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Factors affecting orocutaneous fistula formation following head and neck reconstructive surgery

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Abstract

This paper explores factors associated with the formation of orocutaneous fistula following head and neck reconstructive surgery, and considers ways this complication may be reduced. We retrospectively analysed the medical notes of 102 patients who had reconstructive surgery at the study centre over a 17-month period. Information included patient comorbidities, previous oncological treatment, duration of hospital stay, complications, incidence of fistulas, and the day on which oral intake started. Patients who had previously had chemoradiotherapy were significantly more likely to develop a fistula than those who had not ($p = 0.008$). Associations between other variables were not significant. Our analysis identifies a considerable number of patients who require head and neck reconstructive surgery as a result of new primary or recurrent tumours within previously irradiated fields. It also demonstrates the impact of previous chemoradiotherapy on many elements of recovery and rehabilitation, including but not limited to fistula formation. Treatment for this group of patients requires careful consideration and planning, as their recovery trajectory may be different from those patients who undergo surgery as a primary intervention. We suggest ways to reduce the incidence of fistulas, which include the avoidance of oral intake before the eighth postoperative day.

Keywords: Orocutaneous fistula; Head and neck cancer; Chemoradiotherapy; Flap reconstruction; Oral intake

Introduction

The majority of head and neck surgery which requires free flap reconstruction is related to the treatment of cancer. However, surgery may be required for a number of other aetiologies including trauma, osteoradionecrosis, or benign tumours such as ameloblastoma.

Between 2013 and 2014, 8429 new cancers of the head and neck were diagnosed in the UK, and of them, 2684 were cancers of the oral cavity.[1,2] The use of primary surgery to treat oral cancer is well established, however in recent times the role of surgery to treat recurrent tumours, or new primary tumours within previously irradiated areas has developed.[3] As recurrence after definitive chemoradiotherapy for advanced-stage tumours can be as high as 25%-50%, it is becoming more common for patients to be offered curative salvage surgery.[4] Surgical interventions for this specific sub group of patients present inherent challenges due to the impact of chemoradiotherapy regimens on tissue such as fibrosis, stenosis and oedema, which can have a negative impact on post-operative healing.[5] Microvascular reconstruction can also be problematic because of a lack of suitable

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vessels in the neck. Flap failure rates are commonly used as bench marking tools to monitor the quality of head and neck reconstructive surgery; however this methodological approach may fail to capture more detailed information on complication rates that may be important to analyse and improve practice. To contribute to the evidence base and to develop local guidelines, we identified complications, with particular focus on the formation of fistulas, following head and neck reconstructive surgery.

Material and methods

We retrospectively analysed information on patients who underwent head and neck surgery with a free flap in a single centre between 14 May 2013 and 30 October 2014 (17 months), to collect data on the incidence of complications and the variables associated with them. Patients who had reconstruction with a free or pedicled flap for all aetiologies, and who were under the care of oral and maxillofacial surgeons, were included. Those who had total laryngectomy, pharyngectomy, or reconstruction of the pharynx alone, were excluded.

Statistical analysis was completed using SPSS Statistics for Windows, version 22 (IBM Corp, Armonk, USA). Fisher's Exact Test was used, and statistical significance was set at $p < 0.05$.

Results

A total of 102 patients were included. Details of aetiology, procedure, and comorbidities are presented in Table 1. Twenty-one patients had previous surgery with adjuvant chemoradiotherapy for treatment of head and neck cancer. Five patients had undergone chemoradiotherapy alone for treatment of squamous cell carcinoma of the tonsil (n = 2), tonsil and base of the tongue (n = 2), or palate (n = 1), and presented with new primary tumours or osteoradionecrosis in the oral cavity. These patients were treated with a variety of chemoradiation regimes.

Twenty-four patients (24%) had surgical complications initially, but 99% of flaps survived (Table 2). Of the 11 who developed a fistula (11%), 6 had previously had chemoradiotherapy and surgery, and one had undergone surgery alone.

Duration of fistula ranged from 5–60 days. Two patients had a pervasive orocutaneous fistula which remained beyond discharge home, but healed within 60 days of commencing a period of nil by mouth and being fed via a gastrostomy or nasogastric tube. These two patients had undergone previous surgery alone and surgery with chemoradiotherapy treatment. The remaining nine other patients who developed fistula healed, and were able to restart oral intake following a period of nil by mouth for at least 5 days from the point at which the fistula was identified, to facilitate optimal healing.

Table 1
Patients' details (n = 102).

Variable	No. of cases
Aetiology:	
Cancer	88
Osteoradionecrosis	8
Ameloblastoma	4
Trauma	2
T stage:	
0	1
1	19
2	21
3	8
4	34
N/A	5
Procedure:	
Mandibulectomy	33
Mandibulotomy	6
Maxillectomy	20
Mandibular rim resection	10
Total/partial glossectomy	21
Total parotidectomy	1
Floor of mouth resection	3
Rhinectomy	1
Soft palate and oropharynx resection	1
Full thickness cheek resection	1
Other	5
Reconstruction:	
Fibula flap	40
Radial forearm flap	35
Anterolateral thigh flap	16
Scapula flap	10
Pectoralis major flap	4
Nasolabial rotational flap	1
Previous treatment:	
Chemoradiotherapy	5
Surgery	8
Chemoradiotherapy and surgery	21
Coexisting condition:	
Hypertension	34
Alcohol excess	9
Transient ischaemic attack/cerebrovascular accident	3
Cardiomyopathy	1
Myocardial infarction	5
Angina	3
Ischaemic heart disease	1
Carotid stenosis	1
Atrial fibrillation	2
Pulmonary embolism	1
Depression/anxiety	6
Asthma	11
Gout	9
Ataxia	2
Chronic pancreatitis	2
Gastro-oesophageal reflux disease	11
Chronic obstructive pulmonary disease	8
Epilepsy	1
Pemphigus/psoriasis	2
Arthritis	4
Dementia	1

No surgical interventions were used to facilitate healing for any of the patients who developed fistula.

The overall median duration of hospital stay was 15 days (range 6–170). Those who developed a fistula had a