Transoral Robotic Surgery in the Management of Laryngeal Cancer: Current Evidence and Future Directions

Presenters: Clerk2 呂咏芯 吳宇瑗 王彥成
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Date: 2025/08/20

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CASE PRESENTATION

Name: 許O通

Chart number:

Age: 65

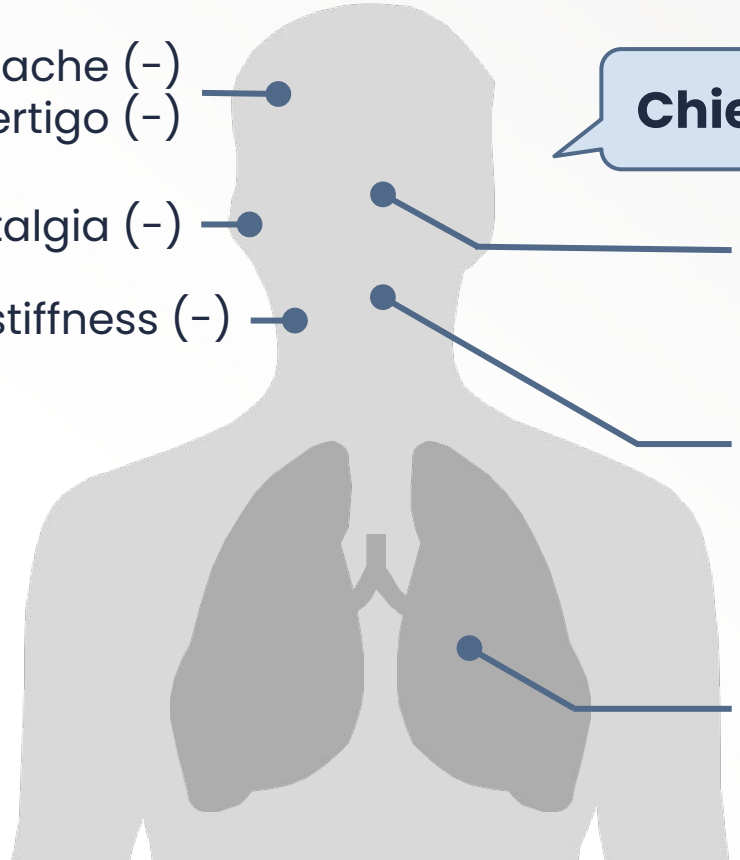
Gender: Male

Occupation: 建築營造業

ADL: Totally independent

Initial visit date: 2025/07/01

Present Illness



Headache (-)
Vertigo (-)

Otalgia (-)

Neck stiffness (-)

Chief complaint: Hoarseness for 1 month

Nose bleeding (-)

Sore throat (-)
Dysphagia (-)
Odynophagia: mild
Choking (-)
Gingival bleeding (-)

Dyspnea (-)
Respiratory Pain (-)
Cough (-)
Hemoptysis (-)

Personal history

Alcohol (-)
Betel nuts (-)
Smoking: 1 PPD >10 yrs

Past history

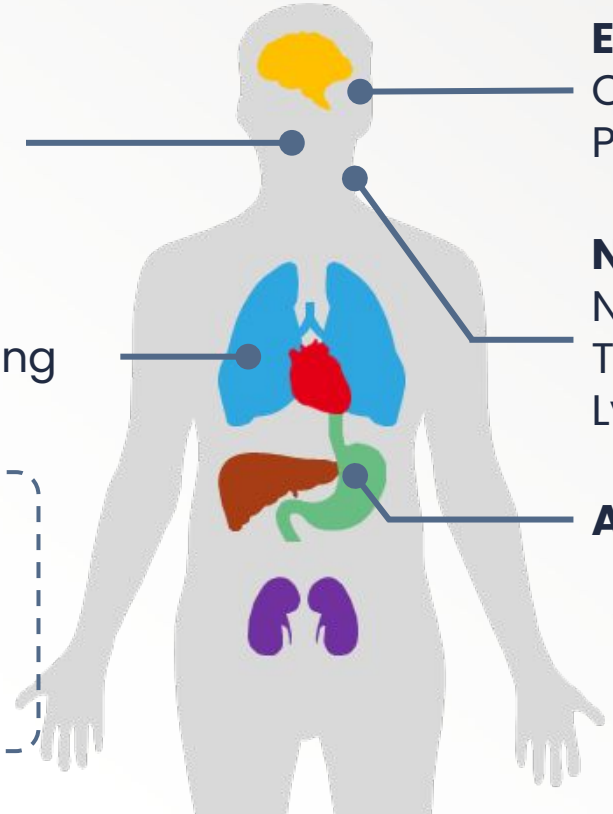
Systemic lupus erythematosus, on hydroxychloroquine and prednisolone, stable

Physical Examination

Oral cavity
No oral visible mass
No oral ulcers
Strong gag reflex

Chest wall, lung
No stridor, nor wheezing
Heart: no murmur

Height: 158cm
Weight: 52kg
BMI: 20.8
Vital signs: stable



Eyes
Conjunctiva, sclera: normal
Pupil: 3+/3+, light reflex: normal

Neck
No palpable neck mass
Thyroid: normal
Lymph node: not palpable

Abdomen: no obvious finding

Nasopharyngolaryngoscopy

2025/07/01

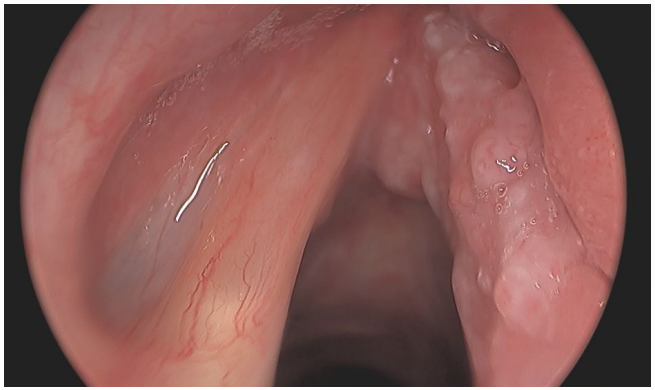
- Smooth nasopharynx
- Laryngeal pachydermia
- Right vocal fold tumor
- Good vocal fold movement

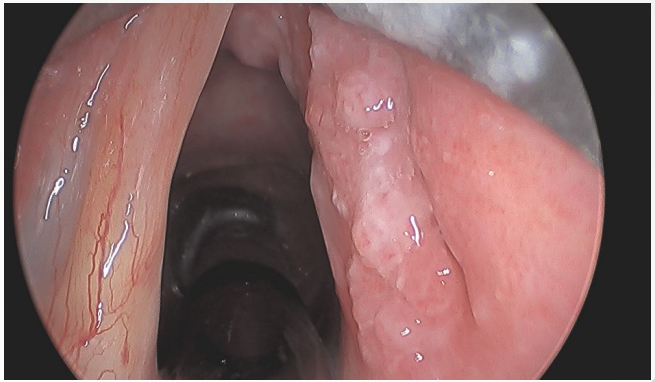
Clinical Course

07/01 OPD: hoarseness for 1 month
Nasopharyngolaryngoscopy: right vocal fold tumor

07/06 Admission for laryngomicrosurgery (LMS) biopsy

1. Severe dysplasia
2. **Microinvasive squamous cell carcinoma**, small focus, CK stain (+), HPV independent with p16 negative





Clinical Course

07/01 OPD: hoarseness for 1 month
Nasopharyngolaryngoscopy: right vocal fold tumor

07/06 Admission for laryngomicrosurgery (LMS) biopsy
- Pathological findings: **Right vocal fold microinvasive squamous cell carcinoma, extend to subglottic and anterior commissure**, p16 negative

07/27 Admission for cancer staging
- Oral function evaluation
- Audiometry and tympanometry
- Neck: carotid phonoangiography, ultrasound
- Abdomen: panendoscopy, abdominal ultrasound
- MRI and whole body PET/CT

Lab data

歷史資料	項目名稱	檢體類別	檢驗報告	單位	正常值(Low)	正常值(High)
---	CBC-I	Blood				
查看	HGB	Blood	13.7	g/dL	13.0	17.0
查看	HCT	Blood	42.2	%	39.0	52.0
查看	MCV	Blood	93.8	fL	82.0	101.0
查看	RBC	Blood	4.50	10^6/μL	4.10	5.90
查看	MCHC	Blood	32.5	g/dL	31.0	36.0
查看	WBC	Blood	7.01	10^3/μL	3.80	10.40
---	WBC DC	Blood				
---	Additional parameter	Blood				
查看	Platelet	Blood	332	10^3/μL	140	400
查看	Neutrophil	Blood	60.4	%	40.0	75.0
查看	Lymphocyte	Blood	29.2	%	20.0	50.0
查看	Monocyte	Blood	7.0	%	3.0	10.0
查看	Eosinophil	Blood	2.7	%	0.0	7.0
查看	Basophil	Blood	0.7	%	0.0	2.0
查看	MCH	Blood	30.4	pg	27.0	33.0
查看	RDW-CV	Blood	14.6	%	11.5	14.5
查看	PDW	Blood	10.0	fL	9.0	17.0
查看	MPV	Blood	9.40	fL	9.30	12.10
查看	ANC	Blood	4.23	10^3/uL	2.50	7.00
查看	Plateletcrit	Blood	0.31	%	0.17	0.32

