

Clinical and Experimental Otorhinolaryngology

Supplementary Table 3. Delphi questionnaire for recommendations in laryngeal cancer surgery guideline

No.	Recommendation	Fully agree	Agree	Neither agree nor disagree	Disagree	Totally disagree	Comments
1	A multidisciplinary team approach is recommended for decision-making regarding the treatment of patients with laryngeal cancer, and patients should be provided sufficient information about the roles of chemotherapy, radiation therapy, and surgery. Strong recommendation, high-quality evidence	32 (88.9)	3 (8.3)	1 (2.8)	0	0	-
A. Diagnosis and work up of laryngeal cancer							
A1. What is the role of a laryngoscopic examination and voice analysis in the diagnosis of laryngeal cancer?							
2A	A laryngoscopic examination of patients with hoarseness is an essential step in the early diagnosis of laryngeal cancer. Strong recommendation, low-quality evidence.	33 (91.7)	3 (8.3)	0	0	0	-
2B	Stroboscopic examination can be used to evaluate suspicious lesions on the vocal folds. Weak recommendation, low-quality evidence.	18 (50)	15 (41.7)	3 (8.3)	0	0	-
2C	Narrow band imaging (NBI) and indirect autofluorescence endoscopy may be useful for conducting laryngeal cancer examinations. Weak recommendation, low-quality evidence.	5 (13.9)	21 (58.3)	10 (27.8)	0	0	-
A2. What are the roles of computed tomography (CT) and magnetic resonance (MR) for the diagnosis of laryngeal cancer?							
3	Preoperative cross-sectional imaging studies (CT, MR) with contrast are recommended for the staging and pretreatment assessment of laryngeal cancer. Strong recommendation, moderate-quality evidence.	34 (94.4)	1 (2.8)	0	0	1 (2.8)	-
A3. What is the role of positron emission tomography (PET)/CT in a preoperative evaluation of laryngeal cancer?							
4	PET/CT is recommended for the evaluation of laryngeal cancer, particularly in advanced-stage cases, as it is superior to conventional CT or MR in terms of the accurate detection of regional/distant metastases and second primary cancers. Strong recommendation, moderate-quality evidence.	27 (75)	7 (19.4)	1 (2.8)	1 (2.8)	0	-
A4. What is the role of ultrasonography in the staging of laryngeal cancer?							
5	For laryngeal cancer staging, US can be used to localize the primary focus and assess the tumor extension, including the cervical nodal status, in a manner complementary to conventional CT/MRI. Weak recommendation, low-quality evidence.	3 (8.3)	22 (61.1)	8 (22.2)	1 (2.8)	2 (5.6)	-
A5. How we can evaluate patients' preoperative general conditions?							
A5-1. Assessment of patients who are eligible for laryngectomy							
6A	In addition to an anesthesia-related assessment of general health, preoperative PFT and ABG levels should be checked in laryngeal cancer patients who have chronic obstructive pulmonary disease (COPD), are older than 60 years, are American Society of Anesthesiologists (ASA) class II or greater, exhibit functional dependence, and have congestive heart failure. Strong recommendation, moderate-quality evidence.	28 (77.8)	8 (22.2)	0	0	0	-
6B	If the patient is eligible for partial laryngectomy, a preoperative assessment of pulmonary status and careful review of the patient's exercise tolerance should be conducted. Strong recommendation, low-quality evidence.	30 (83.3)	6 (16.7)	0	0	0	-
A5-2. Screening assessment of second primary cancers (synchronous and metachronous head and neck carcinomas)							
7A	Patients with laryngeal cancer should be examined carefully to detect secondary malignancies. Strong recommendation, moderate-quality evidence.	30 (83.3)	5 (13.9)	1 (2.8)	0	0	-
7B	Additional modalities such as chest radiography, CT (chest/abdomen), PET/CT, and panendoscopy are recommended for secondary malignancy screening. Strong recommendation, moderate-quality evidence.	21 (58.3)	10 (27.8)	4 (11.1)	1 (2.8)	0	-

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Supplementary Table 3. Continued

