



# Segmental Tracheal Resections in Thyroid Cancer Patients

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## INTRODUCTION

Thyroid cancer is a common cancer in the US, with a good prognosis and high overall survival. In less than 1% of advanced thyroid cancer patients, however, extrathyroidal extension of the tumor can lead to invasion of the trachea, which leads to a significant increase in morbidity and mortality. Often, tracheal resection via window resection or segmental resection with reanastomosis is the only treatment option available to control local disease and decrease the risk of recurrence. These procedures are amongst the most technically challenging and high risk in thyroid and neck surgery.

In a landmark 1991 study, Ishihara and colleagues provided the first significant experience with segmental tracheal resection for 60 advanced thyroid cancer patients from 1973-1988, and this remains the largest experience in the published literature to this date. Herein we describe a contemporary high-volume experience with segmental tracheal resection for advanced thyroid cancer, evaluating perioperative outcomes and survival.

## METHODS

We retrospectively reviewed all consecutive patients undergoing thyroid cancer surgery at MD Anderson Cancer Center from 2016 – 2022, using the following criteria:

### Included:

- Patients who underwent either segmental or window tracheal resection at MDACC

### Excluded:

- Patients who underwent tracheal shave excision

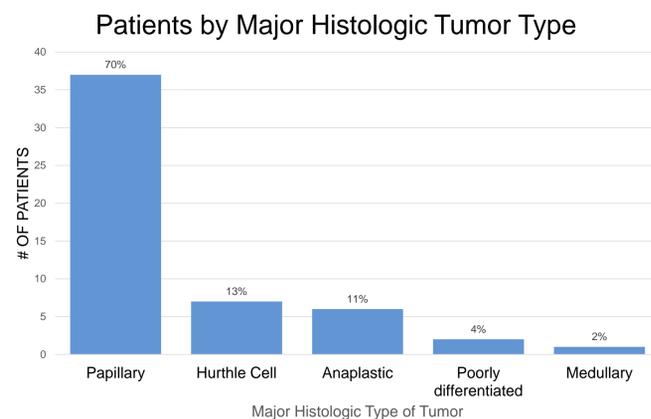
Survival was analyzed using the Kaplan-Meier method. Primary endpoints were overall and progression free survival.

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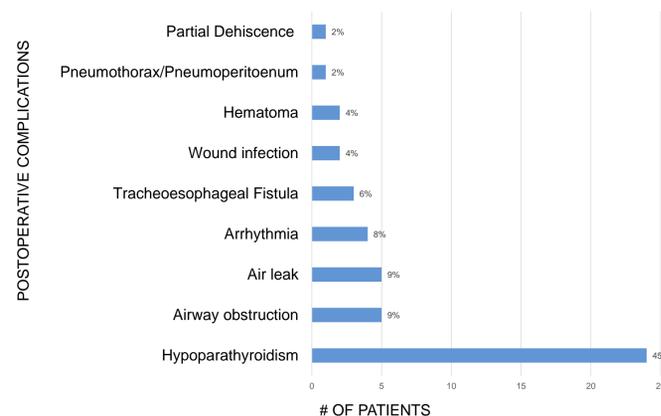
## RESULTS

53 patients received tracheal resection for intraluminally invasive thyroid cancer over a 6-year period, with **51 segmental resections** and **2 window resections** (see Table 1). The median number of **tracheal rings resected** was **5** (range 1-12) rings, with median **5** (range 2-36) **days hospital stay**. 11 (21%) patients returned to the OR within 30 days of tracheal resection.

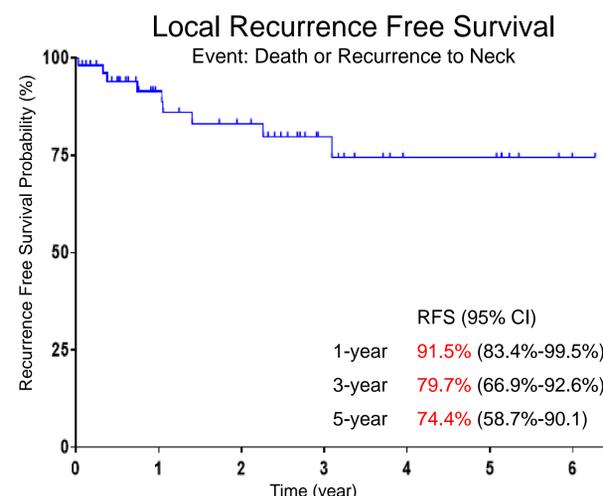


**Figure 1, Patients by Major Histologic Tumor Type.** Pathology included 37 patients with papillary thyroid cancer, 7 with Hurthle cell cancer, 6 with anaplastic cancer (ATC), 2 with poorly differentiated cancer, and 1 with medullary cancer.

### Occurrence of Postoperative Complications



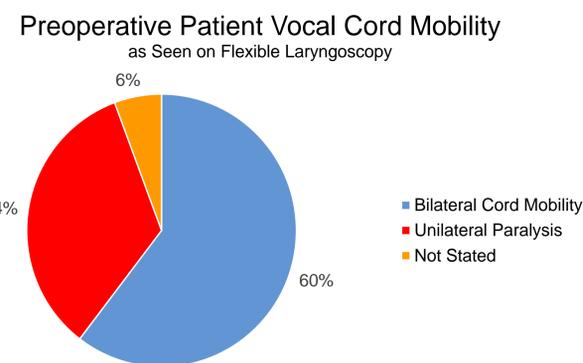
**Figure 3, Occurrence of Postoperative Complications.** 35 (66%) patients had at least one postoperative complication, the most common being either temporary or permanent hypoparathyroidism (21 and 3 respectively), obstructive airway event requiring intervention (5), and air leak from primary anastomosis site (5).



