

Parotid sentinel lymph node biopsy combined with intraoperative facial nerve monitoring in head and neck tumor

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Abstract

Introduction: Most cutaneous head and neck tumors have a proclivity to spread via the lymphatic system and those sited in the upper face and scalp commonly drain to parotid lymph nodes. Sentinel Node Biopsy (SNB) allows the clinician to reliably harvest and then evaluate the first node to receive lymph drainage. Classically superficial parotidectomy would be required to retrieve the SN lodged in the parotid so limiting its utility. The current study utilizes a minimally invasive technique of parotid surgery that makes harvesting of the parotid SN a safe and reliable technique. Sentinel nodes procedure and facial nerve monitoring in order to protect the facial nerve.

Material and methods: A retrospective study was performed and twenty two patients suffering from cutaneous head and neck tumors requiring a sentinel node biopsy benefited from the combination of this procedure. Facial nerve identification and injury were registered.

Results: In all cases nerve monitoring enable to identify and monitoring the facial nerve and the sentinel node(s) were identified. These sentinel nodes were negative for 16 patients, positive for six patients. After surgery, no complication was observed.

Conclusion: This current experience confirms that the intra-parotid sentinel node biopsy combined with the nerve monitoring may be a safe and mini-invasive technique, which reduces the risk of facial nerve injuries as well as the operative time.

Introduction

Whatever their histology (melanoma, meibomian gland carcinoma, Merkel cell carcinoma & squamous cell cancer), most of the cutaneous head and neck tumors have a proclivity to spread via the lymphatic system with a risk of nodal metastasis [1]. Although the lymphatic drainage is not predictable, many cutaneous tumors of the upper face and scalp have a tendency to drain to the parotid lymph nodes (70.6%) [2,3]. In patient's staged as No, sentinel node biopsy (SNB) allows the clinician to reliably harvest and then evaluate the first node to receive lymph drainage [4]. No longer does the oncologist have to estimate the risk of early metastasis and gamble on the appropriate treatment pathway. It is now possible to eliminate chance and determined definitively by SNB whether an early metastasis has occurred. This introduces for the first time personalised care to head and neck cancer patient.

Harvesting sentinel nodes in the parotid would normally require a traditional superficial parotidectomy with facial nerve dissection. The time entailed and morbidity associated with this surgery has detracted from using SNB in this context. But a minimally invasive approach to parotid surgery has been described that reduces these constraints [5]. The risk to the facial nerve is further reduced by the adoption of intraoperative nerve monitoring (IONM). The aim of this study was

to assess if SN's in the parotid gland could be harvested safely by SNB minimally invasive parotid surgery.

Material and methods

Between October 2007 and June 2016, a retrospective review of all the patients who benefited from SNLB by way of minimally invasive parotid surgery in conjunction IOIM was undertaken. This involved a range of histological tumour types (Table 1). The common feature of this study group was the presence of the SN in the parotid gland and the need to retrieve it to assess metastatic spread of cancer.

Surgical technique

All the patients received an injection of a radioactive-tracer (99m

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Table 1. Summary of the patient's data.