No.	Recommendation	Fully agree	Agree	Neither agree nor disagree	Disagree	Totally disagree	Comments
A5-3. Risk factors for laryngeal cancer							
8	A person who reports smoking and drinking habits should undergo regular medical check-ups for laryngeal cancer. Patients who experience voice changes should be sent for a consultation with ENT specialists. Strong recommendation, moderate-quality evidence.	26 (72.2)	9 (25)	1 (2.8)	0	0	-
B. Premalignant laryngeal lesion							
B1. What is the appropriate management for a premalignant laryngeal lesion?							
B1-1. Definition of a premalignant laryngeal lesion							
B1-2. Diagnostic procedure for a premalignant laryngeal lesion							
9	Although various endoscopic and imaging techniques could help physicians to predict whether a lesion is malignant or benign, biopsy is the gold standard for diagnosis. Strong recommendation, moderate-quality evidence.	36 (100)	0	0	0	0	-
B1-3. Approach for a premalignant laryngeal lesion							
10A	Either an intervention or follow-up protocol can be recommended for cases of mild and moderate dysplasia. Weak recommendation, moderate-quality evidence.	19 (52.8)	14 (38.9)	3 (8.3)	0	0	-
10B	Intervention is recommended for cases of severe dysplasia/carcinoma <i>in situ</i> . Weak recommendation, moderate-quality evidence.	26 (72.2)	9 (25)	1 (2.8)	0	0	-
B1-4. Follow-up of premalignant lesions							
11	All patients with varying grades of dysplasia upon pathologic examination should be followed up. Strong recommendation, low-quality evidence.	30 (83.3)	6 (16.7)	0	0	0	-
C. Glottic cancer							
C1. What is the appropriate surgery for a primary T1/T2 glottic cancer?							
12A	Transoral laser microsurgery is recommended for the achievement of acceptable oncologic and functional outcomes in patients with T1/T2 glottic cancer. Strong recommendation, moderate-quality evidence.	27 (75)	6 (16.7)	3 (8.3)	0	0	-
12B ^{a)}	Transoral laser microsurgery can be recommended as a treatment option for T1/T2 glottic cancer with anterior commissure involvement.	5 (13.9)	17 (47.2)	11 (30.6)	3 (8.3)	0	61.1% agree
12B Revised	Transoral laser microsurgery can be recommended as a treatment option for T1/T2 glottic cancer with anterior commissure involvement if adequate resection margin can be obtained. Weak recommendation, moderate-quality evidence.	17 (42.5)	19 (47.5)	2 (5)	2 (5)	0	90% agree
12C	Open partial laryngectomy may be a good surgical option for the achievement of acceptable oncologic outcomes and functional preservation in cases of T1/T2 glottic cancer with limited extension into adjacent subsites or the anterior commissure. Weak recommendation, moderate-quality evidence.	10 (27.8)	18 (50)	3 (8.3)	4 (11.1)	0	-
C2. What is the proper surgical management for T3/T4 glottic cancer?							
13A	Total laryngectomy should be considered as the primary surgical modality for T3/T4 glottic cancers. Strong recommendation, low-quality evidence.	15 (41.7)	10 (27.8)	8 (22.2)	3 (8.3)	0	-
13B	In selected T3/T4 glottic cancers, open partial laryngectomy can be performed to maintain laryngeal function, although the increased postoperative morbidity with this procedure, compared to total laryngectomy, should be considered. Weak recommendation, low-quality evidence.	12 (33.3)	22 (61.1)	1 (2.8)	0	1 (2.8)	-
^{a)}	Transoral laryngeal surgery can be recommended to preserve laryngeal function in the patients with selected T3/T4 glottic cancer.	5 (13.9)	10 (27.8)	10 (27.8)	8 (22.2)	3 (8.3)	41.7% agree

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Supplementary Table 3. Continued

