Surgery in the Management of Recurrent Head and Neck Cancer

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KEYWORDS

• Salvage surgery • Recurrent head and neck cancer
• Head and neck squamous cell carcinoma • Laryngectomy • Neck dissection

KEY POINTS

- About 50% of head and neck cancer patients experience recurrence after initial treatment.
- Re-irradiation is often not possible due to tissue damage, so surgery is the main salvage option.
- Salvage surgery has higher risks and poorer outcomes, including increased feeding tube dependency.
- Only a minority of patients are eligible for salvage surgery, and treatment guidelines are limited by a lack of strong evidence.
- A specialized, multidisciplinary team is essential for optimal resection, reconstruction, rehabilitation, and improved long-term outcomes.

BACKGROUND

Over the last 30 years, there has been increasing use of radiotherapy and chemotherapy in the management of primary head and neck squamous cell carcinomas (HNSCC). Unfortunately, around 50% of patients experience disease recurrence (rHNSCC), with randomized trials describing 2-year locoregional control of 40.5%,[1] creating a large cohort of patients in need of further management after primary treatment failure.

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Abbreviations	
DFI	disease-free interval
DFS	disease-free survival
DSS	disease-specific survival
ENE	extranodal extension
HNSCC	head and neck squamous cell carcinomas
LC	local control
ND	neck dissection
NO	nodal recurrence
OS	overall survival
PCF	pharyngocutaneous fistula
PNI	perineural invasion
rHNSCC	recurrence head and neck squamous cell carcinomas
SLT	speech and language therapist
sPL	salvage partial laryngectomy
SS	salvage intervention
sTL	salvage total laryngectomy
sTLM	transoral laser microsurgery
sTORS	salvage transoral robotic surgery
UADT	upper aerodigestive tract

Treatment with primary radiotherapy causes significant changes within the head and neck mucosa, including fibrosis, chromic ischaemia, and evolution of radio-resistant disease. Mucosal tissues are typically intolerant of further irradiation, causing extensive toxicity with negligible survival benefits.[2] Surgery is therefore often used as a salvage treatment. This has previously required extensive dissection via transcervical or transmandibular approaches, yet recently minimally invasive salvage transoral robotic (sTORS) and transoral laser microsurgery (sTLM) procedures can facilitate conservative approaches for early recurrence.

Nevertheless, SS is associated with an elevated risk of treatment failure and complications compared to primary resections,[3,4] and present several unique difficulties. One article published in 2000 described a 2-year disease-free survival (DFS) of 51% after SS.[5] There is little improvement in modern series, where 5-year DFS ranges from 19% to 47%,[6] with this range likely reflecting patient selection. Moreover, SS is linked to poor functional outcomes, with long-term feeding tube dependency being 18%, increasing to 41% for oral and oropharyngeal salvage.[7] Ultimately, there is little high-quality evidence to produce treatment recommendations, and thus only 37.5% to 60.5% of rHNSCC patients are considered suitable for SS at diagnosis.[8]

PREOPERATIVE WORKUP

Diagnosis of recurrence begins with head and neck examination, including inspection of mucosal sites with flexible or rigid endoscopy, and can be augmented with narrow band imaging, which boasts a negative predictive value 96% in early recurrence.[9] Examination is followed by imaging including ultrasound guided fine needle aspiration or core biopsy in those with suspected nodal involvement. Cross-sectional computed tomography (CT) and MRI are used to assess for locoregional and distant recurrence, often in combination, as posttreatment inflammation can make differentiation between benign and malignant changes difficult. 18F-fluorodeoxyglucose positron emission tomography and computed tomography (18-FDG-PETCT) is additionally recommended for confirmation of locoregional and distant metastatic disease, as the latter often disqualifies curative intervention in many patients. After cross-sectional imaging, assessment under general anesthetic is recommended to assess disease resectability, in

addition to collecting biopsies from suspected relapse sites. Multiple biopsies may be required to distinguish between posttreatment inflammation and malignancy, whilst deep biopsies can be necessary to diagnose submucosal recurrence.

