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ScienceDirect

British Journal of Oral and Maxillofacial Surgery 57 (2019) 649–654

BRITISH Journal of Oral and Maxillofacial Surgery

www.bjoms.com

Health-related quality of life in patients with T1N0 oral squamous cell carcinoma: selective neck dissection compared with wait and watch surveillance

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Accepted 22 May 2019
Available online 21 June 2019

Abstract

Management of the neck in patients with clinical T1N0 oral squamous cell carcinoma (SCC) is controversial. The aim of this study was to report the health-related quality of life (HRQoL) in a consecutive group of patients with stage 1 disease at a time closest to two years after primary surgery. Of 216 patients treated between 2007 and 2012 (after excluding early death and regional recurrence), 195 were eligible. HRQoL was measured using the University of Washington quality of life questionnaire version 4. The overall response rate was 65% (126/195). HRQoL outcomes were good, but compared with patients in the wait and watch group, those who had selective neck dissection (SND) had more problems regarding appearance (14% compared with 1%, $p = 0.008$) and pain (19% compared with 6%, $p = 0.04$). Similar trends were seen for shoulder (14% compared with 8%), mood (16% compared with 8%), and speech (5% compared with 1%), and for poorer overall QoL (30% compared with 16%). It is difficult to establish why patients did or did not have neck dissection in a retrospective sample, but it is likely that those who had SND had larger tumours. The findings highlight the impact that SND has on HRQoL in domains such as appearance, pain, speech, swallowing, and chewing. Previous studies on SND have tended to focus on injury to the accessory nerve and shoulder function, but these new data emphasise the need to include other domains in future trials that compare wait and watch, SND, and sentinel lymph node biopsy.

Keywords: Early oral cancer; neck dissection; health-related quality of life; squamous cell carcinoma; UW-QoLv4

Introduction

Management of the neck in patients with T1/T2N0 oral squamous cell carcinoma (SCC) is controversial, but neck dissection is known to cause morbidity that has an impact on health-related quality of life (HRQoL).[1] Treatments include wait and watch, sentinel lymph node biopsy (SLNB),[2] and selective neck dissection (SND).[3] Recent guidelines have recommended surgical management of the neck as an option in early-stage disease.[4]

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https://doi.org/10.1016/j.bjoms.2019.05.021

Optimal survival and HRQoL are both important considerations.[5] Neck dissection can improve survival in patients with early oral cancer,[6] but patient-reported outcomes have shown poorer HRQoL in those who had neck dissection than in those who did not.[7] Incrementally poorer QoL is seen with SND, modified radical neck dissection (MRND), and radical neck dissection (RND),[7] and there is some evidence that shoulder morbidity is increased when level IIb is included.[8,9]

Patients who are managed under a wait and watch treatment plan have a better HRQoL than those who have neck dissection,[7] but wait and watch must be balanced against the risk of neck failure, the need for further treatment, and disease-specific survival. Tumours with a minimal depth of invasion have a low risk of cervical metastasis, and might be more suitable for this approach,[10] but even relatively superficial lesions can metastasise. A prospective randomised controlled trial has suggested no survival advantage for the surgical treatment of clinically node-negative necks in patients with tumours that are less than 3 mm thick.[6] However, tumour thickness or any other factor cannot be used to stratify patients into low-risk groups, and decisions about optimal management of the N0 neck and the balance of risks will be different in each case. Better understanding of morbidity will help patients decide for themselves about which treatment is best.

Other authors have shown that SLNB confers no survival disadvantage when compared with SND in patients with T1 and T2 N0 disease.[2,11] There is some evidence to suggest that SLNB may be associated with better functional outcomes and HRQoL than SND, but the evidence is weak.[12,13] SLNB may maintain the survival advantage of SND and retain the advantages of wait and watch for HRQoL, but neither assumption is certain.

The main determinants of HRQoL in patients with larger (T3/T4) oral SCC are the use of free flaps and postoperative radiotherapy.[5] The impact of a neck dissection and shoulder dysfunction is less of an issue than problems with a dry mouth, speech, saliva, or chewing.[14] In contrast, the morbidity caused by a neck dissection in patients with T1 and T2 disease seems to be worse than the morbidity at the primary site.

We know of few studies with sufficient patients with stage 1 oral cancer to allow for adequate comparison between wait and watch and SND.[13] The aim of this study therefore was to describe a consecutive group of patients and report their HRQoL at a time closest to two years after primary surgery.

Methods

The audit was approved by the Aintree University Hospital Audit Department, and patients were identified using the Aintree head and neck oncology database. Consecutive patients with clinical T1N0 oral SCC who had primary operations with curative intent between January 2007 and December 2012 were included. As SLNB was not introduced into the unit until immediately after the study period, it was not an option for these patients.

