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Tracheostomy or delayed extubation after maxillofacial free-flap reconstruction?

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Abstract

Tracheostomy is commonly done to secure the airway after free-flap reconstruction in the head and neck, but it can have serious complications. We reviewed the outcomes of 78 patients who had microvascular free-flap reconstruction for maxillofacial pathology. Twenty-five had primary tracheostomy and 53 delayed extubation 24–48 hours after operation. Both groups had similar operations, and the duration of stay in the intensive therapy unit (ITU) was almost identical. However, the overall hospital stay was significantly longer (27.2 days) in the tracheostomy group than in the delayed extubation group (20.4 days, $p = 0.03$). Three patients who had a tracheostomy had serious complications related to the procedure (12%), including cardiorespiratory arrest when the tracheostomy tube was obstructed. Only one patient in the delayed extubation group required a delayed (secondary) tracheostomy for persistent oedema of the airway and failed delayed extubation (2%), and a further two had a tracheostomy for other reasons (4%). Of those who had delayed extubation, 50 (94%) did not ultimately require a tracheostomy, which is consistent with other studies. We have used our data to develop an algorithm to help clinicians decide when tracheostomy is needed. In general, primary tracheostomy should be considered for patients who have maxillofacial free-flap reconstruction and bilateral neck dissection, or those with oropharyngeal tumours who need additional access procedures. Delayed extubation is safe after free-flap reconstruction and unilateral neck dissection in patients who do not have conditions such as obstructive sleep apnoea or poor lung function.

Keywords: Tracheostomy; Free-flap; Extubation; Airway; Maxillofacial; Reconstruction

Introduction

The methods used to secure the airway after free-flap reconstruction of the head and neck are controversial. Some clinicians do a tracheostomy routinely while others keep patients intubated overnight, and aim to extubate the following day (delayed extubation). In a survey of British maxillofacial units, 30% would "usually" and 39% would "almost always" do an elective tracheostomy for uncomplicated free-flap maxillofacial operations.[1] However, the procedure carries risks. Complications range from minor problems such as hypertrophic scarring to life-threatening events such as blockage of the tube and respiratory arrest, and rates vary between 4% and 45%.[2–6] We know of no universally accepted algorithm or scoring system to help clinicians choose the most appropriate method of managing the airway,[7,8] but reported evidence suggests that patients who do not have a tracheostomy recover faster and have a shorter stay in hospital than those who do. [5,9–11] Restricting the use of tracheostomy to selected cases has also become an important part of some ERAS (enhanced recovery after surgery) programmes.[12] Unfortunately, it can be difficult to compare the outcomes of operations on the head and neck between

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patients who have had a tracheostomy and those who have not because of the diverse range of coexisting conditions and the different operations.[10,13]

At the Oral and Maxillofacial Surgery (OMFS) Unit at St George's Hospital, London, UK, tracheostomy is done only in selected patients who have free-flap reconstruction. We retrospectively audited the postoperative management of the airway (tracheostomy or delayed extubation) in these patients, and reviewed the cases that required a secondary or delayed tracheostomy, and those with serious complications related to the procedure.

Material and methods

Patients who had microvascular free-flap reconstruction by the OMFS team at St George's Hospital between April 2013 and April 2015 were included. Reconstruction was done for malignant (such as squamous cell carcinoma) or benign disease (such as ameloblastoma or osteoradionecrosis). Patients were divided into two groups: those who had a tracheostomy at the time of operation (primary tracheostomy), and those who were kept intubated and admitted to the intensive therapy unit (ITU) with the aim of being extubated in the following 24-48 hours (delayed extubation). The consultant surgeon and anaesthetist evaluated all the patients before and after operation according to the protocol of the unit. Generally, from an anaesthetic point of view, tracheostomy was recommended for patients with obstructive sleep apnoea, obesity, or those with a grade III or IV laryngoscopy view or poor lung function, or both. Tracheostomy apparatus consisted of a cuffed, non-fenestrated tracheostomy tube with an inner cannula that was inserted though a routine surgical approach. Patients in this group were subsequently admitted to the ITU. Those in the delayed extubation group were admitted to the ITU at the end of the operation with the endotracheal tube in place. The next morning, they were assessed by both the OMFS and ITU teams to find out if they could be safely extubated before transfer to the surgical ward.

Patients whose operations did not involve a free-flap, and those who did not have sufficient data, were excluded from the study. We obtained information on each case from patients' notes, and from theatre, operative, and pathology records, discharge summaries, clinical letters, and radiographs. Details included sex, age at operation, TNM staging, site and subsite of the maxillofacial tumour (anterior, posterior, midline), type of free-flap (soft tissue, composite), type of neck dissection, and whether it was unilateral or bilateral. We also documented all coexisting conditions, serious inpatient complications, additional procedures, and returns to theatre, as well as all serious complications that resulted from the tracheostomy, and which patients required a delayed tracheostomy. Statistical analysis was completed with the help of Minitab® software Version 17.2 (Minitab Ltd, Coventry, UK).

Table 1
Summary of results from both groups. Data are number (%) unless otherwise stated.

	Tracheostomy group (n = 25)	Delayed Extubation group (n = 53)
Median (range) age (years)	57 (60)	64 (64.5)
Male: female ratio	17: 8	23: 30
Diagnosis:		
SCC	21	42
Osteoradionecrosis	2	6
Ameloblastoma	0	3
Post trauma	1	1
Other malignancy	1 (adenoid cystic carcinoma)	1 (cribriform adenocarcinoma)
T-stage:		
1	4 (19)	12 (29)
2	11 (52)	12 (29)
3	0	3 (7)
4	6 (29)	15 (35)
Mandibulectomy:		
Segmental	4	15
Unilateral neck dissection	2	14
Bilateral neck dissection	2	1
Marginal	0	8
Unilateral neck dissection		8
Oral tongue/floor of mouth:	14	19
Unilateral neck dissection	1	18
Bilateral neck dissection	13	1
Buccal:	0	5
Unilateral neck dissection		5
Oropharyngeal:	5	1
Unilateral neck dissection	5	1
Midface:	0	5
Unilateral neck dissection		5
Lip/chin/skin/post trauma	2	0
Type of free-flap:		
Radial	20	31
ALT	1	1
Composite radial	0	5
Fibular	2	5
DCIA	2	11
Delayed trache required	N/A	3 (5.6)
Median (range) nights in ITU	1 (1–6)	1 (1–9)
Median (range) duration of stay	22 (8–57)	16 (9–49)
Gastrostomy	12 (48)	9 (8.6)
Return to theatre	5 (20)	10 (18.9)

(SCC = squamous cell carcinoma; ALT = anterolateral thigh, DCIA = deep circumflex iliac artery flap; ITU = intensive therapy unit).

Results

Eighty-four maxillofacial reconstructive operations were done over a 2-year period. Six patients who did not have free-flaps were excluded from the study (Table 1). Of the remaining 78, 63 (81%) were treated for squamous cell carcinoma (SCC), 8 (10%) for osteoradionecrosis, and 7 (9%) for other diagnoses (Table 1).

The group consisted of 40 men and 38 women, with a median (range) age of 61.8 (28–92) years. Pre-existing conditions and postoperative complications were similar in both groups. The types of operation are summarised in Table 1.