PREOPERATIVE RISK FACTORS

Decision-making in rHNSCC is complex, and clinicians must balance the extent of surgery required to ensure complete resection with treatment-associated morbidity, particularly when no adjuvant treatments are available after R1 resections. Consequently, there are several reversible and nonreversible influences that must be evaluated during treatment planning and rehabilitation for all patients (**Table 1**).

Reversible Preoperative Risk Factors

Preoperative optimization of reversible risk factors is paramount to reducing the rate of complications such as pharyngocutaneous fistula (PCF) and improving survival. Modifiable comorbidities that augment postoperative PCF formation include smoking (odds ratio [OR] 1.62), chronic obstructive pulmonary disease (OR 1.62), coronary atherosclerotic heart disease (OR 1.82), and low serum albumin (OR 2.95), and hemoglobin (OR 1.97).[10] Smoking is of particular importance, as continued abuse may also influence survival.[11–13] Malnutrition is particularly important, due to its association with PCF, wound infections, cardiovascular events, and delayed discharge. Assessment by specialist dieticians is thus recommended in all patients before salvage, with oral or enteral nutritional supplementation offered to those with existing or anticipated swallow impairment or malnourishment.[14] Counseling, exercise programs, and speech and language therapist (SLT) assessment with video fluoroscopy or fibreoptic endoscopic evaluation of swallowing is also strongly supported to bolster speech, swallow, and nutritional outcomes.[14]

Nonreversible Preoperative Risk Factors

Several prognosticators are nonreversible, yet it is essential clinicians account for these factors due to their influence on mortality. Commonly these include age (hazard ratio [HR] 1.06–2.18)[12,15–17] and Charlson Comorbidity Index score (HR 1.43).[18,19] Specific predictors, such as in-field recurrence (HR .51), elevated gamma-glutamyl transferase (HR 3.3), and total lesion glycolysis on 18-FDG-PETCT (HR 3.42) may also alter survival, but are less commonly reported.[20–24]

Staging of the original cancer is a frequent predictor, with primary stage IV disease being a negative prognosticator for overall survival (OS) after salvage (HR 2.37–11.85).[15,19,25,26] Recurrent T (HR 1.395–2.8) and N status (HR 1.31–5.14) also have a significant impact on survival independently and as combined locoregional recurrence (HR 2.73).[21,23,25,27–33] Tumor subsite may also have a role; however, the highest risk sites diverge between series, with supraglottic (HR 2.03) and nonglottic (HR 1.85) recurrences linked to worse OS.[27,28]

Another major nonreversible factor is disease-free interval (DFI), with DFIs more than 6 to 12 months facing improved survival than those with shorter periods of disease abeyance (HR 1.4–2.96).[13,15,16,19,22,23,29,32,34–37] Around 50% of relapses occur within 6 months (residual disease),[35] and thus the majority of rHNSCCs likely have higher risk disease profiles due to earlier presentation. Finally, human papilloma virus (HPV) positivity is well documented in primary oropharyngeal cancers to have improved survival compared to HPV-negative disease. This has been replicated in recurrence, where HPV-negativity corresponded with inferior OS (HR 1.8). HPV-positive recurrences however have significant associations with distant metastases,[35] theoretically disqualifying many patients from SS.

Table 1
Prognostic indicators for overall survival following salvage surgery

Author	Salvage Surgery Sites	No	Advanced Primary Stage	Advanced Recurrent T Stage	Age	Complications	Disease Free Interval	Extra-Nodal Extension	Locoregional Recurrence	Margin Status	Nodal Recurrence	PNI	Primary N stage	Smoking	Other (See Below)
Cheraghlou et al,[30] 2018	L	726								✓	✓				✓
Choi et al,[24] 2019	O	71													✓
Chung et al,[22] 2015	H, L, N, O, OP	10					✓	✓			✓		✓		✓
Chung et al,[23] 2020	H, L, N, O, OP	73		✓			✓		✓				✓		✓
Contrera et al,[11] 2024	H, L, N, O, OP	280												✓	✓
Fletcher et al,[31] 2019	L	78						✓			✓	✓			
Hafstrom et al,[21] 2023	O	83						✓		✓	✓				✓
Hardman et al,[12] 2022	H, L, OP	278		✓	✓					✓				✓	
Haque et al,[34] 2018	L, O, OP	73					✓	✓[a]		✓[a]					
Haring et al,[35] 2023	H, L, N, No, O, OP	162					✓								✓
Heft Neal et al,[13] 2020	OP	120					✓							✓	
Kim et al,[19] 2015	H, L, O, OP	191	✓				✓								✓
Locatello et al,[33] 2021	H, L, N, No, O, OP	234							✓						✓