Patient	Age	Sex	Localization	Histology	Nodes			
					Superficial	Deep	Total	SN positif
1	68	M	right eye	melanoma	2	0	2	0
2	61	M	right eye	melanoma	1	1	2	0
3	58	F	scalp	melanoma	3	0	3	1
4	77	M	right upper eyelid	squamous cell carcinoma	1	1	2	0
5	76	M	retro-auricular	squamous cell carcinoma	2	1	3	0
6	61	M	right eye	squamous cell carcinoma	0	1	1	0
7	66	F	right upper eyelid	merckelcarcinoma	2	2	4	0
8	77	M	right lower eyelid	annexielcarcinoma	2	0	2	0
9	54	M	right lower eyelid	sebaceouscarcinoma	1	0	1	0
10	51	M	ethmoid sinus relapsing in the orbit	adenocarcinoma	0	1	1	1
11	52	M	right eye	squamous cell carcinoma	2	0	2	0
12	60	M	right cheek	melanoma	2	0	2	1
13	66	M	cervical left	melanoma	1	1	2	0
14	83	M	right eye	squamous cell carcinoma	5	3	8	1
15	83	M	left temporal	melanoma	0	1	1	1
16	79	F	left upper eyelid (recurrence)	squamous cell carcinoma	0	2	2	0
17	28	M	right lower eyelid	squamous cell carcinoma	0	1	1	0
18	56	M	left lower eyelid	sebaceouscarcinoma	2	1	3	1
19	74	M	left lower eyelid	sebaceouscarcinoma	1	0	1	0
20	80	F	right cheek	squamous cell carcinoma	1	0	1	0
21	86	M	left ear	squamous cell carcinoma	1	4	5	0
22	57	M	left eye	squamous cell carcinoma	0	1	5	0
Total					29	21	50	6
Mean	66,05				1,44	0,95	4,35	0,27

Technetium colloidal rhenium sulfide [99mTc NANOCIS CIS bio international, Gif sur Yvette, France]) with lymphoscintigraphy the day before the surgery. A dose of 2 or 4 x 15 mBq (Becquerel, or 2 x 0.4mCi) in 0.2 mL volume was injected in the peri-tumoral area. Tomoscintigraphy was performed 1 hour later with a double head gamma-camera associated to CT scan in order to facilitate the location (SPECT-CT) (Figure 1).

Surgery was performed under general anesthesia without local anesthesia. The surgeon used a combination of pre-operative SPECT-CT to identify the general anatomical location of the node and at surgery a hand held gamma probe was used to be guided the operator onto the SN (Europrobe II, small probe semiconductor Cadmium, EM instrument, France). The technique of extra capsular dissection [5] was used to harvest the SN. A limited pre or infra-auricular cutaneous incision was used to expose the parotid fascia and allowing incision through the fascia directly above the SN. The technique was adapted to the requirements of each patient. The SN was said superficial when it was located under the capsula and deeply situated when it was intra glandular either intra superficial lobe or in the parotid tail. Deeply SN was relatively easy to harvest by a secure approach between the upper and lower branche of the facial nerve of the facial nerve through the nerve detection. Once the node was identified it was removed carefully without violating its capsule (Figure 2). The use of IONM helped minimize any risk to the facial nerve (Figure 3). Once hemostasis was complete the incision in the parotid capsule was reaproximated and the skin closed with non-absorbable sutures (Ethylene 5/0).

Results

Twenty two patients had parotid surgery to retrieve SN between October 2007 to june 2016. The mean age of patients was 66 y (range 28-86y). A SN sentinel lymph was identified and retrieved in all cases. A mean of 4,3 nodes per patient (range 1-8) was found, 29 nodes were

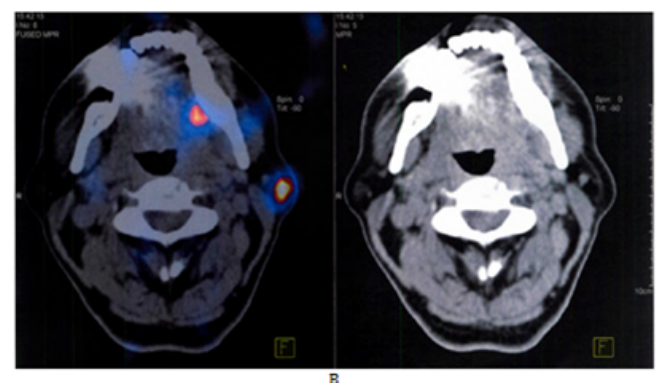


Figure 1. Example of preoperative imaging of SPECT-CT highlighting the nodes mapping. A) example of 3D reconstruction. B) example of SPECT-CT slides.

in the superficial part of the parotid and 21 nodes were lay deep to the facial nerve trunk.