No.	Recommendation	Fully agree	Agree	Neither agree nor disagree	Disagree	Totally disagree	Comments
a)	Transoral laryngeal surgery can be recommended to preserve laryngeal function in the patients with selected T3 glottic cancer. Weak recommendation, low-quality evidence.	6 (15)	19 (47.5)	8 (20)	7 (17.5)	0	62.5% agree Removed
13C	Surgical management of the thyroid gland in cases involving a subglottic extension exceeding 10 mm, transglottic tumors, and a subglottic subsite should include at least ipsilateral lobectomy and isthmectomy. Strong recommendation, high-quality evidence.	21 (58.3)	11 (30.6)	4 (11.1)	0	0	-
C3. What is the appropriate management of the neck lymph nodes in glottic cancer?							
C3-1. Management for clinically positive neck (N+) in patients with glottic cancer							
14A	Therapeutic neck dissection in patients with N+ glottic cancer should include at least the ipsilateral neck levels II, III, and IV. Strong recommendation, low-quality evidence.	30 (83.3)	6 (16.7)	0	0	0	-
14B	Elective contralateral neck dissection is not routinely recommended for ipsilateral N+ glottic cancer. Weak-recommendation, low-quality evidence.	15 (41.7)	12 (33.3)	8 (22.2)	1 (2.8)	0	-
C3-2. Management for clinically nodal disease (N0) in patients with glottic cancer							
15A	Elective neck dissection is not routinely recommended for T1N0 and T2N0 glottic cancers, but should be considered for T3N0 and T4N0 glottic cancers. Strong recommendation, low-quality evidence.	24 (66.7)	10 (27.8)	1 (2.8)	1 (2.8)	0	-
15B	In cases of T3N0 and T4N0 glottic cancer, elective neck dissection should include ipsilateral neck levels II, III, and IV. Strong recommendation, low-quality evidence.	25 (69.4)	9 (25)	2 (5.6)	0	0	-
D. Supraglottic cancer							
D1. What is the appropriate surgical treatment for a supraglottic primary site?							
D1-1. Surgical treatment in T1/T2 supraglottic cancer							
16A	Conservative laryngeal surgery (open partial laryngectomy or laser/robotic transoral laryngeal surgery) is recommended primarily for the patients with T1/T2 supraglottic cancer. Strong recommendation, moderate-quality evidence.	25 (69.4)	8 (22.2)	3 (8.3)	0	0	-
16B	If surgical exposure is inadequate during transoral laryngeal surgery for supraglottic cancer, conversion to another treatment option, such as radiation therapy or open partial laryngectomy, should be considered. Strong recommendation, low-quality evidence	27 (75)	8 (22.2)	0	1 (2.8)	0	-
D1-2. Surgical treatment for T3/T4 supraglottic cancer							
17A	Total laryngectomy can be considered as the primary surgical treatment for T3/T4 supraglottic cancer. Strong recommendation, low-quality evidence.	18 (50)	13 (36.1)	4 (11.1)	1 (2.8)	0	-
17B	Partial laryngectomy can be performed to maintain laryngeal function in selected T3/T4 supraglottic cancers without extensive tongue base invasion, bilateral cricoarytenoid unit impairment, or inferior extension to the cricoid cartilage, although the risk of increased postoperative morbidity relative to total laryngectomy should be considered. Weak recommendation, low-quality evidence.	12 (33.3)	18 (50)	6 (16.7)	0	0	-
D2. What comprises appropriate neck lymph node management in supraglottic cancer?							
D2-1. Management for clinically nodal disease (cN+) in patients with supraglottic cancer							
18	Therapeutic neck dissection should be performed for N+ in patients with supraglottic cancer. The extent of neck dissection should include at least level II, III, and IV. Strong recommendation, low-quality evidence.	28 (77.8)	8 (22.2)	0	0	0	-

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Supplementary Table 3. Continued