Lupato et al,[15] 2022	H, L, O, OP	164	✓			✓			✓			✓				
Maruo et al,[36] 2020	H, L, OP	134							✓			✓		✓		
Mazerolle[16] 2020	H, L	239				✓			✓			✓				
Meulemans et al,[27] 2023	H, L	290			✓					✓		✓	✓	✓		✓
Mimica et al,[28] 2019	L	241			✓							✓			✓	✓
Nandy et al,[25] 2022	O	168	✓										✓	✓		✓
Philouze et al,[29] 2017	OP	52			✓				✓							✓
Sandulache et al,[32] 2016	L	168							✓				✓			
Suzuki et al,[20] 2018	H, L, OP	51														✓
Taguchi et al,[26] 2016	H, L, OP	78	✓				✓									✓
Tian et al,[37] 2021	O	177							✓							✓
Tsai et al,[71] 2021	H, L	90										✓				✓
Wulff et al,[70] 2017	H, L	142					✓								✓	✓

Others: Charlson comorbidity index, contralateral neck nodes, elevated gamma-glutamyl transferase, HPV status, in-field recurrence, insurance status, Karnofsky performance score, lymphovascular invasion, maximum standardized uptake value ≥22.8, metabolic tumor volume, neutrophil/lymphocyte ratio, new localization versus local recurrence, nonglottic recurrence, previous multimodal therapy, race, residual or recurrent disease, salvage ND, supraglottic tumors, synchronous cancers, Total lesion glycolysis, tumor differentiation, Washington University Head and Neck Index greater than 4.

Abbreviations: +/−, nasal cavity; Hn, Hypopharynx; L, larynx; N, nasopharynx; O, oral; OP, oropharynx.

[a] As a combined risk factor.

SALVAGE SURGICAL PROCEDURES

Organ-Preservation in Recurrent Laryngeal and Hypopharyngeal Cancers

Organ-preservation SS minimizes functional loss by forgoing complete excision of laryngeal structures in early-to-moderate stage recurrence, for example, partial laryngectomy (sPL) techniques such as vertical hemilaryngectomy and supraglottic laryngectomy. These can be performed via open or sTORS and sTLM routes, with transoral routes also used for wide excision of highly localized lesions.

Salvage PL demonstrates acceptable 2-year local control (LC) of 86.9% to 92% and 5-year OS of 60% to 99% across retrospective series.[38] Two-year LC is also encouraging in sTORS, ranging from 94.3% to 100%.[39] Variable results are seen in sTLM, with 1 meta-analysis noting rates of 74.2%, and 39.1% at 1 and 5 years.[40] Completion and salvage total laryngectomy (sTL) rates after sPL are 26%,[7] and 26.5% for sTLM,[40] and thus it is important to counsel patients on the possible need for TL for laryngeal dysfunction or further recurrence. Owing to its often-late stage at presentation, organ-preservation procedures in hypopharyngeal recurrence is uncommon, with small series demonstrating optimistic survival and function.

Total Laryngectomy and Laryngopharyngectomy

Salvage TL and laryngopharyngectomy are the gold standard managements for moderate-to-advanced laryngeal and hypopharyngeal recurrence and are associated with 2-year locoregional control of 74% to 90%.[41] These operations are often associated with complications, most notably PCF, occurring in 25% to 28.9%.[42,43] There are several steps a surgeon must therefore consider before embarking on sTL. These include management of the thyroid, which exhibits invasion in 8.1% to 10.7%, particularly in subglottic and T4 disease.[44] Preservation of 1 hemithyroid is desirable in lateralized tumors to avoid long-term thyroid hormone and calcium supplementation; however, this must be balanced against the risk of leaving microscopic disease behind when adjuvant therapies are unavailable. Another consideration is salivary bypass tubes that have evidence to suggest they reduce PCF and pharyngeal stenosis[45] but are poorly tolerated and are usually reserved for circumferential resections with free flap reconstruction.