We reviewed operative and pathology records, and obtained information on follow up to February 2016 from clinical notes and letters. Patients with disease beyond clinical stage I, and those treated with palliative intent, were excluded. It is the practice of the unit to send the University of Washington quality of life (UWQoL) questionnaire to patients after treatment, and questionnaires completed at a time closest to 24 months and a minimum of nine months from operation, were analysed.

The UWQoL questionnaire is well established.[15] Version 4 consists of 12 single question domains, each with between three and six response options that are scaled evenly from 0 (worst) to 100 (best), according to the hierarchy of response. We used criteria derived from earlier work to establish the domains in which patients had a severe problem or dysfunction.[16] These criteria are based on a mix of domain scores and the importance of domains during the previous week. We also analysed two subscale composite scores (Physical function and Social-emotional function) and a single six-point overall measure of QoL.[17] Physical function is the simple mean score of the swallowing, chewing, speech, saliva, taste, and appearance domains, whilst social-emotional function is the simple mean score of the activity, recreation, pain, mood, anxiety, and shoulder domains. Finally, for the single-item overall QoL score, patients were asked to consider not only their physical and mental health, but also other factors, such as family, friends, spirituality, or personal leisure activities that were important to their enjoyment of life.

The aim was to describe HRQoL about two years after operation in patients (without regional recurrence) who had neck dissection or were under wait and watch surveillance. Baseline characteristics and UWQoL responses were compared between groups, and the Mann-Whitney test was used to assess the significance of the differences. Statistical significance was set at the 5% level.

Results

A total of 216 patients met the inclusion criteria, 168 in the wait and watch group and 48 in the neck dissection group. Twenty-one were excluded. Of these, 13 had regional recurrence (12 wait and watch, one neck dissection), seven had died within nine months (all wait and watch), and one wait and watch patient who presented with a synchronous laryngeal tumour was treated by radiotherapy. This left 47 who had neck dissection and 148 who were under wait and watch surveillance. UWQoL data from at least nine months after operation were available for analysis in 79% (37/47) of the neck dissection group (median (IQR) 24 (21-29) months after operation) and in 60% (89/148) of the wait and watch group (median (IQR) 22 (19-27) months). More UWQoL data were

Table 1
Baseline details of patients with University of Washington quality of life (UWQoL) data who had neck dissection or were under wait and watch surveillance. None had regional recurrence.

	Neck dissection (n = 37)	Wait and watch (n = 89)	p value*
Men	20	52	0.70
Age (years):			
<55	13	20	
55–64	12	31	0.33
≥65	12	38	
Median (IQR)	58 (52–66)	64 (55–69)	0.06
Site of primary tumour:			
Tongue (anterior 2/3)	27	47	
Floor of mouth	5	27	0.09
Other	5	15	
Year of treatment:			
2010–2012	13	45	0.12
Free flap (soft)	11	0	<0.001
Adjuvant radiotherapy	3	0	0.02

* Fisher's exact test, apart from Mann-Whitney test for age.

available for the earlier 2007-9 group than for the 2010-12 group (68/85, 80% compared with 58/110, 53%), and also for the neck dissection group (37/47, 79% compared with 89/148, 60%). There was no other notable variation by sex, age group, site of primary tumour, or treatment (results not shown). Patients with UWQoL data who had neck dissection were generally six years younger than those in the wait and watch group (Table 1), and more of them had tumours in the anterior two-thirds of the tongue (27/37, 73% compared with 47/89, 53%, respectively). In the neck dissection group, 11/37 had free-flap tissue transfer, and 3/37 adjuvant radiotherapy.

QoL after about two years was worse for patients who had neck dissection than for those in the wait and watch group (Table 2). This was seen for both physical ($p < 0.001$) and social-emotional ($p = 0.04$) function, and for overall QoL that was rated as less than good (11/37, 30% compared with 14/87, 16%, $p = 0.09$). More clinically significant dysfunction was seen in patients in the neck dissection group (Table 3) for appearance (5/37, 14% compared with 1/89, 1%, $p = 0.008$) and pain (7/37, 19% compared with 5/88, 6%, $p = 0.04$). Similar trends were seen in the shoulder, mood, and speech domains (Table 3). When results were grouped into those with the best possible domain responses and those with lower scores (Table 3), patients in the neck dissection group reported poorer HRQoL in all domains except anxiety. The most notable differences were seen in the appearance ($p < 0.001$), speech ($p < 0.001$), swallowing ($p = 0.008$), chewing ($p = 0.02$), and pain ($p = 0.02$) domains.