No.	Recommendation	Fully agree	Agree	Neither agree nor disagree	Disagree	Totally disagree	Comments
D2-2. Management for clinically negative neck (N-) in patients with supraglottic cancer							
19A	Elective ipsilateral neck dissection should be considered in patients with supraglottic cancer. Weak recommendation, low-quality evidence.	16 (44.4)	10 (27.8)	7 (19.4)	3 (8.3)	0	-
19B	Elective contralateral neck dissection should be considered in patients with supraglottic cancer with T3/T4 primary tumors, midline crossing, clinically involved ipsilateral neck nodes, or suspicious extracapsular node extension. Weak recommendation, low-quality evidence.	18 (50)	14 (38.9)	3 (8.3)	1 (2.8)	0	-
19C	Selective neck dissection of levels II, III, and IV is more appropriate than comprehensive neck dissection for patients with clinically N0 supraglottic cancer. Strong recommendation, moderate-quality evidence.	26 (72.2)	10 (27.8)	0	0	0	-
E. Postoperative risk stratification/rehabilitation/long-term follow-up							
E1. How we can stratify the risk of recurrence in postoperative laryngeal cancer patients? To which patients should postoperative adjuvant therapy be administered?							
E1-1. Postoperative management and complications							
20	Preoperative assessment and management of factors that predispose a patient to postoperative complications are necessary. Strong recommendation, moderate-quality evidence.	31 (86.1)	4 (11.1)	1 (2.8)	0	0	-
E1-2. Adjuvant treatment							
21A	Postoperative adjuvant treatment is recommended for stage III/IV laryngeal cancer. Strong recommendation, high-quality evidence.	23 (63.9)	11 (30.6)	1 (2.8)	1 (2.8)	0	-
21B	Adjuvant radiation or chemoradiotherapy is recommended for patients with laryngeal cancer and risk factors such as a tumor with vascular invasion, perineural invasion, or multiple nodal metastases. Strong recommendation, high-quality evidence.	30 (83.3)	4 (11.1)	1 (2.8)	1 (2.8)	0	-
21C	Adjuvant chemoradiotherapy is recommended for patients with laryngeal cancer and positive surgical margins or extracapsular nodal extension. Strong recommendation, high-quality evidence.	32 (88.9)	3 (8.3)	0	1 (2.8)	0	-
E2. Postoperatively, what types of rehabilitation and/or psychiatric support are required for patients with laryngeal cancer?							
E2-1. Swallowing rehabilitation							
22A	Swallowing rehabilitation can be recommended for patients with aspiration tendencies after transoral surgery or open partial laryngectomy. Strong recommendation, moderate-quality evidence.	30 (83.3)	6 (16.7)	0	0	0	-
22B	A modified barium swallow with videofluoroscopy can be recommended for an evaluation of swallowing function. Strong recommendation, low-quality evidence.	23 (63.9)	12 (33.3)	1 (2.8)	0	0	-
E2-2. Voice rehabilitation methods after total laryngectomy							
23	Options for voice rehabilitation, including esophageal speech, electrolarynx, and tracheoesophageal speech with a voice prosthesis, should be offered to patients who have undergone total laryngectomy. Strong recommendation, low-quality evidence.	33 (91.7)	3 (8.3)	0	0	0	-
E2-3. Shoulder dysfunction after neck dissection							
24A	The spinal accessory nerve should be identified during neck dissection. Strong recommendation, moderate-quality evidence	34 (94.4)	2 (5.6)	0	0	0	-
24B	Early shoulder rehabilitation is recommended after surgery. Strong recommendation, moderate-quality evidence	27 (75)	8 (22.2)	1 (2.8)	0	0	-

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Supplementary Table 3. Continued

No.	Recommendation	Fully agree	Agree	Neither agree nor disagree	Disagree	Totally disagree	Comments
E2-4. Counselling for smoking cessation							
25	Smoking cessation from the time of diagnosis is strongly recommended for patients with laryngeal cancer. Strong recommendation, high-quality evidence.	34 (94.4)	2 (5.6)	0	0	0	-
E2-5. Psychiatric consultation							
26	Psychiatric consultation should be considered for the patients with laryngeal cancer. Strong recommendation, high-quality evidence.	15 (41.7)	13 (36.1)	6 (16.7)	2 (5.6)	0	-
E3. How can we postoperatively follow-up patients with laryngeal cancer?							
E3-1. Long-term follow-up schedule							
27A	Patients should be regularly examined for more than 5 years after treatment. Strong recommendation, high-quality evidence.	29 (80.6)	4 (11.1)	3 (8.3)	0	0	-
27B	Patients should be followed-up frequently during the first 2 years because of the high risk of locoregional recurrence; this schedule includes every 1–3 months during year 1, and every 2–6 months during year 2. Strong recommendation, low-quality evidence.	30 (83.3)	6 (16.7)	0	0	0	-
E3-2. Tests during the follow-up period							
28A	Laryngoscopic examinations should be performed regularly to check for local recurrence. Strong recommendation, low-quality evidence.	34 (94.4)	2 (5.6)	0	0	0	-
28B	A CT or MR study is recommended within 6 months after treatment to provide baseline images for later reference. Strong recommendation, low-quality evidence.	25 (69.4)	9 (25)	2 (5.6)	0	0	-
28C	PET-CT is recommended for the detection of distant metastasis, recurrence, and second primary tumors. Strong recommendation, moderate-quality evidence.	25 (69.4)	10 (27.8)	1 (2.8)	0	0	-
28D	A chest radiography or CT study is recommended for the detection of lung metastasis and second primary tumors in the lung. Strong recommendation, moderate-quality evidence.	24 (66.7)	8 (22.2)	4 (11.1)	0	0	-
28E ^{a)}	US can be recommended for the detection of cervical lymph node recurrence. US can be recommended for the detection of cervical lymph node recurrence. Weak recommendation, low-quality evidence.	7 (19.4) 12 (30)	15 (41.7) 25 (62.5)	11 (30.6) 3 (7.5)	2 (5.6) 0	1 (2.8) 0	61.1% agree 92.5% agree
E3-3. Thyroid function evaluation							
29A	A thyroid function evaluation is recommended to evaluate the presence of hypothyroidism in patients with laryngeal cancer who have undergone head and neck radiation therapy or thyroid gland removal (partial or full). Strong recommendation, low-quality evidence.	31 (86.1)	5 (13.9)	0	0	0	-
29B	Thyroid function should be evaluated twice yearly during the first 5 years after treatment, and annually thereafter. Thyroid function may be subjected to periodic follow-up evaluation for 10 years. Weak recommendation, low-quality evidence.	11 (30.6)	15 (41.7)	8 (22.2)	1 (2.8)	1 (2.8)	-
F. Salvage surgery							
F1. What is the appropriate surgery for recurrent laryngeal cancer?							
F1-1. Salvage surgery for a local failure of non-surgical treatment							
30A	Total laryngectomy is recommended for recurrent rT3/rT4 cancer. Strong recommendation, low-quality evidence.	30 (83.3)	5 (13.9)	1 (2.8)	0	0	-
30B	Transoral laser microsurgery can be used as a salvage option for recurrent rT1/rT2 cancer. Weak recommendation, low-quality evidence.	8 (22.2)	17 (47.2)	9 (25)	2 (5.6)	0	-