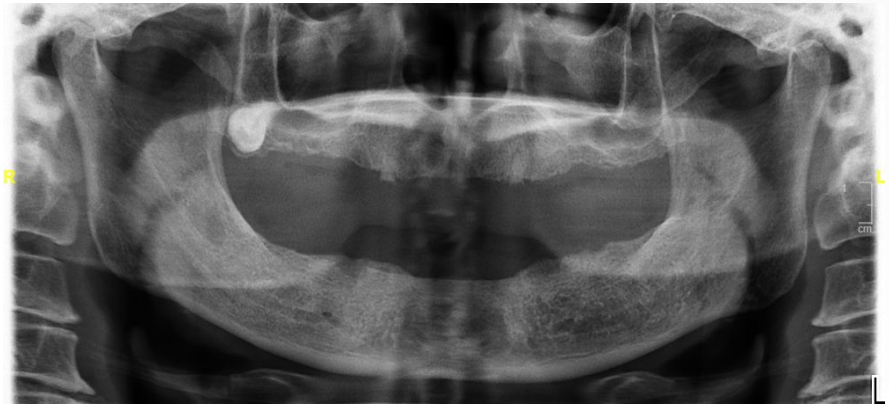
歷史資料	項目名稱	檢體類別	檢驗報告	單位	正常值(Low)	正常值(High)
查看	PT	Blood	10.2	sec	8.0	12.0
查看	INR	Blood	1.01		0.80	1.20
查看	APTT	Blood	27.5	sec	23.3	35.8

歷史資料	項目名稱	檢體類別	檢驗報告	單位	正常值(Low)	正常值(High)
查看	Na	Blood	137	mmol/L	136	146
查看	K	Blood	3.8	mmol/L	3.5	5.1
查看	Ca	Blood	9.1	mg/dL	8.6	10.3
查看	BUN	Blood	26	mg/dL	7	25
查看	Creatinine	Blood	1.07	mg/dL	0.70	1.30
---	Creatinine & eGFR	Blood				
查看	Bilirubin-T.	Blood	0.5	mg/dL	0.2	1.2
查看	ALBUMIN	Blood	4.0	g/dL	3.5	5.7
查看	AST	Blood	15	U/L	13	39
查看	ALT	Blood	11	U/L		41
查看	Glucose AC	Blood	83	mg/dL	70	100
查看	Triglyceride	Blood	104	mg/dL		150
查看	HDL Cholesterol	Blood	55	mg/dL	40	
查看	LDL Cholesterol	Blood	123	mg/dL		130
查看	eGFR(CKD-EPI)	Blood	77.0		60.0	
查看	eGFR(MDRD)	Blood	>60.0		60.0	

Cancer Staging Work-up: Oral Function

Dental evaluation

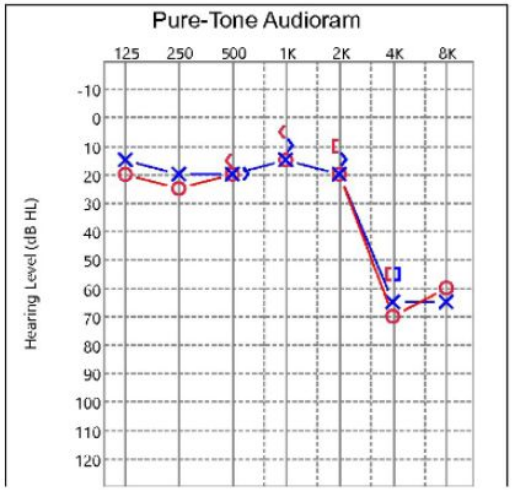
1. Chronic periodontitis, #13 23 retained roots
2. Panoramic radiographic



Swallowing evaluation

1. Total oral intake with no restrictions
2. Oral motor
   a. Lips & cheeks poor
   b. Tongue strength & ROM good

Cancer Staging Work-up: Speech/Pure Tone Audiometry

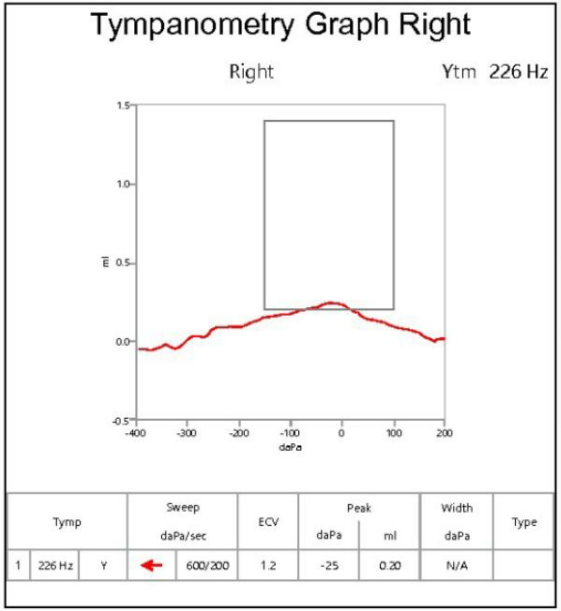


AC PTA 18 dB BC PTA 10 dB SII 73 %

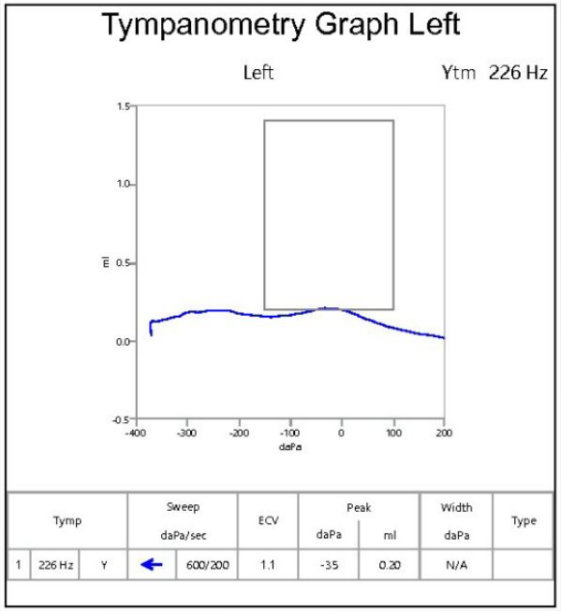
AC PTA 18 dB BC PTA 15 dB SII 73 %

Speech Test

Ear	Test Type	Aided	%	dB HL
L	SRT			25
R	SRT			20



Tymp			Sweep daPa/sec	ECV	Peak daPa	Peak ml	Width daPa	Type
1	226 Hz	Y	600/200	1.2	-25	0.20	N/A	



Tymp			Sweep daPa/sec	ECV	Peak daPa	Peak ml	Width daPa	Type
1	226 Hz	Y	600/200	1.1	-35	0.20	N/A	

1. Audiometry: bilateral symmetrical **high-frequency** severe sensorineural loss
2. **Good speech audibility**
3. Tympanometry: bilateral type As, indicate mild stiffness of tympanic membrane or ossicular chain

Cancer Staging Work-up: Neck

Carotid phonoangiography

1. Right ICA, left CCA, bulb and ICA 15-49% stenosis
2. Adequate total VA flow amount

Ultrasound of neck

No lymphadenopathy, no obvious neck metastasis

Cancer Staging Work-up: Abdomen and Chest

Panendoscopy

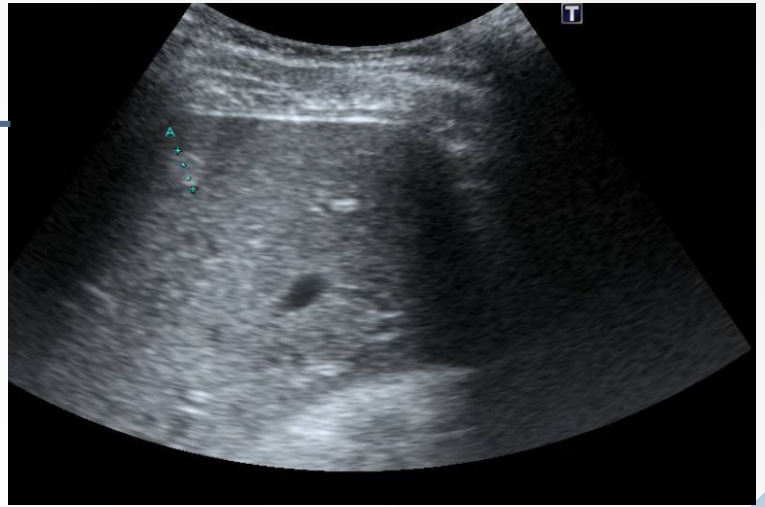
1. Hiatal hernia, lower esophagus
2. Gastritis, antrum

Chest X-ray

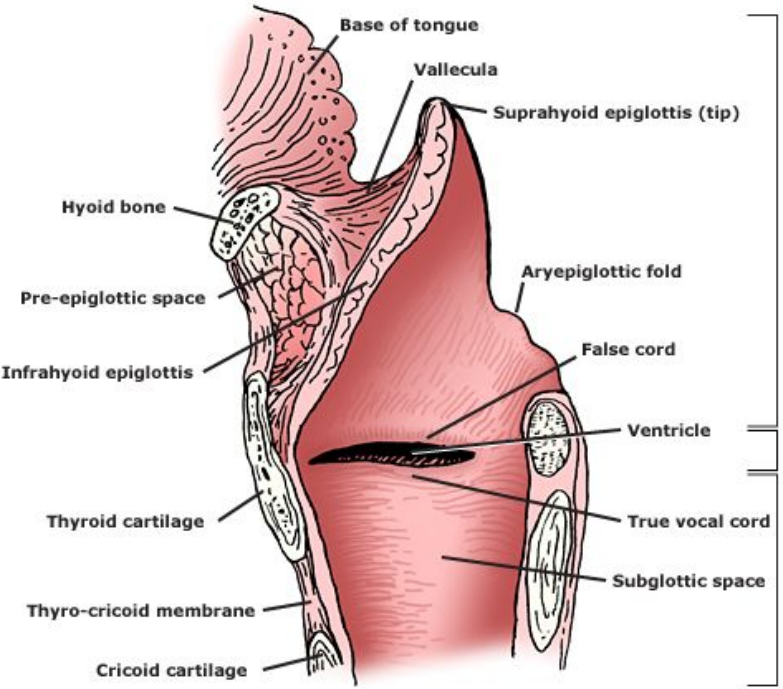
No active lung lesions.