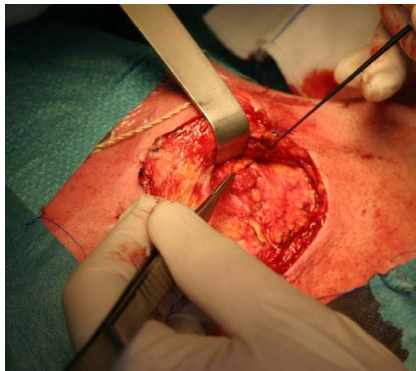


Figure 2. Exemple of the needle electrodes positioning with the NIM (NIM-3; Medtronic Xomed, Jacksonville, FL).



Figure 3. A limited incision of superficial parotid capsula allowed to access to the nodes which was intraoperatively spotted by a handheld gamma camera.

The SNLB was negative 16 patients and positive for metastatic disease in 6 (including one case of ethmoid adenocarcinoma isolated cells and one case of micrometastasis). The results are summarized in table 1.

There were no incidents of facial nerve injury or other complications in this small series of cases.

Discussion

The majority of cutaneous cancers in the head and neck have an affinity for lymphatic dissemination. The drawback is that the lymphatic drainage in the head and neck from any one anatomical area is not predictable [6]. This give SLNB it advantage [7].

Sentinel lymph node biopsy is a procedure that can provide critical information regarding lymph node status and the accurate regional staging of the cancer. It provides information specific to the individual patient and so is important to provide appropriate personalized and optimal treatment regimes to eliminate the cancer [6,8-12]. Morton [10] confirmed with the long-term results of the Multicenter Selective Lymphadenectomy Trial that SNB in head and neck melanoma increases both the disease-free and the specific survival of the patient. Active surveillance as a method of managing potential metastasis has been exposed as inadequate in a recent prospective randomized trial or oral cancer (de Cruz). In case of positive sentinel node biopsy, Andersen et al. [13] indicate that there is a survival benefit for patients who undergo completion of lymph node dissection. Consequently SNB has been advocated in the UK by NICE to be adopted nationally in the management of mouth cancer. The advantage for most patients, is to avoid neck dissection. In the context of patients with cancers in the upper face or scalp if cancer contaminated lymph nodes are allowed to

enlarge until clinically apparent by a wait and see policy then patients are condemned to a total parotidectomy frequently with sacrifice of part or all of the facial nerve and a concomitant neck dissection followed by adjuvant RT. This has to be borne by elderly patients in the main resultant poor outcome. From the medico-economic point of view, the SLNB approach appears to be more efficient compared to the traditional surgical approach [14].

The parotid is a common drainage area for cutaneous head and neck tumors in the upper face and scalp. In this small study a range of cutaneous cancer were included because they had the common biological feature of preferential spread via the lymphatic system. In all cases the SN lay in the parotid gland [5]. In a series of cadaver dissection [15] and in a clinical retrospective review [16] the intraparotid nodes were superficial to the facial nerve, and in most cases they were located in the preauricular area or in the parotid tail.

Hancock [17] demonstrated that local dissection is a safe and effective method of removing parotid lesions without threatening the facial nerve. The surgical procedure of extra capsular dissection applied in the current cases is a variation of the aforementioned technique. There was no injury to the facial nerve in this small series of cases which might in part be attributed to the use of IONM. The advantage of this test is the early detection of the facial nerve or one of its peripheral branches [1,18] and is thought to reduce mechanical trauma to the these delicate structures.

Conclusion

Current experience of the application of SNB in head and neck cancer confirms that it is an a reliable way of identifying early lymphatic metastasis and is a safe oncological procedure. The current study demonstrates that by adopting a minimally invasive approach to parotid dissection in conjunction with IONM, that SN can be safely retrieved from the parotid gland. The technique has potentially an important application in elderly individuals with cutaneous cancers of the scalp and temple that are at risk of metastasis. If metastasis are allowed to materialize clinically these patient's do not tolerate easily the therapeutic regime normally required to cure the disease. This study opens the prospect of the selective use parotid SNB.

Conflict of interest

We have no conflicts of interest.

Acknowledgment

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