When patients who had free tissue transfer or radiotherapy were excluded (all from the neck dissection group), the findings were similar. Overall QoL was worse in the neck dissection group than in the wait and watch group (7/24, 29% being less than good compared with 14/87, 16%, $p = 0.15$). Physical function ($p < 0.001$) and social-emotional scores ($p = 0.14$) were also worse in the neck dissection group (median (IQR) 84 (69-95) and 83 (63-98), respectively).

Table 2
University of Washington quality of life (UWQoL) subscale scores and overall QoL results for patients without regional recurrence.

	Neck dissection (n = 37)	Wait and watch (n = 89)	p value*
Median (IQR) physical function subscale score (0-100):	86 (70–95)	96 (87–100)	<0.001
Score:			
<60	3	2/88	
60–69	6	3/88	
70–79	6	7/88	
80–89	7	13/88	
90–100	15	63/88	
Median (IQR) social-emotional function subscale score (0–100):	83 (62–90)	91 (77–95)	0.04
Score:			
<60	8	7	
60–69	3	10	
70–79	6	9	
80–89	10	16	
90–100	10	47	
Overall QoL rated as very poor, poor, or fair	11/37	14/87	0.09

* Mann–Whitney test for subscale scores and Fisher's exact test for overall QoL.

Dysfunction was most severe in the neck dissection group (Table 3) for appearance ($p = 0.03$), and there were similar trends for pain, shoulder, mood, and speech. These patients reported poorer HRQoL in all domains except anxiety and saliva (Table 3).

Discussion

To our knowledge, relatively few studies have reported HRQoL outcomes for early-stage oral cancer.[12,18] There is, however, a growing recognition of the importance of HRQoL in the decision making process, and resources are available to help clinicians in this regard.[19]

Our sample size was adequate, and the response rate comparable to that reported in other studies on HRQoL.[13,18] The SND group was smaller, and reflects the fact that the wait and watch strategy was routinely offered for smaller tumours at the time the data were collected. From a retrospective sample it is difficult to understand why patients did or did not have a neck dissection, and we acknowledge this limitation. It is likely that those who had SND had larger stage 1 tumours. Another issue is that this study reported survivors who did not have neck failure. Of the 13 who did, only four had HRQoL data, so they were excluded from the analysis.

Changes in appearance after neck dissection are multifactorial. The best possible response was chosen by 74/89 (83%) of the wait and watch group, but by only 8/37 (22%) of the neck dissection group ($p < 0.001$). Weakness of the

Table 3
University of Washington quality of life (UWQoL) domain results for patients without regional recurrence.

	No. of patients	Mean domain score	Severe problem/dysfunction	Inbetween	Best response (score = 100)	p value**	p value***
Physical function:							
Appearance:							
Wait and watch	89	93.8	1	14	74		
Neck dissection	37	73.0	5	24	8	0.008	<0.001
Neck dissection*	24	76.0	3	14	7	0.03	<0.001
Swallowing:							
Wait and watch	89	94.8	1	12	76		
Neck dissection	37	86.8	1	13	23	0.50	0.008
Neck dissection*	24	88.8	0	9	15	>0.99	0.02
Chewing:							
Wait and watch	87	86.8	3	17	67		
Neck dissection	37	75.7	1	16	20	>0.99	0.02
Neck dissection*	24	79.2	0	10	14	>0.99	0.08
Speech:							
Wait and watch	88	93.4	1	17	70		
Neck dissection	37	80.0	2	20	15	0.21	<0.001
Neck dissection*	24	75.8	1	17	6	0.38	<0.001
Taste:							
Wait and watch	88	89.9	2	20	66		
Neck dissection	36	80.3	2	14	20	0.58	0.05
Neck dissection*	23	83.5	1	9	13	0.51	0.12
Saliva:							
Wait and watch	88	90.7	4	18	66		
Neck dissection	36	84.7	1	12	23	>0.99	0.27
Neck dissection*	24	89.2	1	5	18	>0.99	>0.99
Social-emotional function:							
Pain:							
Wait and watch	88	90.1	5	19	64		
Neck dissection	37	79.1	7	11	19	0.04	0.02
Neck dissection*	24	81.3	3	9	12	0.37	0.05
Activity:							
Wait and watch	88	83.2	7	29	52		
Neck dissection	37	77.7	2	20	15	>0.99	0.07
Neck dissection*	24	79.2	1	14	9	>0.99	0.07
Recreation:							
Wait and watch	88	83.8	7	34	47		
Neck dissection	37	77.7	2	22	13	>0.99	0.08
Neck dissection*	24	81.3	0	15	9	0.34	0.25
Shoulder:							
Wait and watch	85	87.6	7	14	64		
Neck dissection	36	77.2	5	10	21	0.34	0.08
Neck dissection*	24	80.8	3	6	15	0.69	0.20
Mood:							
Wait and watch	87	82.2	7	35	45		
Neck dissection	37	71.6	6	19	12	0.21	0.05
Neck dissection*	24	74.0	3	14	7	0.45	0.07
Anxiety:							
Wait and watch	88	76.5	9	45	34		
Neck dissection	37	74.3	5	17	15	0.75	0.84
Neck dissection*	24	80.4	2	10	12	>0.99	0.36