Abdominal ultrasound

1. Liver cyst
2. Hepatic tumor, probably hemangioma
3. Calcified spot of liver
4. Gallbladder polyp, small
5. Renal cyst, left



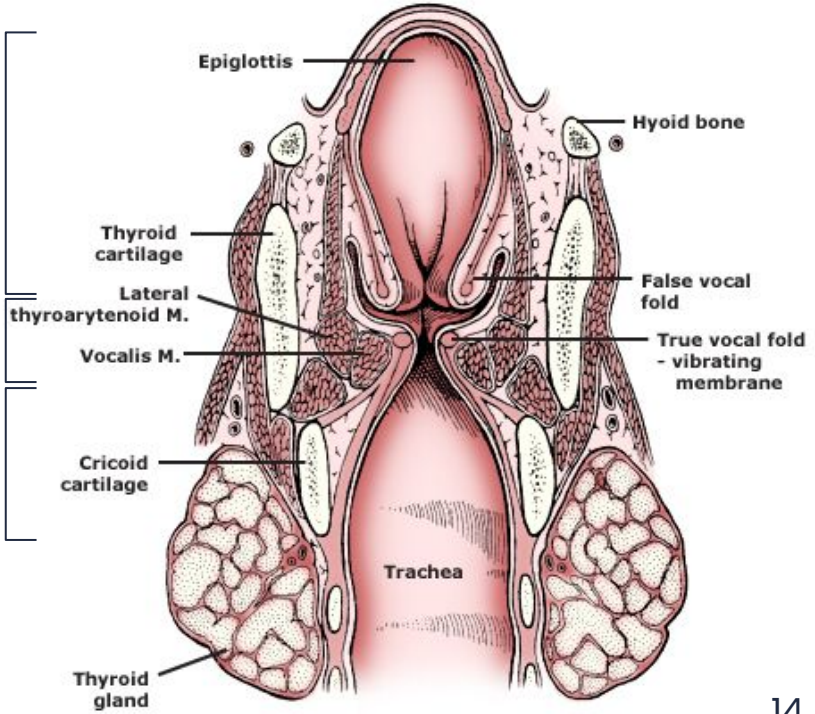
AJCC 8th TNM Staging for Laryngeal Cancer



Supraglottis

Glottis

Subglottis



AJCC 8th TNM Staging for Laryngeal Cancer

Laryngeal cancer

Supraglottis

Glottis

Subglottis

T

N

M

T category	T criteria
TX	Primary tumor cannot be assessed
Tis	Carcinoma *in situ*
T1	Tumor limited to the vocal cord(s) (may involve anterior or posterior commissure) with normal mobility
T1a	Tumor limited to one vocal cord
T1b	Tumor involves both vocal cords
T2	Tumor extends to supraglottis and/or subglottis, and/or with impaired vocal cord mobility
T3	Tumor limited to the larynx with vocal cord fixation and/or invasion of paraglottic space and/or inner cortex of the thyroid cartilage
T4	Moderately advanced or very advanced
T4a	Moderately advanced local disease. Tumor invades through the outer cortex of the thyroid cartilage and/or invades tissues beyond the larynx (eg, trachea, cricoid cartilage, soft tissues of neck including deep extrinsic muscle of the tongue, strap muscles, thyroid, or esophagus).
T4b	Very advanced local disease. Tumor invades prevertebral space, encases carotid artery, or invades mediastinal structures.

AJCC 8th TNM Staging for Laryngeal Cancer

Laryngeal cancer

Supraglottis

Glottis

Subglottis

T
N
M

Clinical N
Pathological N

N category	N criteria
NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, 3 cm or smaller in greatest dimension and ENE(−)
N2	Metastasis in a single ipsilateral node, larger than 3 cm but not larger than 6 cm in greatest dimension and ENE(−); **or** Metastases in multiple ipsilateral lymph nodes, none larger than 6 cm in greatest dimension and ENE(−); **or** Metastases in bilateral or contralateral lymph nodes, none larger than 6 cm in greatest dimension and ENE(−)
N2a	Metastasis in a single ipsilateral node, larger than 3 cm but not larger than 6 cm in greatest dimension and ENE(−)
N2b	Metastases in multiple ipsilateral nodes, none larger than 6 cm in greatest dimension and ENE(−)
N2c	Metastases in bilateral or contralateral lymph nodes, none larger than 6 cm in greatest dimension and ENE(−)
N3	Metastasis in a lymph node, larger than 6 cm in greatest dimension and ENE(−); **or** Metastasis in any lymph node(s) with clinically overt ENE(+)
N3a	Metastasis in a lymph node, larger than 6 cm in greatest dimension and ENE(−)
N3b	Metastasis in any lymph node(s) with clinically overt ENE(+)

AJCC 8th TNM Staging for Laryngeal Cancer

Laryngeal cancer

Supraglottis

Glottis

Subglottis

T

N

M

Distant metastasis (M)			
M category	**M criteria**		
M0	No distant metastasis		
M1	Distant metastasis		
Prognostic stage groups			
When T is...	**And N is...**	**And M is...**	**Then the stage group is...**
Tis	N0	M0	0
T1	N0	M0	I
T2	N0	M0	II
T3	N0	M0	III
T1, T2, T3	N1	M0	III
T4a	N0, N1	M0	IVA
T1, T2, T3, T4a	N2	M0	IVA
Any T	N3	M0	IVB
T4b	Any N	M0	IVB
Any T	Any N	M1	IVC

Cancer Staging Work-up: MRI and Whole Body PET/CT

Staging: cT1bN0M0, stage I

- T
  - Tumor involves right vocal cord and anterior commissure
  - Normal vocal fold movement
- N: no significant FDG-avid regional nodal metastasis
- M: no distant metastasis

Risk evaluation

Age and patient status
Age: <70, ECOG 1, KPS: 90/100

Systemic disease
No heart disease, FEV1>50%, Ccr>30, no cirrhosis, nor stroke history

CV risk
Minimal risk

Nutrition
No cachexia, no severe weight loss

Respiratory function
No airway obstruction

Tumor status
No tumor bleeding, no vascular invasion

Coagulation function
Normal, no PT nor APTT prolonged

No immunocompromised

Minimal risk

Assessment and Treatment Choice

Assessment

Laryngeal squamous cell carcinoma, involved right vocal fold and anterior commissure, cT1bN0M0, stage I, minimal risk

Treatment choice

1. Radiation therapy (RT)
2. Transoral robotic surgery (TORS)
3. Transoral laser microsurgery (TLM)

TORS was scheduled on 08/20 due to patient's preference.

02

Laryngeal Cancer and Types of Surgery

Laryngeal Cancer

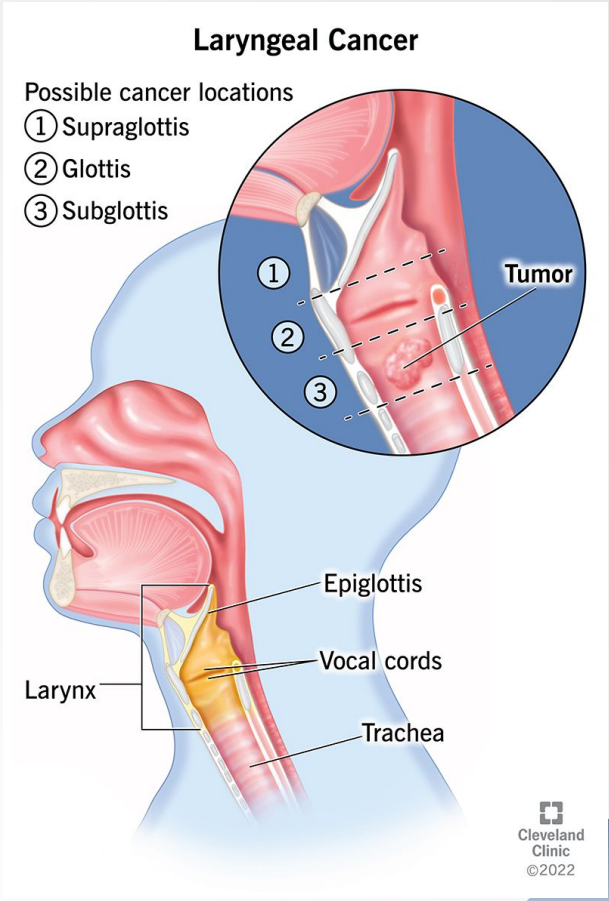
30%–40% of head and neck malignancies

Most common malignancy in otolaryngology

Worldwide:
over 180,000 cases of laryngeal cancer
approximately 100,000 deaths annually

Men > Women (Alcohol + Tobacco)

SQCC is the most common histologic subtype



Iran J Public Health. 2023 Nov;52(11):2248-2259.
UpToDate: Treatment of early (stage I and II) head and neck cancer: The larynx
StatPearls: Laryngeal Cancer

Risk Factors of Laryngeal Cancer

tobacco use : 5-25 fold increased risk
excessive **alcohol** consumption : dose dependent
Betel nut chewing : certain regions of Asia

} Synergistic effect

Occupational and Environmental Exposures :
Heat
chemicals (Opium)
viral infections (EBV, HPV, HCV, and HIV)

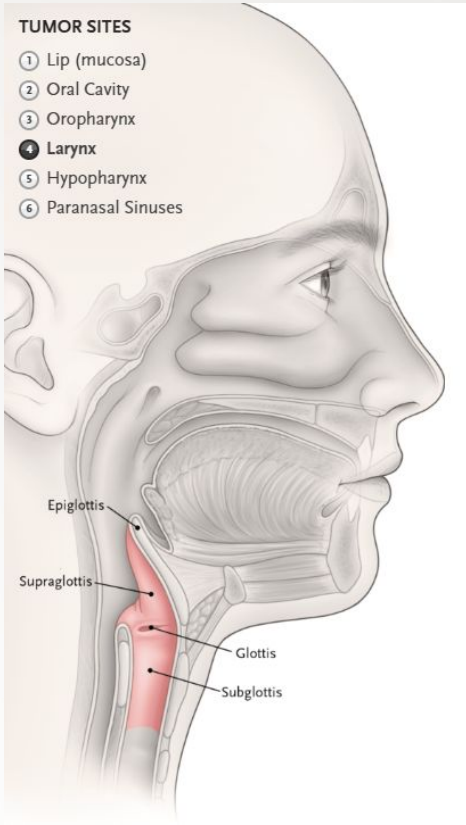
Others:
gastroesophageal reflux, Genetic factors, Syndromes

