoperative facial nerve monitoring device. Burns were sustained at electrode insertion sites and their extent was related to the duration of monitoring. The most probable

explanation of these burns is electrolysis.

Conclusions: Successful retracing of technical defaults with biomedical engineers at the device manufacturer have led to the upgrade of the facial nerve monitor apparatus. The benefits of facial nerve monitoring largely outweigh the fortuitous occurrence of skin burns reported in this study. Therefore, this complication should not represent a drawback to the use of facial nerve monitoring. **Key Words:** Facial nerve—Intraoperative nerve monitoring—Burns—Parotidectomy—Electrolysis—Direct current.

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Intraoperative facial nerve monitoring (FNM) is based on the recording of electromyographic activity (EMG) generated by mechanical or electrical stimulation of the facial nerve. It has been developed to prevent nerve injury during surgical procedures in which the facial nerve is at particular risk (1).

The most widely used technique relies on the placement of 3-needle electrodes per monitoring channel, inserted in facial muscles, ipsilateral to the operated side. Each set (channel) consists of two active and one ground electrode. This configuration is a differential recording because the output reflects the difference between the signals of the two active electrodes. Usually two monitoring channels are available in commercial devices. Because of the functional and esthetic importance of the periocular and perioral regions, the most often monitored muscles are the orbicularis oculi and the orbicularis oris muscles. Ground electrodes are most often placed in the paranasal area. To provide the surgeon with immediate feedback information, the output of the evoked electromyographic activity is visible on a screen display or audible over a loudspeaker.

Facial nerve monitoring has become an integral adjunct in facial nerve identification and preservation in patients undergoing major neurotologic procedures (2,3). Condi-

tions in which intraoperative facial nerve monitoring seems to meet large approval for routine use are skull base procedures such as cerebellopontine angle tumor resections, congenital aural atresia repairs, or cases of revision parotid surgery (4-7). Some training centers seem to favor the technique for teaching purposes (8). Although FNM has been proven to help preserve the facial nerve during surgical procedures potentially placing the nerve at risk, the method is not considered as the standard of care for routine otologic surgery or uncomplicated parotid gland surgery (9), and therefore, the precise role of FNM remains a matter of debate.

While the discussion has been on the reliance of the method, no direct complication of FNM has been reported. This paper describes a potential and unexpected hazard of this technique.

CASE REPORTS

Case 1

A 47-year-old woman underwent a total parotidectomy, radical neck dissection, partial composite mandibular resection, and reconstruction with a fibula free flap and pectoralis major myocutaneous flap for an osteosarcoma of the left mandible. Intraoperative FNM was conducted using the Neurosign 100 (MAGSTIM Company Limited, U.K.) apparatus with habitual electrode configuration. After this 18-hour procedure, the surgeons discovered large skin injuries at the electrode implantation sites. Skin defects were 2 × 3 cm in width (Fig. 1). Electrical skin burns were

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