* Excluding patients who had free flaps or radiotherapy.
** Comparison of number with severe problem/dysfunction between groups (Fisher's exact test).
*** Comparison of number with best possible response between groups (Fisher's exact test).

marginal mandibular branch of the facial nerve that causes an asymmetrical smile, as well as cervical scars, hollowing of tissue, radiotherapy, fibrosis, and loss of the skin's mobility, can all contribute to problems in this domain. Batstone et al reported weakness of the marginal mandibular branch of the facial nerve in 18% of patients who had neck dissection, but severe injuries were rare (3%).[20] Scarring after neck dissection may affect HRQoL, and one study showed that SLNB resulted in a smaller scar, better skin complexion, and less soft tissue deficit than elective neck dissection.[12] All types of neck dissection seem to cause fibrosis that results in stiffness, constriction, and a change in appearance, and HRQoL scores tend to be low in these domains.[21] Shah et al reported that tightness of the neck was severe enough to interfere with daily activities in 37%, but that it eased over time.[22] We know of no data on these issues after SLNB.

Pain and numbness are common after neck dissection. In our study 7/37 (19%) of patients who had elective neck dissection and 5/88 (6%) of the wait and watch group reported severe dysfunction ($p = 0.04$). Another large study found that 34% of patients had neck pain after SND compared with 12% after surgical treatment of the primary cancer without neck dissection.[7] Preservation of the cervical root branches can reduce pain and improve HRQoL.[23,24]

The severity of shoulder symptoms relates to the type of operation.[9,13] Our data suggested worse HRQoL with SND than with wait and watch surveillance, though the differences were not significant. Sacrifice of the spinal accessory and cervical nerves results in more morbidity than when they are spared.[9,23] SLNB gives better shoulder function than SND, but worse functional outcomes than wait and watch.[13] In most patients, SLNB is likely to avoid dissection of the spinal accessory and cervical nerves, and the associated morbidity, but further research is required to find out if this translates into a meaningful improvement in HRQoL. Despite there being measurable differences in shoulder outcomes between neck dissections that spare the accessory nerve and patients who do not have operations, HRQoL outcomes in the surgical group tend to be good.[5]

Speech was reported as a serious problem in 2/37 (5%) of the SND group and in 1/88 (1%) of the wait and watch group. A total of 70/88 (80%) in the wait and watch group and 15/37 (41%) of the neck dissection group gave the best possible response for speech ($p < 0.001$). Another study found that 24% of patients who had SND and 11% of those under wait and watch surveillance reported impaired speech six months after operation.[7] It is not clear in our study if this difference was related to the method of tumour resection in the two groups.

In our study, patients who had neck dissection were around six years younger than those under watch and wait surveillance, and also had more tumours in the anterior two-thirds of the tongue. These characteristics could account for some of the differences in HRQoL between the groups, as could other factors that we did not measure, such as depth of invasion. After the exclusion of patients who had free tissue transfer or radiotherapy (all from the neck dissection group), the findings remained similar. The intention was not to adjust for baseline characteristics, but to accept the clinical differences inherent within the groups, and to describe the HRQoL outcomes that clinicians might expect their patients to report. Another limitation of our study is that our findings were from a single unit, and decisions about wait and watch or SND in patients with stage 1 oral cancer might vary in other centres.

Since our data were collected, evidence and guidelines have changed, and SLNB is now an option for surgical staging. While this is a smaller undertaking than neck dissection, patient-reported outcome measures are yet to be established,[13,25] and are the subject of ongoing research. Many healthcare economies will not have the infrastructure to provide SLNB, so comparison with wait and watch is valid.

More data are needed to inform patients adequately about their treatment. Our study indicates that for stage 1 oral cancer we should move away from the traditional focus on injury to the accessory nerve and shoulder function, and report other aspects of HRQoL such as appearance, pain, speech, swallowing, and chewing, which may be more important to patients. These domains should be included in future trials that compare outcomes of wait and watch, SND, and SLNB.

Funding

No funding was received for this study.

Conflict of interest

We have no conflicts of interest.

Ethics statement/confirmation of patients' permission

Ethics approval not required. Patients' permission not necessary.

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