**Figure 5, Local Recurrence Free Survival.** 5 (9%) patients developed locoregionally recurrent disease, all in the central neck. Of these 5 patients, only 1 is deceased. Median follow-up time was 2.3 years (range 11 days to 6 years).

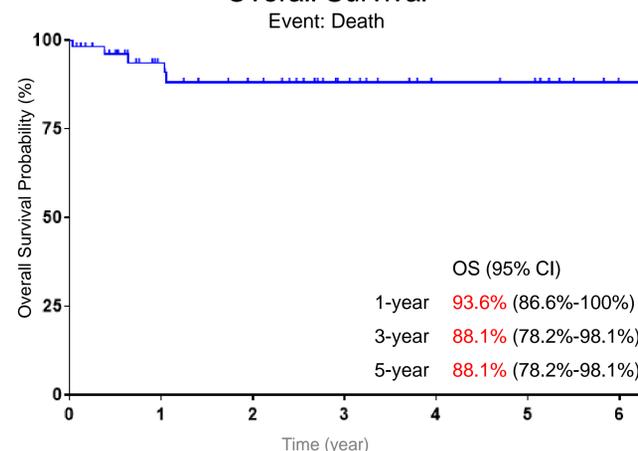
**Table 1, Segmental vs Window Tracheal Resection**

Type of Resection	# of Patients (%)
Segmental	51 (96%)
Window	2 (4%)
Total	53 (100%)



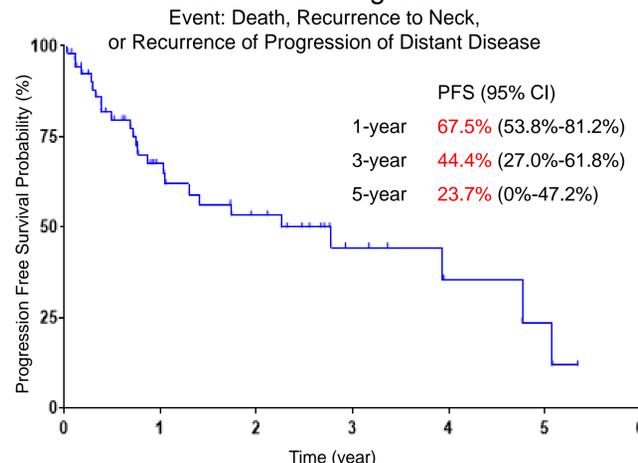
**Figure 2, Preoperative Patient Vocal Cord Mobility as Seen on Flexible Laryngoscopy.** 18 patients had a preoperative unilateral vocal cord paralysis, 15 in the right and 3 in the left. No patients had preoperative bilateral cord paralysis.

### Overall Survival



**Figure 4, Overall Survival.** Overall, 5 (9%) patients are deceased, 3 of which had ATC, and 48 (91%) are alive. One patient (2%) died within 30 days of surgery due to respiratory distress. Median follow-up time was 2.3 years (range 11 days to 6 years).

### Local/Distant Recurrence/Progression Free Survival



**Figure 6, Local and Distant Recurrence and Progression Free Survival.** 11 (21%) patients had recurrence of distant metastases (DM), and 12 (23%) had progression of pre-existing DM. Median follow-up time was 2.3 years (range 11 days to 6 years).

**Table 2, New Tracheostomy Tube Placed Intra/postoperatively**

Type of Tracheostomy	# of Patients (%)
Temporary	6 (11%)
Permanent	1 (2%)
Total	7 (13%)

**Table 3, Concomitant Procedures**

Procedure	# of Patients (%)
Esophageal Resection	24 (45%)
Laryngectomy	4 (8%)
Sternotomy	2 (4%)

## DISCUSSION

The technical challenges and high risk of perioperative complications associated with tracheal resection are evident in our cohort, as two-thirds of patients experienced at least one complication after surgery. However, the most common complication was temporary hypoparathyroidism, and 50% of patients were discharged after 5 days or less, indicating a relatively uncomplicated postoperative course for many patients.

High overall survival rates indicate that tracheal resection is associated with multiyear survival in thyroid cancer patients with intraluminal disease. It is also associated with locoregional disease control, as less than 10% of patients experienced local recurrence, and none had recurrent disease in the trachea. However, risk of local and distant recurrence slightly increased over time.

This is the largest tracheal resection cohort since 1991. Additionally, this is one of the only tracheal resection cohorts to date to include non-differentiated thyroid cancer patients, which comprised 17% of this cohort.

## CONCLUSION

In the largest contemporary experience with segmental tracheal resection for advanced thyroid cancer, we highlight the complexity and significant perioperative risks associated with these surgeries, with minority of patients requiring return to the OR, and very rare perioperative death. The vast majority of patients remain alive and locoregionally disease-free several years following surgery.

## REFERENCES

- 1) NCI. SEER Program, 2022.
- 2) Kim et al. Eur Arch Otorhinolaryngol, 2016.
- 3) Matsumoto et al. Cancers, 2021.
- 4) Allen et al. The Laryngoscope, 2020.