CASE REPORT

Use of Checkpoint nerve stimulator in resection of in-transit melanoma and reconstruction with cheek advancement flap

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This case involves an 88-year-old female with a history of malignant melanoma of her left medial cheek for which she had undergone excision and reconstruction with a cheek advancement flap approximately 12 months prior at another institution. At that time a sentinel lymph node could not be identified. She subsequently developed lymph node metastasis in one of her submental lymph nodes, which was removed. She also developed an in-transit lesion (melanoma skin metastasis) in her nasolabial fold between her original melanoma and the positive lymph node in the submental area. The patient was then referred for incontinuity resection of the in-transit lesion as well as for selective neck dissection (see Figure 1).

The goal of the procedure was to resect the in- transit melanoma including the lymphatic channels leading into the affected nodal basin as well as a selective neck dissection and reconstruction of the cheek defect. Given the previous surgery and cheek advancement flap procedure, scar tissue around facial nerve branches is expected and care must be taken to notice and preserve any facial nerve branches.

The procedure was started with appropriate mapping of the lymphatic channels within the area of the previous melanoma on her left medial cheek using ICG (indocyaningreen) infrared fluorescence lymphangiography (SPY Elite® System, Lifecell, Branchburg, NJ, USA). Lymphatic channels were visualized along the nasolabial fold draining into the submental space as well as another smaller lymphatic tract going through the flap into the preauricular area (see Figure 1).

Then the procedure was started with the selective neck dissection, which was performed by the otolaryngologist. Thereafter, I performed the incontinuity resection of the previous melanoma site and the in-transit lesion, starting

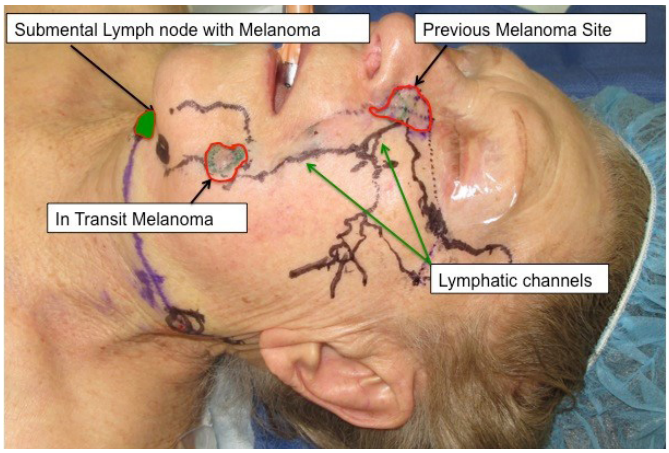

Figure 1: Preoperative markings of previous melanoma medial cheek, lymphatic channels, In-transit Melanoma nasolabial fold and submental lymph node with melanoma.

at the previous melanoma site (juncture between the lateral nasal wall and periorbital subunit). A 1-1.5 cm wide strip was marked, which incorporated the old scar and the lymphatic channels leading to the in-transit lesion and draining into the submental nodal basin. The in-continuity

Figure 2: In-continuity resection of melanoma and in transit lesion marked with Isosulfan blue and ICG.

resection markings were confirmed with ICG infrared fluorescence lymphangiography as well as Isosulfan blue dye injection lymphangiography (see Figure 2).

The excision extended paranasally along the ala to the nasolabial fold to include the old scar, lymphatic channels and in-transit lesion. The dissection was carried down to the SMAS (sub-muscular-aponeurotic-system) and great care was taken to preserve any facial nerve branches (see Figure 3).

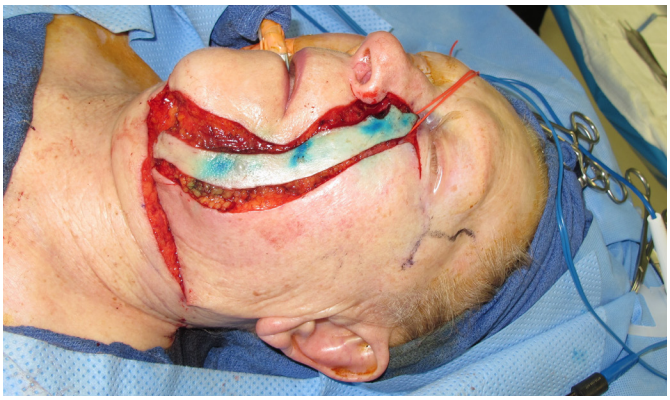

Figure 3: In-continuity resection of melanoma and in transit lesion, preservation of facial nerve branches.