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Supplementary Table 3. Continued

No.	Recommendation	Fully agree	Agree	Neither agree nor disagree	Disagree	Totally disagree	Comments
30C	Open partial laryngectomy, especially supracricoid laryngectomy, can be recommended for recurrent rT2 and selected rT3 cancers. Weak recommendation, low-quality evidence.	16 (44.4)	15 (41.7)	5 (13.9)	0	0	-
30D ^{a)}	Pectoralis major muscle flap onlay reinforcement may reduce fistula formation resulting from salvage total laryngectomy after concurrent chemoradiotherapy; however, the panels cannot recommend for or against routine provision of this procedure.	6 (17.1)	16 (45.7)	8 (22.9)	4 (11.4)	1 (2.9)	62.8% agree
	Pectoralis major muscle flap onlay reinforcement may reduce fistula formation resulting from salvage total laryngectomy after concurrent chemoradiotherapy; however, the panels cannot recommend for or against routine provision of this procedure. No recommendation, insufficient evidence.	8 (20)	25 (62.5)	4 (10)	2 (5)	1 (2.5)	82.5% agree
F1-2. Management of the N0 neck during salvage surgery after non-surgical treatment							
31A	Ipsilateral elective neck dissection is recommended for recurrent supraglottic, transglottic, or rT3/rT4 glottic cancer. Strong recommendation, low-quality evidence.	19 (52.8)	11 (30.6)	4 (11.1)	1 (2.8)	1 (2.8)	-
31B ^{a)}	Bilateral elective neck dissection can be recommended in recurrent supraglottic cancer.	9 (25)	11 (30.6)	13 (36.1)	2 (5.6)	1 (2.8)	55.6% agree
	Bilateral elective neck dissection can be considered for recurrent supraglottic cancer. Weak recommendation, low-quality evidence	10 (25)	23 (57.5)	4 (10)	3 (7.5)	0	82.5% agree
31C	Elective neck dissection can be avoided for recurrent glottic rT1N0 rT2N0 cancer with initial N0. Weak recommendation, moderate-quality evidence.	10 (27.8)	14 (38.9)	10 (27.8)	2 (5.6)	0	-
F1-3. Salvage surgery for recurrence after surgical therapy							
32	In eligible cases, extensive resection is recommended for a stomal recurrence after total laryngectomy. Weak recommendation, low-quality evidence.	15 (41.7)	18 (50)	2 (5.6)	1 (2.8)	0	-

Values are presented as number (%).

US, ultrasonography; MRI, magnetic resonance imaging; PFT, pulmonary function test; ABG, arterial blood gas; ENT, ear nose throat.

^{a)}Failed to get more than 2/3 agree in Delphi questionnaire.