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Minimally-invasive neck dissection and free flap reconstruction in patients with cancer of the head and neck

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Abstract

We describe our experience of cervical lymphadenectomy with microvascular anastomoses involving levels I to V through a minimally-invasive neck dissection. We retrospectively studied 12 patients who had levels I to IV neck dissection with free flap reconstruction between July 2013 and April 2015 at Poole Hospital (male:female ratio 8:4, mean (range) age 66 (49 – 83) years). The mean (range) operating time was 7 (5 – 8) hours, and the total volume drained from the neck was 105 (60-300) ml. The mean (range) number of harvested lymph nodes was 26 (13-39) from levels I to III, and 33 (20-42) from levels I to IV. Four patients developed weakness of the marginal mandibular nerve, but there were no serious complications. All flaps were successful, there was no regional recurrence, and most patients were discharged on postoperative day 15. This technique provides adequate exposure for lymphadenectomy and anastomosis, and we think that head and neck surgeons should include it in the armamentarium of reconstruction.

Keywords: Minimal Access; Neck Dissection; Anastomosis

Introduction

Dissection of the cervical lymph nodes is central to the treatment and staging of cancer of the head and neck. It is essential for prognosis and improves disease-free and overall survival.[1]

As oral squamous cell carcinoma (SCC) has a high propensity to metastasise to the lymph nodes, and there is a 25% to 30% chance of occult metastases,[2] selective neck dissection is usually done when the main tumour is resected. In conventional operations, surgeons usually make a U-shaped or Y-shaped incision for wider exposure, but this leaves a visible scar.

We have previously reported that minimally-invasive, endoscopically-assisted neck dissection[3] gives prognostic results that are similar to those of conventional dissection, a better aesthetic outcome, faster recovery, and a shorter stay in hospital. Here we describe complete harvest of the cervical lymph nodes from levels I to IV through an incision 5 cm long, which provides sufficient access for anastomosis of the flap. To our knowledge, this has not been reported before.

Patients and methods

Twelve patients (8 men and 4 women, mean (range) age 66 (49-83) years) with oral cancer had minimally-invasive neck dissection with simultaneous free flap reconstruction between July 2013 and April 2015 (Table 1). Tumours were at various sites: floor of the mouth (n = 2), tongue (n = 6), buccal mucosa (n = 2), and maxilla (n = 2). Eleven patients had radial forearm free flaps (RFFF), and one had a composite flap that included the angle of the scapula and the serratus anterior

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Table 1
Patients' details.

Case No.	Sex	Site of SCC	Stage	Flap	Operating time (hours:minutes)	Nodal yield	Drain (ml)	Day drain removed	Length of hospital stay (days)
1	M	Upper gingiva	T2N1M0 (III)	RFFF	6:30	24 (I-III)	70	5	14
2	F	Tongue	T2N2b (IV)	RFFF	6:30	32 (I-IV)	80	4	16
3	M	Tongue	T2N1M0 (III)	RFFF	8:00	38 (I-IV)	80	5	16
4	M	Floor of mouth	T1N1M0 (III)	RFFF	5:00	42 (I-IV)	100	5	14
5	M	Palate	T1N2bM0 (IV)	RFFF	5:30	20 (I-IV)	80	5	14
6	M	Tongue	T2N0M0 (II)	RFFF	7:00	29 (I-IV)	110	6	17
7	M	Cheek	T2N0M0 (II)	RFFF	7:00	13 (I-III)	60	4	15
8	F	Floor of mouth	T2N1M0 (III)	RFFF	8:00	33 (I-III)	90	5	11
9	F	Tongue	T2N0M0 (II)	RFFF	8:00	41 (I-IV)	90	4	16
10	M	Tongue	T2N0M0 (I)	RFFF	6:30	21 (I-III)	300	6	15
11	F	Tongue	T2N1M0 (III)	RFFF	7:00	30 (I-IV)	105	6	15
12	M	Upper gingiva	T4N2bM0 (IV)	Angle of scapula	8:00	39 (I-III)	90	5	18

SCC: squamous cell carcinoma; RFFF: radial forearm free flap.

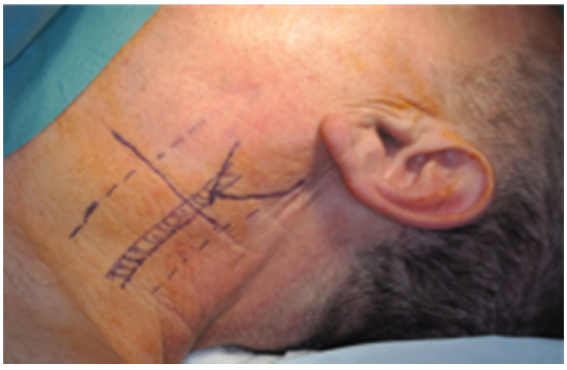

Fig. 1. Marking the incision.

Fig. 2. Dissection to the subplatysmal layer.

muscle.[4] Five selective neck dissections included levels I to III, and the remaining seven, levels I to IV.

Surgical technique

In addition to the usual dissection tools, we use a 30°, 4 mm diameter endoscope (Karl Storz GmbH & Co, Tuttlingen, Germany) to increase the field of vision and improve illumination, and a Harmonic® scalpel (Ethicon) and long monopolar blade (GoldVac™ Push Button, ConMed Corporation, Utica, NY, USA) for tissue dissection.

We place a sandbag under the shoulders of the patient to extend the neck, and mark anatomical structures such as the lower border of the mandible and anterior border of the sternocleidomastoid muscle (Fig. 1). We make a 5 cm incision at the leading edge of the sternocleidomastoid muscle to align horizontally with the hyoid bone. We then follow the incision and dissect the subplatysmal layer up to the lower border of the mandible (subfascial dissection is recommended around the submandibular gland to avoid injury to the marginal mandibular branch of the facial nerve) (Fig. 2). To create a pocket in each area, we prepare the subplatysmal dissection in the anterior, inferior, and lateral region, and identify the great auricular nerve, which lies 6.5 cm below the tragus. If possible, we isolate the external jugular vein. The spinal accessory nerve can then be found 1 cm below the junction of the great auricular nerve at the leading edge of the sternocleidomastoid muscle. We then dissect the submandibular gland free from the lower border of the mandible. Lymphadenectomy can proceed when these important structures have been identified.

We begin to dissect the lymph nodes from the most superior and posterior area (level IIB), and then proceed to level IIA, across the internal jugular vein, and down to levels III and IV. When this is finished we dissect to the omohyoid muscle to reach the hyoid bone. Level IA can be cleared as soon as the digastric muscle and the mylohyoid muscle are identified. We dissect level IB conventionally by pulling the mylohyoid muscle forward and the submandibular gland down, and as soon as the lingual nerve has been identified, we dissect the surrounding lymph nodes and the submandibular gland.

After completion of the dissection in levels IIA and IB, the facial artery and common facial vein are identified, dis-