Iran J Public Health. 2023 Nov;52(11):2248-2259.
UpToDate: Epidemiology and risk factors for head and neck cancer

Classification of Laryngeal Cancer

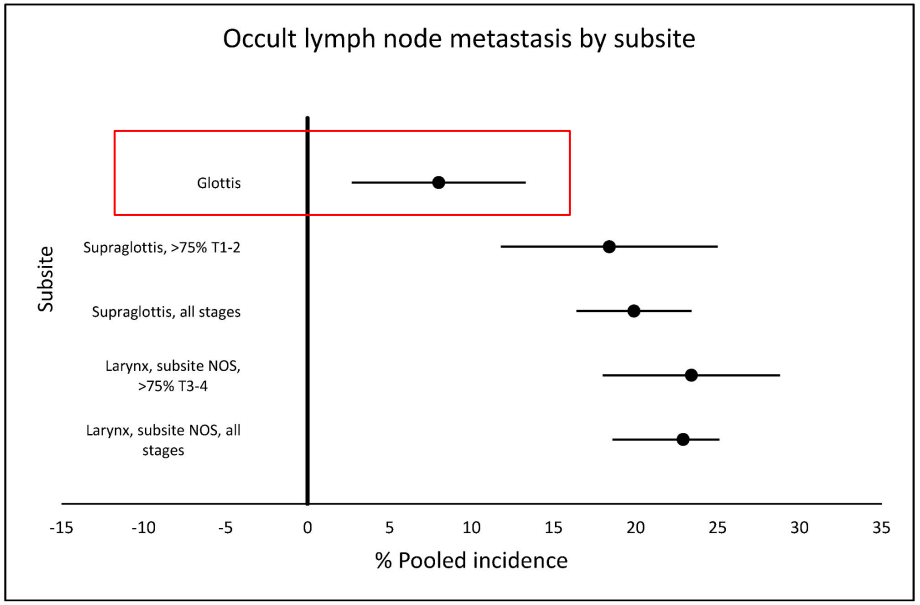
3 subdivisions of the larynx:

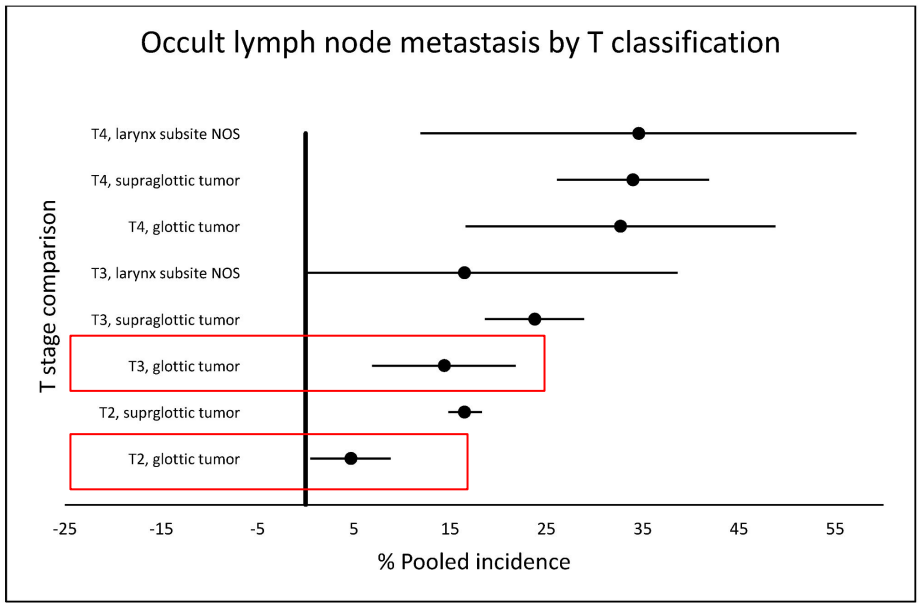
1. **Supraglottic**: **second most** common
   Suprahyoid epiglottis
   infrahyoid epiglottis
   aryepiglottic folds (laryngeal aspect),
   arytenoids, false vocal cords
2. **Glottic**: **most** common
   True vocal cords
   anterior and posterior commissures
3. **Infraglottic**: **least** common
   lower boundary of the glottis
   lower margin of the cricoid cartilage



N Engl J Med 2020;382:60-72
UpToDate: Treatment of early (stage I and II) head and neck cancer: The larynx

Incidence of Occult Lymph Node Metastasis in Laryngeal Cancer



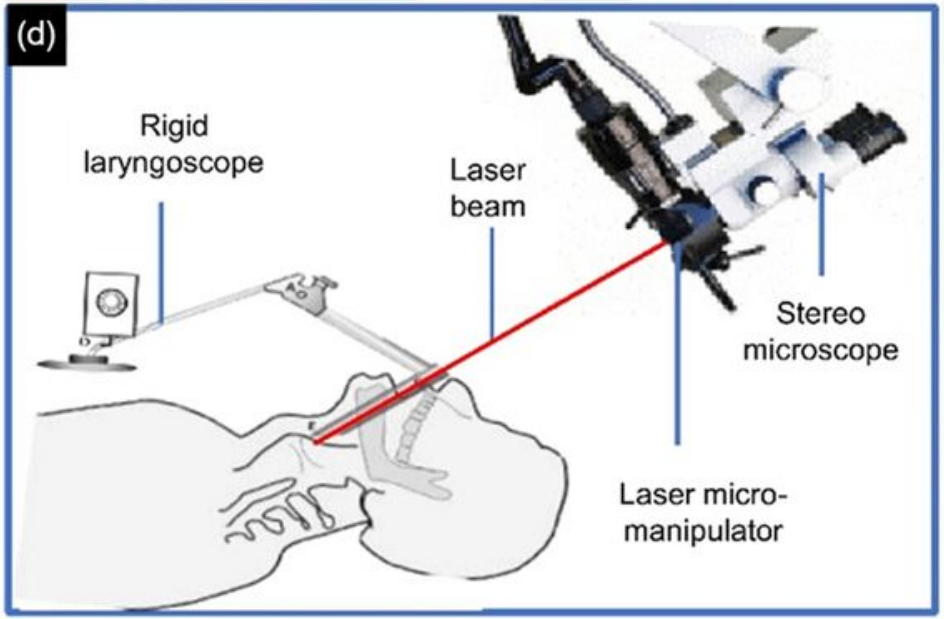


Five of 105 patients (4.8%) had occult metastasis in T1 stage

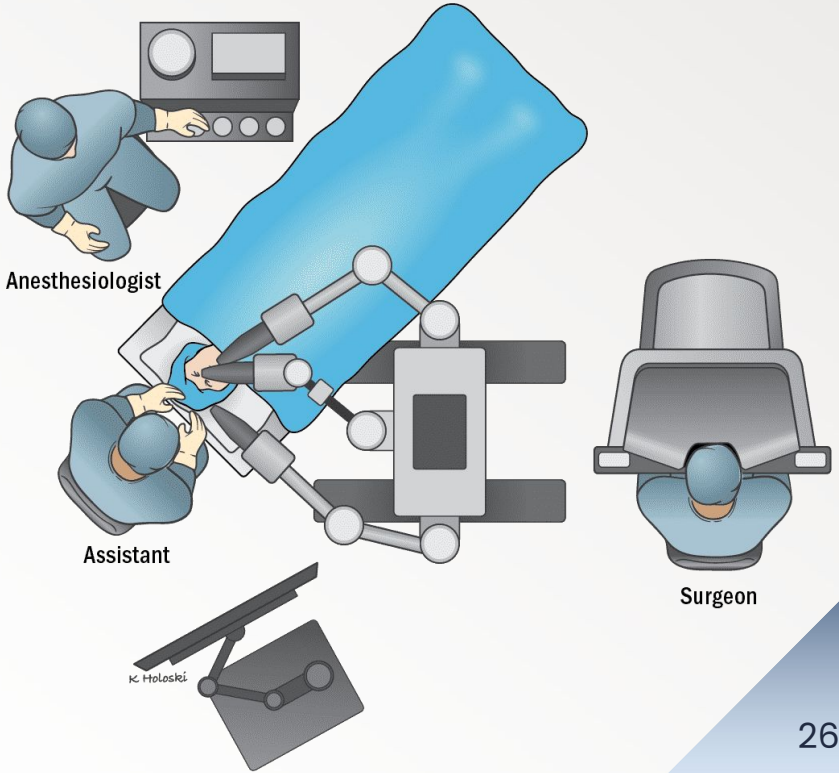
Cancers 2020, 12(4), 1059; https://doi.org/10.3390/cancers12041059

Minimally Invasive Surgery for Laryngeal Cancer

TLM



TORS



Advanced Intelligent Systems November 20224(12)

Patient Selection for TORS

feasibility of achieving **complete oncological resection**
preservation of the neurophysiological functions
(protective, respiratory, and phonatory functions)

selected stage **T1, T2, and T3** tumours

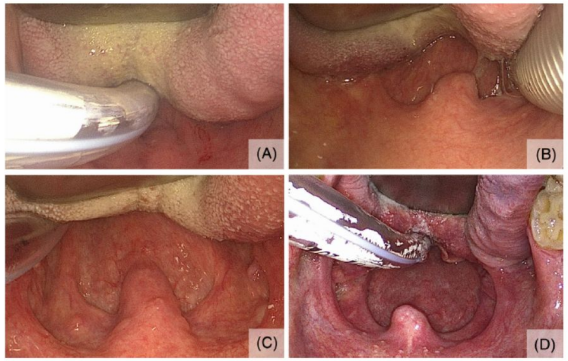
Absolute contraindications:

- inadequate transoral exposure
- compromised arytenoid or vocal cord mobility
- invasion of the paraglottic space, thyroid, or cricoid cartilage
- invasion of the posterior commissure
- involvement of > 2 cm of the base of the tongue mucosa
- involvement of the tongue base muscles

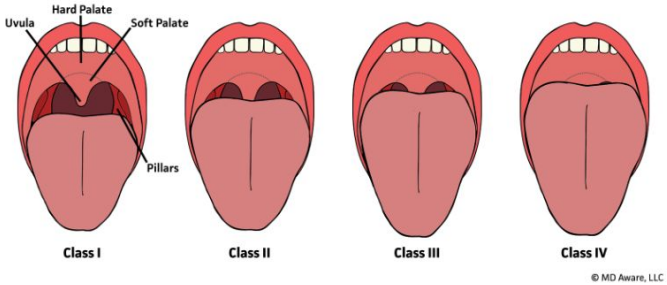
Contemp Oncol (Pozn). 2022 Jul 8;26(2):91–96.
Head Neck. 2021 Oct;43(10):3010-3021.