Timing of voice restoration with tracheoesophageal protheses is another deliberation, with reviews describing higher rates of PCF and periprosthetic leak after primary compared to delayed secondary puncture.[46] Primary prostheses are therefore historically avoided in sTL; however, there is growing evidence describing acceptable PCF rates with primary insertion (16.4%).[47] Whilst this confers earlier voice rehabilitation, comparison in a prospective trial is warranted before instigating a widespread change in practice.

The final consideration is reconstruction or reinforcement with vascularized, nonirradiated tissue via pedicled or free flaps. Vascularized flaps are necessary in total laryngopharyngectomy to reestablish upper aerodigestive tract (UADT) continuity, but also promote wound healing in noncircumferential defects by providing blood supply to poorly vascularized, previously-irradiated tissues. In an updated systematic review, PCF after primary closure rose from 31.2% to 37% and reduced from 22.2% to 19% with vascularized tissues.[43] A network meta-analysis found all permutations of free, pedicled, reinforcement, and reconstructive grafts reduced PCF instance compared to primary closure,[43] definitively establishing the importance of flap reinforcement.

Recurrent Oropharyngeal Cancers

Oropharyngeal recurrence may be salvaged by open or minimally invasive sTORS and sTLM. Survival after salvage oropharyngeal surgeries varies considerably,

with a review of 776 open and transoral resections finding 5-year OS of 30%.[48] Five-year survival ranged from 14% to 54%, with poorer outcomes correlating with risk factors such as advanced staging and short DFI. Outcomes are superior to nonsurgical therapy, with 1 meta-analysis of surgical and nonsurgical interventions finding better 5-year OS after surgery (26%–67% vs 0%–32%).[49] Salvage TORS enjoys more promising outcomes, with a 2-year OS and DFS of 73.8% and 74.8% in 1 review; the reason for better outcomes may be due to a greater concentration of T1-T2 disease.[39]

Recurrent Oral Cavity Cancers

Salvage oral cavity resections are less common, as many primary cancers are managed with surgery alone, and a combination of surgery and chemoradiotherapy is used in recurrent disease. Oral cavity SS can be performed through transoral and open procedures, dependent on tumor size, location, and local invasion. Salvage resections resultantly have variable survival, with 2-year DFS ranging from 26.2% to 77.2%.[25,50] Certain risk factors, in particular extranodal extension (ENE) and involved margins, exert a profound survival effect, with 2-year DFS ranging from 32.4% to 77.2% dependent on these features.[50]

SALVAGE NECK DISSECTION

Extent of Salvage Neck Dissection

Therapeutic or prophylactic cervical lymph node excision is essential in many salvage procedures, with the levels and laterality of dissected nodes determined by subsite, previous treatment, and degree of nodal involvement. Neck dissection (ND) may also be necessary for access to vessels in free flap reconstruction or prophylactic ligation in sTORS. In SS, there has been interest in super-selective NDs, defined as removal of $\leq$2 levels or involved regions only. The supporting evidence is scant, with 1 series of suspected node relapses noting more complications after level I-V ND compared to II-IV, despite both exhibiting similar nodal positivity and 3-year OS.[51] Furthermore, 1 series of unilateral NDs for node positive disease found only 2/54 patients had positive nodes outside of a single nodal level, with the authors concluding 53/54 would have achieved clearance with super-selective approaches.[52] A later series found projected 5-year disease-specific survival (DSS) of 60% after super-selective ND.[53] Super-selective ND has also been considered in advanced nodal recurrence, with 1 study of modified radical, selective, and super-selective dissections producing regional failures of 17%, 5%, and 0%.[54] Unfortunately, the super-selective cohort contained only 7 patients, and results may reflect the need for extensive clearance in disease with ENE. Finally, in isolated nodal recurrence, Okano described 28 patients undergoing targeted extirpation of involved nodes only, resulting in 7/28 patients suffering further regional recurrence, albeit this did not influence the 3-year DSS of 66%.[55]