The previous melanoma resection and cheek advancement flap reconstruction resulted in the facial nerve branches being encased in scar tissue with a less predictable plane of dissection. Several branches of the facial nerve, specifically two zygomatic branches and the frontal branch, presented much more superficial, likely due to the previous surgery and flap procedure. Those branches were located within the scar tissue using the Checkpoint nerve stimulator (see Figure 4). All facial nerve branches were preserved throughout the case.

The cheek advancement flap was carefully undermined and the incision was extended in the periorbital area, about 2 cm into the temporal area for further flap advancement. Then, again the facial nerve branches including the marginal mandibular nerve were tested and appeared to be intact (see Figure 5).

The flap was advanced and inset without tension (see Figure 6).

In this case the Checkpoint nerve stimulator was specifically useful, as the patient had undergone previous surgery leading to changes in the anatomic planes and scar tissue around the facial nerve branches. In addition, the use of Isosulfan blue, to visualize the lymphatic channels for the in-continuity-resection, stains the tissues blue and can further make the distinction between nerve and scar tissue difficult. One of the advantages that Checkpoint brings is the ability to stimulate the nerve

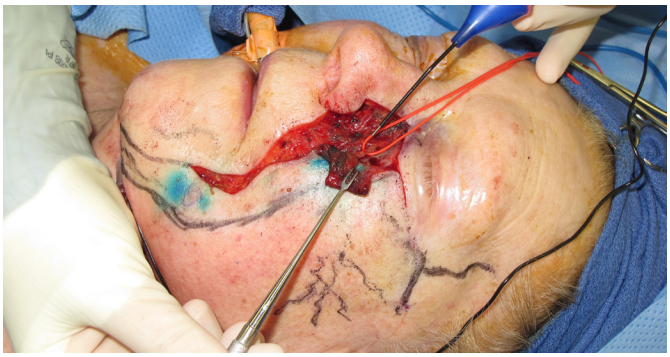

Figure 4. Zygomatic branch superficial within scar tissue after previous cheek advancement flap.

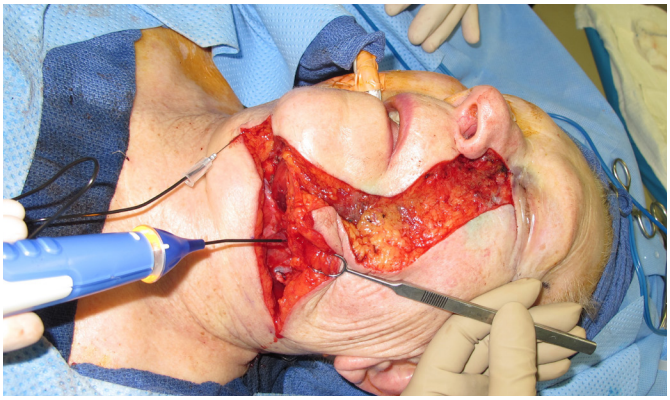

Figure 5: Dissection and advancement of cheek flap, testing of marginal mandibular nerve with Checkpoint nerve stimulator.

Figure 6: On table result after inset of cheek advancement flap

through scar tissue and as dissection further progresses the nerve maintains its ability to respond following repeated stimulation of its branches. This can be helpful when repeat stimulation is needed to identify the specific nerve branches.

When testing tissue for the presence of nerves or when nerves have clearly been identified the Checkpoint stimulator is set at the lowest current, at 0.5mA to start and the pulse width is gradually advanced until a response is seen or up to 200 microseconds. If no motor response is seen at 0.5mA, the pulse width is decreased to

0 and the output current is increased to 2.0mA at which point again the pulse width is gradually increased until a response is seen. The higher settings are particularly helpful when there is significant scar tissue around the nerve as in the case presented here.

The ability to adjust stimulation directly within the sterile field during the dissection allows for the device to stay in contact with tissue while scanning for nerves embedded in scar tissue. The biphasic output of current from the Checkpoint nerve stimulator allows for repeat stimulation and prolonged contact without, causing electrical injury or loosing motor response of the nerve with sustained contact. As mentioned before this feature is particular helpful when repeat stimulation is needed to identify the specific nerve branches. Other cases where a sustained, tetanic and repetitive motor response is critical are selection of cross facial nerve graft donor branches, identification of synkinetic facial nerve branches for selective neurectomy and any nerve transfers.

About the author

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