Grading of inadequate transoral exposure

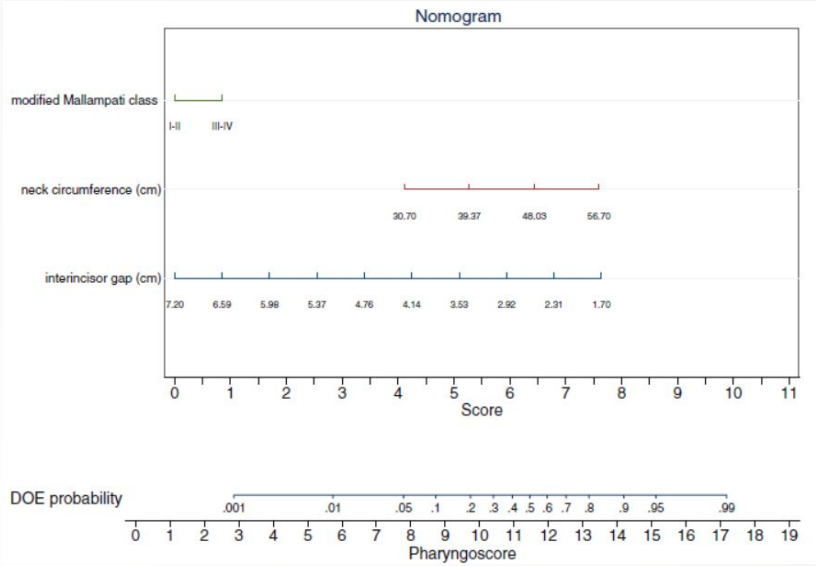
Visualization Grade



Modified Mallampati Classification

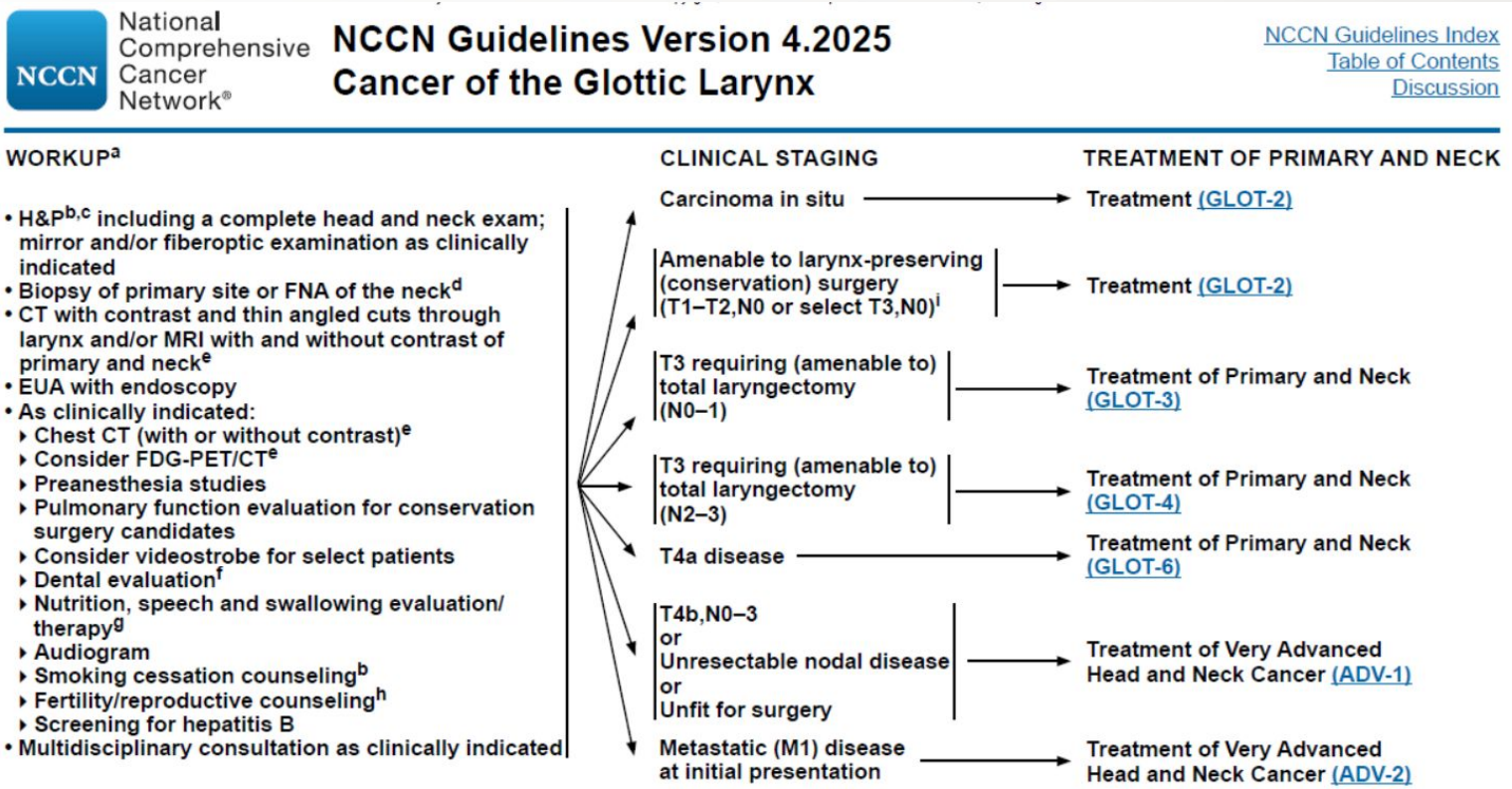


Pharyngoscore

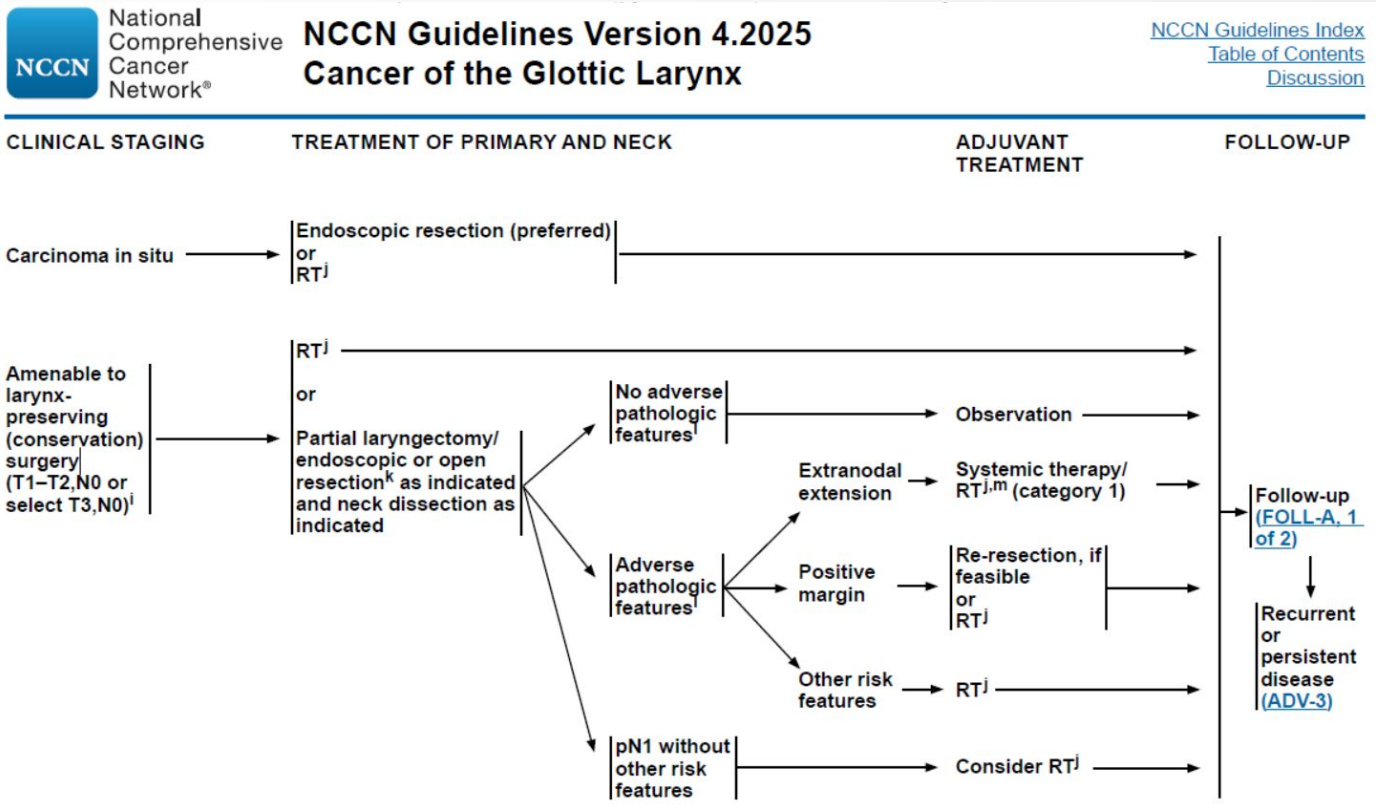


Head Neck. 2021 Oct;43(10):3010-3021.