Neck Dissection in Nodal Recurrence

The need for prophylactic ND in N0 sTL cases has received considerable attention (**Table 2**).[56–61] This is typically determined by the risk of occult nodal metastasis at each subsite, with supraglottic disease having higher rates of occult nodes (17.8%–27.3%) than the glottis (9%–12%).[57,59,60] Staging also influences lymphatic invasion, with occult nodes seen in 5.9% to 9% of T1-T2 disease, and 21% to 29.1% of T3-4 tumors.[57,59] Nevertheless, ND may exert little influence on survival, with no significant differences at 5 years noted between ND and observation across 2 reviews.[58,60]

Table 2
Rates of occult nodal metastasis in nodal recurrences

Author	Total Patients	Site	Rate of Occult Nodal Disease
Davies-Husband et al,[56] 2020	872	Laryngectomy	14%
Finegersh et al,[57] 2020	382	Oral Cavity	16.2%
		Oropharynx	12.9%
		Hypopharynx	23.7%
		Supraglottic/ transglottic	27.3%
Gross et al,[58] 2020	799	Laryngectomy	11%
Lin et al,[59] 2019	922	Glottic	9%
		Supraglottic	24%
		Transglottic	17%
Lin et al,[60] 2019	775	Laryngectomy	13.7%
		Glottic	12%
		Supraglottic	17.7%

GETTEC developed an algorithm for management of N0 salvage laryngectomies, proposing no neck clearance for patients with cT1-T2 laryngeal recurrence, and cT3-4 disease with DFIs of greater than 12 months, and ND in cT3-4 cancers arising less than 12 months from primary treatment.[62] Unfortunately, external validation of this protocol found no difference in the rate of occult nodal metastasis between the follow-up and ND groups (14.4% vs 14.9%, $P = .94$).[63] Fundamentally, as with local site surgery, the extent of ND must be weighed against a lack of adjuvant options in previously irradiated patients.

Occult nodes are less common in recurrent compared to primary oropharyngeal tumors (12.9% vs 24%);[57] however there is an absence of literature on the extent of ND required in N0 recurrent oropharyngeal cancers, especially when stratified by HPV status. Owing to primary cancers predominantly undergoing surgery, there is a similar dearth of data on oral cavity recurrence. Recommendations may be extrapolated from primary cancers, where occult metastasis occurs in 8.5% to 41.3%.[64] In primary N0 cohorts, trial evidence shows ND has improved but nonsignificant 5-year OS (75.8% vs 67.6%) and DFS (64.4% vs 50.9%), potentially supporting dissection in recurrences with formerly untreated nodes.[65]

RECONSTRUCTION IN SALVAGE SURGERY

There are several indications for flap reconstruction following SS, including reinforcement to mitigate the risk of PCF, restoration of UADT continuity, reduction of skin and soft tissue defects, and covering of exposed vessels. The mode of SS commands the choice of tissue, for example, sTL closed primarily may be reinforced with a pedicled pectoralis major, circumferential pharyngeal resections can be restored by tubed anterolateral thigh grafts, and bony defects demand reconstruction via osseocutaneous radial forearm free or fibula free flap. Regardless of approach, reconstruction after SS carries a small, yet higher danger of free flap failure than primary operations (4.8% vs 1.2%, $P = .006$).[66] Additionally, previous radiotherapy, alongside comorbidities such as peripheral vascular disease are independent risk factors for flap failure on

multivariate analyses.[67] Reconstructive teams must therefore be hypervigilant for signs of flap compromise following SS, particularly in those with accompanying comorbidities.