NCCN guideline for glottic cancer



NCCN guideline for glottic cancer



TORS in Laryngeal Cancer

Review > Otolaryngol Clin North Am. 2023 Apr;56(2):313-322. doi: 10.1016/j.otc.2022.12.010.

The Role of Robotic Surgery in Laryngeal Cancer

Wei Jia [1], Emma King [2]

Affiliations + expand

PMID: 37030944 DOI: 10.1016/j.otc.2022.12.010

Introduction

Treatment of Laryngeal cancer :
Open surgery and chemoradiation therapy
-> TLM (same oncological outcomes)
-> apply the same concept with TORS

TORS : resect **supraglottic and glottic** cancer
- TOR supraglottic laryngectomy (TOR-SGL)
- TOR cordectomy
- TOR laryngectomy (TOR-LG)

Treatment Goals of TORS

- Resection with **negative margins**
- **Single** modality treatment
  (negative margin + neck dissection)
- **Reduce morbidity** of open surgery and chemoradiation
- **Preserve the functions of larynx** (voice, breathing, swallowing)
- **Long-term cure rates**
- Reduce **complications** and **hospital stay**

Comparisons with TLM

Pros:

- **Superior visualization** of the operative field
- Replicate **3D vision**
- **More ergonomic** in adjusting the endoscopic view
- **Dexterity**: Greater degrees of movement and rotation
- **Eliminate the tremor** when using long instruments
- **En-bloc resection** as well as **suturing to close defects**
- **Mimic the two-handed** surgical experience

Cons:

- More **expensive**
- Not readily available at all centers
- **Increased procedure time** and **set up time**
- **Optimum access** when working in the distal larynx
- **Crowd** the operative field and **limited visibility**

TOR supraglottic laryngectomy (TOR-SGL)

TOR-SGL: for early (T1-T2) and some T3 supraglottic lesions
Commonest robotic procedure for laryngeal SCC
The European Laryngological Society (ELS) classification for SGL

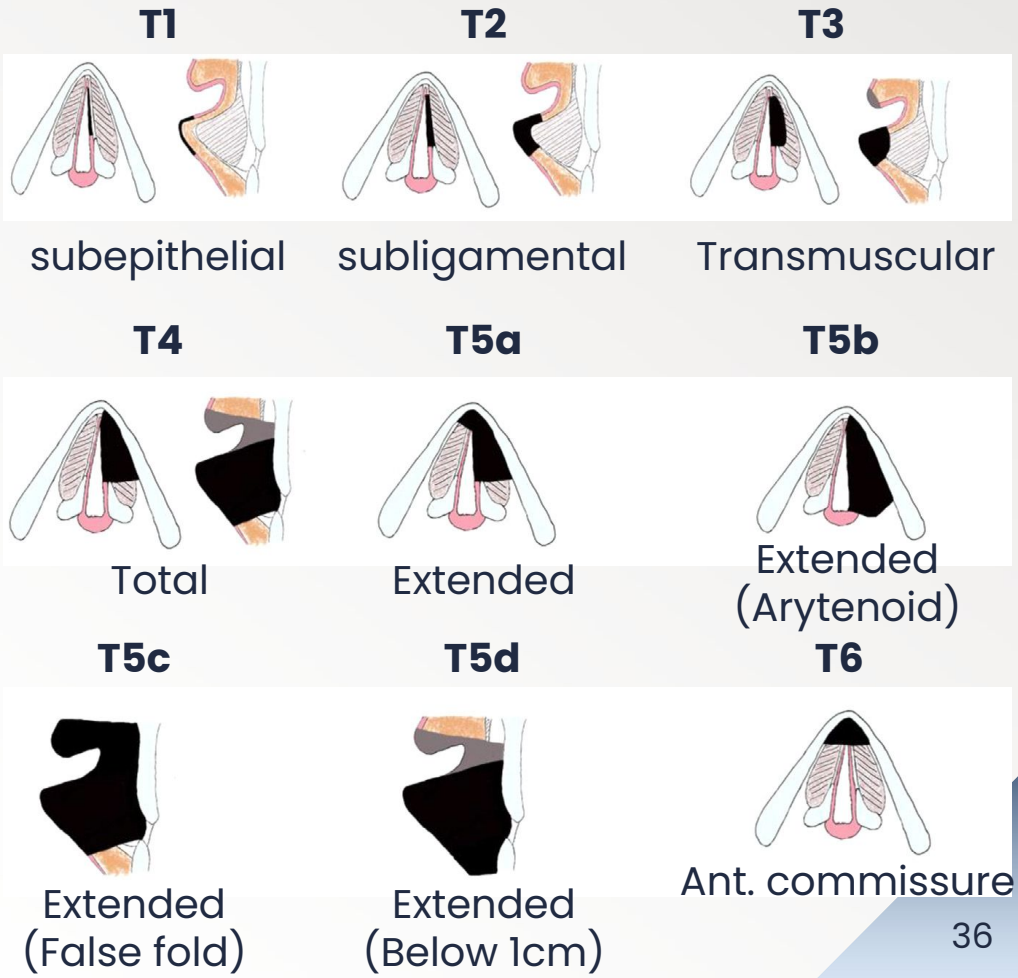
TOR cordectomy

ELS classification for cordectomy

For early glottic cancer:

- TLM: gold-standard approach
- TORS:
  More exposure of field
  More distal in the larynx
  Low positive margin rate
  Low local recurrence rate

  Not routine use:
  Higher tracheostomy and feeding tube rates
  (High thermal injury to tissue)



TOR laryngectomy (TOR-LG)

Indications for TOR-LG are not yet well-defined

Laryngectomy:
locally advanced laryngeal SCC with or without neck disease
-> required **bilateral neck dissection**

TOR-LG can be utilized in:

- **without neck dissection**
- **Salvage surgery for recurrent SCC** after RT and Chemotherapy
- Primary closure **without flap reconstruction**
- **Rare benign or malignant cancers:**
  Adenoid cystic carcinoma, low-grade condrosarcoma and chondroma
- **Laryngeal failure:**
  Recurrent aspirations, long-term tracheostomy, enteral feeding

Outcomes and Complications

Functional Outcomes:

- Resumption of oral intake
- Feeding tube
- Percutaneous endoscopic gastrostomy

Complications:

- Bleeding -> hemorrhage, airway obstruction
- Placement of **tracheostomy tubes**
- **Aspiration pneumonia**
- Laryngeal stenosis
- Bilateral temporary **vocal fold immobility**

Conclusion and Future Perspective

Conclusion:

- Minimally invasive procedure for laryngeal cancer in selected patients
- TORS for **supraglottic cancer: most amount of evidence**
- TORS for **glottic cancer**:
  technological improvement for making it comparable with TLM

Future Perspective:

- **Single-port robots**: better exposure of the field
- **Combined use of TORS and lasers**: reduce morbidity

TORS Supraglottic Laryngectomy

https://youtu.be/9vo_kaGzfEY?si=EcJlh_waeYtSeyGw

TOR cordectomy

https://www.youtube.com/watch?v=k8Fv9RX9YJk

03

Discussion

Transoral Robotic Surgery for Early-T Stage Glottic Cancer Involving the Anterior Commissure-News and Update

About the article

Title: Transoral Robotic Surgery for Early-T Stage Glottic Cancer Involving the Anterior Commissure-News and Update
Journal: Frontiers in Oncology (IF = 3.3)
Year of publication: 2022
Study type: Retrospective cohort study

Transoral Robotic Surgery for Early-T Stage Glottic Cancer Involving the Anterior Commissure—News and Update

Chen-Chi Wang[1,2,3], Wen-Jiun Lin[2], Jing-Jie Wang[2,4], Chien-Chih Chen[5,6], Kai-Li Liang[1,2] and Yen-Jung Huang[2]*

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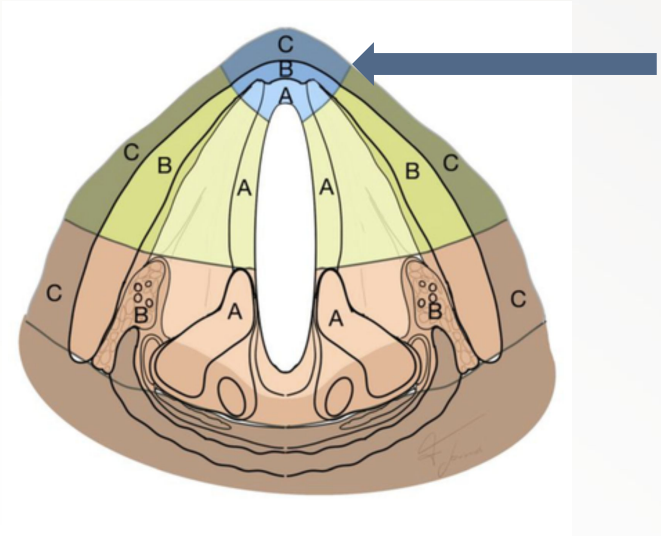
Anatomy

Anterior Commissure (AC) of glottis: Where bilateral vocal folds join anteriorly to the angle between the laminae of the thyroid cartilage



Benazzo et al. (2020). Imaging Accuracy in Preoperative Staging of T3-T4 Laryngeal Cancers

Anatomy

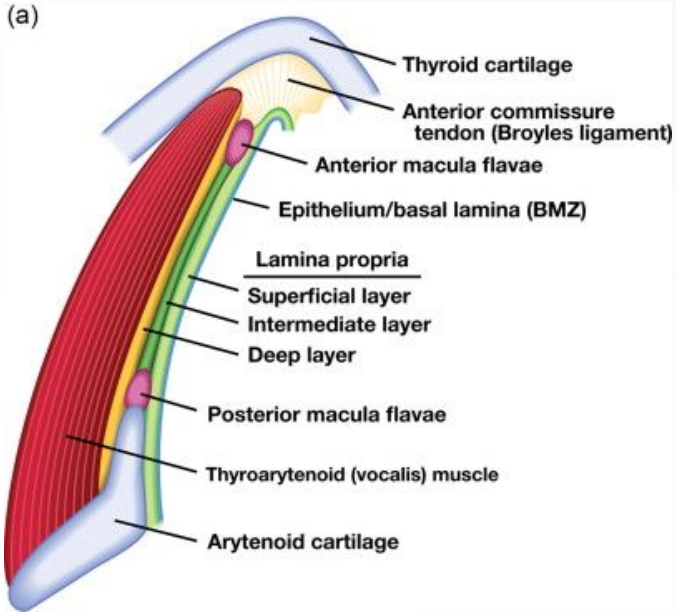
20% of all glottic tumors involve the AC, because

- Broyles' ligament inserts into the thyroid cartilage at AC
- only a 2–3 mm space between the AC mucosa from the thyroid cartilage.
- **lack of a thyroidal perichondrium** in this area and vascularization due to thyroid cartilage ossification

→ Considered AC involvement a risk factor for:

1. glottic cancer recurrence
2. Failure of radiotherapy

Anatomy



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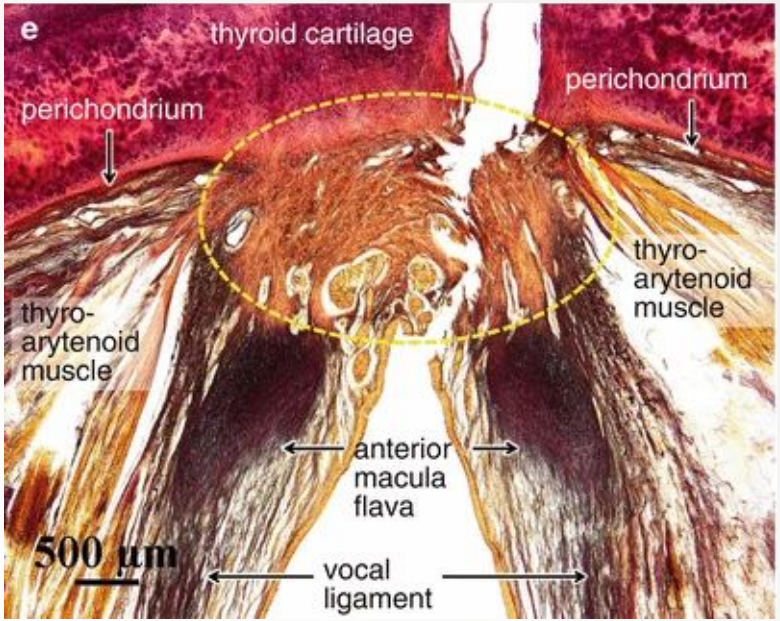


Sato, K. (2018). Compartments of the Human Larynx.

Treatment choice

Conventional:

- Open partial laryngectomy (PL): Reserved for recurrence
- Transoral laser microsurgery (TLM): Decrease chance of postoperative morbidity
- Radiotherapy (RT): Best organ preservation
- Might consider total laryngectomy (TL) if RT failure

Limitation of TLM

- Narrow working field
- line-of-sight issue

TLM Limitations

- Tumors **located at or involving the AC** had the **highest site for local recurrence (37.1%)** of all sites in the Larynx
- **Inadequate exposure** and **tangential visualization** leading to **incomplete excision** are the main reasons for the higher recurrence rate
- Involvement of the AC in r**ecurrent glottic cancer after radiotherapy** seems to be a relative contraindication to TLM

Treatment choice

Conventional:

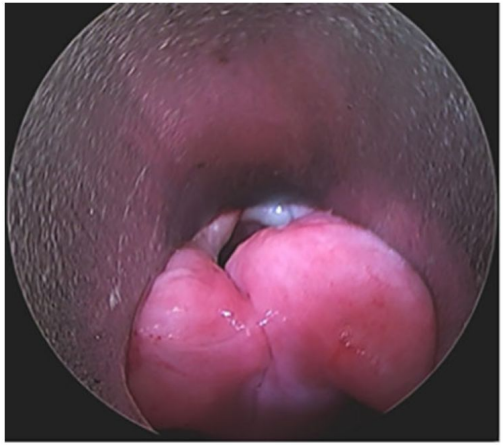
- Open partial laryngectomy (PL): Reserved for recurrence
- Transoral laser microsurgery (TLM): Decrease chance of postoperative morbidity
- Radiotherapy (RT): Best organ preservation
- Might consider total laryngectomy (TL) if RT failure

Limitation of TLM

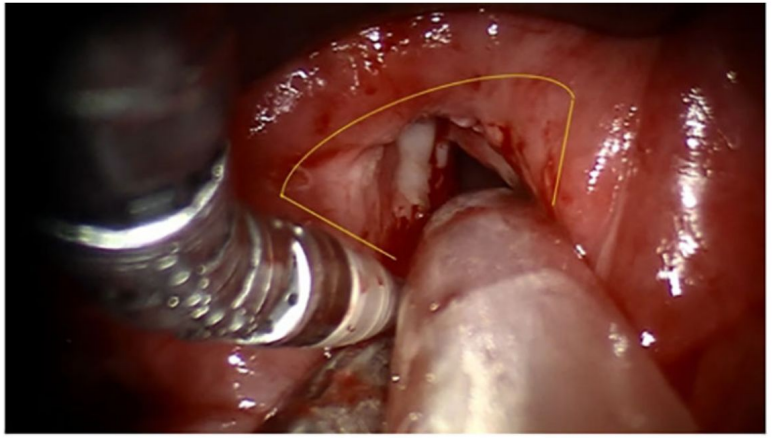
- Narrow working field
- line-of-sight issue

Transoral robotic surgery (TORS)

- Increased degree of freedom
- Reported less recurrence



A



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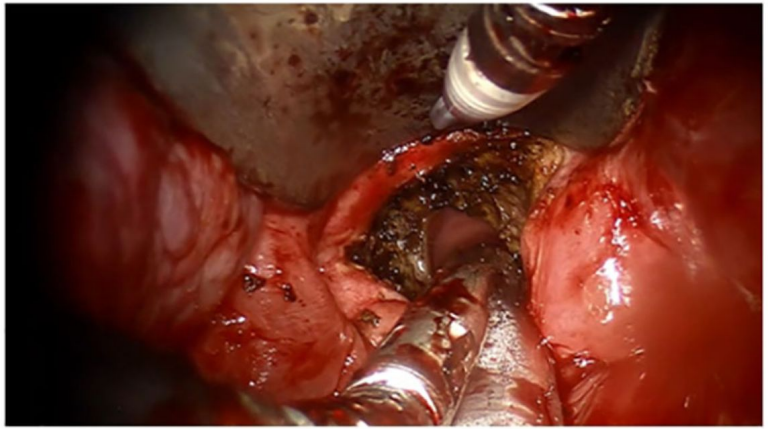
B



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Materials and methods

Interval: July 2010 to December 2019
Site: Taichung Veterans General Hospital
Patients: 22 patients, with early T-stage primary or recurrent glottic cancer with AC involvement, all of them received TORs.

Half of them (11) were with **recurrent cancer** and previously received TLM only (4), RT only(5), or both (2)
The other half (11) had **early glottic cancer without treatment** before

Patients

	Total (n = 22)	
	n	%
Age (mean ± SD)	66.55 ± 8.96	
Sex		
Female	1	(4.55%)
Male	21	(95.45%)
Clinical T stage		
I	7	(31.82%)
II	15	(68.18%)
Clinical N stage		
0	20	(90.91%)
I	1	(4.55%)
II	1	(4.55%)
Clinical stage		
I	7	(31.82%)
II	13	(59.09%)
III	1	(4.55%)
IV	1	(4.55%)
Cordectomy type		
Va+c	19	(86.36%)
VI	3	(13.64%)

Follow-up

5-year Metrics:

- Death
- Disease-specific death
- Recurrence
- Total laryngectomy
- Tracheostomy dependent
- VHI-10 (Phonation function)
- FOSS (Functional Outcome Swallowing Scale)

Results

	Fresh (n = 11)		Recurrence (n = 11)				p value
			Past RT (n = 7)		Without past RT (n = 4)		
	n	%	n	%	n	%	
Outcome (5 year)							
Death	0	(0%)	0	(0%)	1	(25%)	0.095
Disease-specific death	0	(0%)	0	(0%)	1	(25%)	0.095
Recurrence	0	(0%)	4	(57.14%)	1	(25%)	0.019*
Total laryngectomy	0	(0%)	3	(42.86%)	0	(0%)	0.024*
Tracheostomy dependent	0	(0%)	3	(42.86%)	2	(50%)	0.038*
VHI-10 (n = 17)	17.91	± 11.86	22.25	± 12.92	13.50	± 4.95	
FOSS (n = 21)	0.00	± 0.00	0.57	± 0.98	1.00	± 0.00	

Outcome (5 year)	No previous RT (n = 15)		Previous RT (n = 7)		p value
	n	%	n	%	
Death	1	(6.67%)	0	(0%)	1.000
Disease-specific death	1	(6.67%)	0	(0%)	1.000
Recurrence	1	(6.67%)	4	(57.14%)	0.021*
Total laryngectomy	0	(0%)	3	(42.86%)	0.023*
Tracheostomy	2	(13.33%)	3	(42.86%)	0.274
VHI-10 (n = 17)	17.23	± 11.05	22.25	± 12.92	
FOSS (n = 21)	0.21	± 0.43	0.57	± 0.98	