POSTOPERATIVE RISK FACTORS

Complications

Salvage procedures have an elevated risk of complications, with pooled rates for sTL and sTORS being 67.5% and 33.6%[42,68] (**Table 3**). Salvage TL is at particular risk of complications compared to primary resections,[3,4] with 1 series noting differences of 33% versus 48%.[3] Other issues include wound complications (14.1%), swallowing difficulty (18.6%), bleeding (5.9%), and chyle leak (1.4%).[42] Other procedures exhibit similar complications, with hypopharyngeal resections exhibiting PCF (0.0%–71.4%), carotid artery rupture (2.9%–13.3%), and stoma stenosis (4.2%–20.0%),[69] whilst sTORS experience bleeding (10.5%) and emergency tracheostomy (4.4%).[68] Complications may influence survival, with 1 series noting a significant impact on 5-year OS.[26] Another series of 142 sTL found complications within 1 year significantly influenced 5-year OS and DFS; however, complications at greater than 1 year did not influence outcomes.[70]

Histopathology

High-risk histopathological features such as tumor differentiation (HR 1.68–2.89), lymphovascular invasion (HR 2.54), and perineural invasion (PNI) (HR 2.17–2.69) can negatively influence prognosis.[25–27,31,71] ENE is often identified as a negative prognostic indicator in recurrence (HR 3.22),[31] which can have an additive effect when combined with high-risk features such as PNI (HR 3.97).[34] Perhaps the most impactful factor is surgical margins, which is a frequent prognosticator for survival and secondary recurrence after sTL (HR 2.54).[71] In 1 series, sTL was associated with notably higher rates of positive margins than primary procedures (10% vs 24%), resulting in significantly worse 5-year OS and DFS, stressing the importance of clearance when chemoradiotherapy is unavailable.[72] In TLM, approximately 41% of cases demand multiple procedures for clearance; however, the influence of margins is unclear in glottic recurrence, where there is a nominal relationship between margins, recurrence, and laryngeal preservation.[73]

Oropharyngeal margins are controversial, due to incongruities in close margin definitions from 1-5 mm.[74] Although recommended, 5 mm margins are often not feasible in the postradiotherapy oropharynx, where only a small volume of soft tissue overlies major vasculature, which may be further diminished by cautery artifact and tissue processing. RECUT, a study of 278 sTORS, found 1 mm was the strongest delimiter for secondary recurrence, with margins around this cut-off demonstrating 2-year LC of 54.2% and 80.9%, widening the pool of patients eligible for sTORS.[75] Oral cavity margins are better established by 1 review of primary and recurrent disease, which calculated local recurrence in 1 mm increments and found margins from 0 to 3.9 mm exhibited inferior control compared to cases with $\geq$5 mm,[76] establishing the importance of wide clearance in all oral HNSCCs.

POSTOPERATIVE MANAGEMENT

Postoperative Antimicrobials

Postoperatively, rates of surgical site infections improve with postoperative antibiotics[77]; however, the duration of antimicrobials is debated. For instance, one review noted fewer surgical site infections with 24 to 48 hours of antibiotics, but

Table 3
Postoperative complications

Author	Salvage Surgery	No	Total Complications	Airway Complications	Carotid Artery Rupture	Flap Failure	Haemorrhage	PCF	Stoma Stenosis	Wound Complication
Cooke et al,[69] 2024	Hypopharynx resection	442	-	-	2.9%–13.3%	0%–27.3%	-	0%–71.4%	4.2%–20.0%	-
Gross et al,[58] 2019	ND in salvage laryngectomy	799	19%–71%	-	-	-	-	6%–57%	-	-
Hardman et al,[39] 2020	TORS	161	-	-	-	-	9.3%	0.6%	-	-
Hasan et al,[42] 2016	Laryngectomy	957	67.5%	7.5%	-	-	5.9%	28.9%	17.5%	14.1%
Kao et al,[48] 2016	Oropharyngeal resection	776	-	19%–20%	1%–8%	-	0%–13%	0%–39%	-	0.6%–44%
Lin et al,[59] 2019	ND in salvage laryngectomy	922	50%	-	2%	2%	-	29%	-	18%
Turner et al,[68] 2023	TORS	533	33.6%	-	-	-	12%	2.9%	-	-

this advantage waned after greater than 48 hours.[77] Of note, only 5/39 studies described prior irradiation as a risk factor for infection, and there is thus little to suggest an increased infection risk and the need for prolonged antibiotic courses after SS.