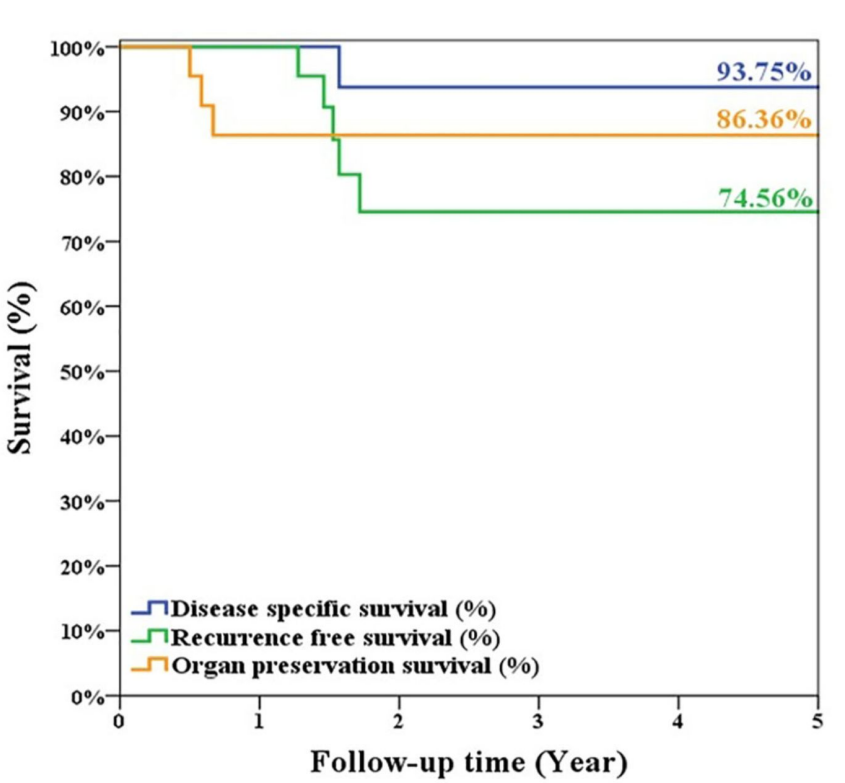
VHI-10

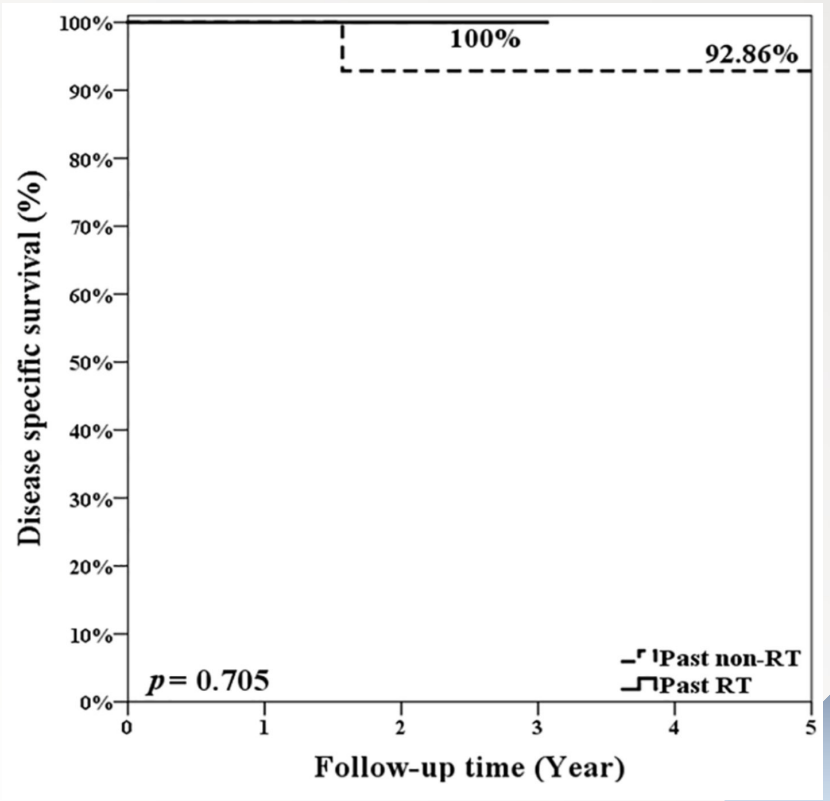
Voice Handicap Index-10						
F1	My voice makes it difficult for people to hear me.	0	1	2	3	4
F2	People have difficulty understanding me in a noisy room.	0	1	2	3	4
F8	My voice difficulties restrict my personal and social life.	0	1	2	3	4
F9	I feel left out of conversation because of my voice.	0	1	2	3	4
F10	My voice problem causes me to lose income.	0	1	2	3	4
P5	I feel as though I have to strain to produce voice.	0	1	2	3	4
P6	The clarity of my voice is unpredictable.	0	1	2	3	4
E4	My voice problem upsets me.	0	1	2	3	4
E6	My voice makes me feel handicapped.	0	1	2	3	4
P3	People ask, "What's wrong with your voice?"	0	1	2	3	4

VHI-10

FOSS Stage	Characteristics
Stage 0	Asymptomatic
Stage 1	Episodic or daily symptoms of dysphagia with normal meal time
Stage 2	Dysphagia requiring significant dietary modifications or prolonged meal time
Stage 3	Dysphagia with weight loss $\leq$10% of body weight with daily symptoms
Stage 4	Dysphagia with weight loss $\geq$10% of body weight or

Result


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Survival (%)
93.75%
86.36%
74.56%
Disease specific survival (%)
Recurrence free survival (%)
Organ preservation survival (%)
0
1
2
3
4
5
Follow-up time (Year)


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Disease specific survival (%)
100%
92.86%
p = 0.705
Past non-RT
Past RT
0
1
2
3
4
5
Follow-up time (Year)

Discussion – Literature review

Year	Author (reference)	Case no.	AC case no.	Tracheostomy	Long-term outcomes
2009	Park (12)	4	2	Yes	Not available
2011	Blanco (13)	1	1	Yes	Not available
2012	Vural (18)	1	1	Yes	6-months
2012	Kayhan (14)	10	Not described	Done in 1 patient	Ranged from 2 to 16 months
2013	Lallemant (16)	13	Not described	Done in 1 patient	12 months
2016	Wang (17)	8	8	Nil	Mean follow-up 40 months
2019	Kayhant (15)	48	6	Nil	Mean follow-up 65 months
2021	Present study	22	22	Done in 1 patient	Mean follow-up 55 months

Discussion – TLM vs. TORs

Fresh case of glottic cancer with AC involvement

Year	Author (reference)	Approach	Chohor	Results
2009	Rodel (3)	TLM	n = 153 T1 T2	5-year local control 73% for T1a, 68% for T1b, 76% for T2
2016	Hoffman (29)	TLM	n = 96 Tis T1 T2	5-year local control 74.4% 5-year disease free survival 61.7% 5-year overall survival 79.2% 5-year disease specific survival 91.5%
2021	Present study	TORS	n = 11 T1 T2	5-year local control 100% 5-year disease free survival 100% 5-year overall survival 93.8% 5-year disease specific survival 93.8%

→ TORS showed non-inferiority to TLM in terms of survival rate

Discussion – TORS

After irradiation failure: **Higher recurrence rate** and **lower organ preservation** but the **overall and disease-specific survival** is **similar**

Outcome (5 year)	No previous RT (n = 15)		Previous RT (n = 7)		p value
	n	%	n	%	
Death	1	(6.67%)	0	(0%)	1.000
Disease-specific death	1	(6.67%)	0	(0%)	1.000
Recurrence	1	(6.67%)	4	(57.14%)	0.021*
Total laryngectomy	0	(0%)	3	(42.86%)	0.023*
Tracheostomy	2	(13.33%)	3	(42.86%)	0.274
VHI-10 (n = 17)	17.23	± 11.05	22.25	± 12.92	
FOSS (n = 21)	0.21	± 0.43	0.57	± 0.98	

→ Might consider TORS after irradiation failure

Discussion – PL

Bertolin et al. - **local control rate**: 87% / **overall survival**: 75%

De Virgilio et al. - PL offers **better local control rate** in radio-recurrent laryngeal cancer compared to TLM or TORs.

Holsinger et al. - pointed out the patient must present **good pulmonary function**, **no major comorbidities**, and willingness to accept potential **lengthy rehabilitation** if PL was going to be done

Study limitations

- Small Cohort Size
- Optimal Exposure Not Always Available
- Instrument limitation
- Consideration of Airway and Swallowing
- Cost of Robotic Surgery
- No pre- and post- operative comparison regarding function

Conclusion

- TORS could be considered in **primary or salvage management** of **glottic cancer with AC involvement**
- TORS might be considered an alternative before trying open surgery to preserve the organ and reduce the morbidity
- Functional outcome were acceptable
- Tracheostomy might not be needed
- **Low level of evidence** comparing TORS directly with established methods like TLM

Comparison

Types	RT alone*	TLM*, **	TORS**
Overall survival rate	79.4%	84.5% / 79.2%	93.8%
Local control rate	71.6%	77.2% / 74.4%	100%

*Vasudevan, S. et al. (2025). Transoral Laser Microsurgery Versus Radiotherapy for T1-T2 Glottic Cancer with Anterior Commissure Involvement: A Systematic Review and Meta-Analysis.
**Wang, C. C. et al. (2022). Transoral Robotic Surgery for Early-T Stage Glottic Cancer Involving the Anterior Commissure-News and Update.

Back to our patient

- Laryngeal squamous cell carcinoma, involved right vocal fold and anterior commissure, cT1bN0M0, stage I
- Fresh case, without previous RT
- Surgery: TORS, Cordectomy type Va
- A favorable 5-year overall survival rate can be expected
- Low recurrence rate and might be tracheostomy independent
- Might follow up phonation and swallowing function after surgery

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THANK YOU!