Postoperative Nutrition

Early enteral feeding is advocated by best practice guidelines to alleviate the risk of complications.[14] This is especially important in SS patients, who often suffer preexisting swallow dysfunction, altered UADTs, and recurrent tumor catabolism, that all may lead to an underestimation of patient's nutritional needs. Continued intervention by specialist dieticians is essential to ensure appropriate modification of nutrition regimens and avoidance of refeeding syndrome.[14]

In salvage oral and oropharyngeal resections, oral feeding within 5 days may be considered, guided by the quality of swallowing rehabilitation, aspiration risk, and wound healing. This is evidenced by 1 series of oral and oropharyngeal flap-assisted resections for osteoradionecrosis and malignacy,[78] where early oral feeding (<5 days) demonstrated a reduced length of stay (20.6 vs 11.5 days, $P<.01$) with no associated rise in complications. By contrast, early oral feeding in primary and sTL is not supported as it confers a substantially elevated risk of PCF (RR 1.35).[79]

Postoperative Swallowing Assessment

There is scarce literature on speech and swallow rehabilitation after SS, with the articles overwhelmingly discussing rehabilitation after primary chemoradiotherapy. Nonetheless, continued involvement of SLTs post-SS including instrumental assessments is vital to recovery. Use of water-soluble contrast swallow to assess for PCF and guide rehabilitation following sTL is common practice, yet there is weak evidence to support this. Retrospective series have demonstrated moderate sensitivity (58%–72.7%) but excellent specificity (92.7%–100%) in the prediction of PCF[80]; however, given high rates of PCF after sTL, water-soluble contrast swallows may be useful in safely guiding oral feeding.

LONG-TERM FOLLOW-UP

Owing to the risk of relapse after treatment, existing 5-year follow-up recommendations are uniform across guidelines,[14] incorporating 1 to 3 monthly review in year 1, 2 to 6 monthly for year 2, and every 4 to 8 months for years 3 to 5. The PETNECK2 study, which randomizes HNSCC patients to routine review or 18-FDG-PETCT and patient directed follow-up, may dramatically change follow-up for primary disease.[81] Unfortunately, rHNSCC do not meet this trial's exclusion criteria, and thus existing follow-up for recurrence is unlikely to change for the foreseeable future.

Imaging Surveillance

Surveillance imaging following SS, despite support from UK guidelines,[14] is a particular source of controversy. Although there is limited evidence for imaging surveillance, earlier detection of oligometastatic disease is linked to improved survival. For example, a multivariate analysis of patients undergoing radiotherapy, surgery, or radiofrequency ablation found tumor volume, ECOG performance status, and distant metastases, are independent prognosticators for mortality in oligometastatic HNSCC.[82] Annual surveillance in high-risk SS patients may therefore aid earlier detection of secondary recurrence, expanding the treatment options for further local or oligometastatic disease. Earlier detection of metastases also allows commencement of effective systemic therapy and the option for recruitment into trials.

SUMMARY

Head and neck surgery is increasingly used as a curative salvage modality. Nonetheless, SS is not without its challenges, and both patients and clinicians must be aware of the plethora of techniques, prognostic indicators, functional deficits, and complications that may influence postoperative convalescence. Resection, reconstruction, and rehabilitation by a dedicated team of surgeons and allied health professions with experience of rHNSCC are fundamental to anticipating these issues and enhancing long-term survival.

CLINICS CARE POINTS

- Approximately 50% of head and neck squamous cell carcinomas recur after primary treatment; however, only 37.5% to 60.5% are eligible for salvage surgery (SS).
- There is a wide array of salvage techniques available, including total and partial laryngectomy, transoral robotic surgery, transoral laser microsurgery, and open oral and oropharyngeal resections, which can achieve good survival outcomes in appropriately selected patients.
- There are numerous preoperative and postoperative, patient, tumor, and histologic factors that influence prognosis that clinicians must evaluate when treating patients with SS.
- Complications are increased compared to primary procedures, in particular pharyngocutaneous fistula, which occur in 25% to 28.9%% of salvage laryngectomies. Clinicians must consider interventions such as nutritional support and reinforcement with vascularized tissue to minimize these complications.
- Salvage surgical procedures have a considerable quality-of-life and functional burden, and rehabilitation by a dedicated multidisciplinary team is vital to improving outcomes.

DISCLOSURE

The authors have nothing to disclose.

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