

# Cartilage Shaving Procedure for Thyroid Carcinoma Invading the Tracheal Cartilage : Is it an Appropriate Treatment ?

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## 기관연골 침윤 갑상선암의 면도식 절제술식의 평가

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= 국 문 초 록 =

기관연골까지만 침윤된 갑상선암에서 침윤된 기관연골을 면도식으로 깎아 내는 술식을 선택했을 때 효과적인 치료방법이 되는가를 알아보기 위하여 본 연구를 실시하였다.

1979년 부터 1988년까지 10년간 수술이 시행된 갑상선암환자 432예중 기관연골까지만 침윤된 환자는 16예 이었다. 남자가 3예, 여자가 13예 이었으며, 이들의 평균 연령은 55.8세 이었고, 조직학적으로는 유두상암이 14예, 여포상암이 2예 였다.

전예에서 침윤된 기관연골을 면도식으로 깎아내었으며, 수술후 보조치료로 방사성 동위원소 치료나 외부 방사선 조사를 추가하였고, 또한 갑상선 호르몬 투여로 TSH 억제 치료를 하였다. 평균 추적 기간은 67.7 개월이었다. 16예중 무병생존은 4예에 불과하였고, 12예가 치료에 실패했는데 이중 7예는 갑상선암의 재발로 사망하였다.

이상의 결과로 면도식 절제술은 갑상선암이 기관연골에 침윤되었을 때의 술식으로는 부적당하며 무병 생존율을 향상시키기 위해서는 비록 표재성인 기관연골 침윤이라도 기관제술과 같은 적극적인 술식 선택이 바람직하다고 사료되었다.

**KEY WORDS :** Thyroid carcinoma · Tracheal invasion · Cartilage shaving.

### Introduction

Thyroid carcinoma extending into the tracheal lumen is usually managed by tracheal resection. However, there is no clear guideline concerning the

extent of surgery for patients with cartilage invasion only.

In some institutions, shaving the tumor off the tracheal cartilage is preferred for the lesions<sup>1-3)</sup>. Through an assessment of treatment outcomes for such

patients managed by the cartilage shaving procedure, and an attempt was made to clarify whether the cartilage shaving procedure is appropriate for control of tracheal cartilage invasion.

### Materials and Methods

Of 432 patients with thyroid carcinoma seen between 1979 and 1988, 16 patients(3.7%) were found to have tracheal cartilage invasion only. The diagnosis of each case was established by operative findings at the time of surgical exploration and was followed by histologic confirmation of tracheal cartilage specimens. Patients with intraluminal involvement or cases initially treated by tracheal resection were excluded from the current series.

There were 13 female and 3 male patients. Their ages ranged from 23 to 74 years with a mean of 55.8 years. Twelve patients were primary and 4 were recurrent cases.

The mean diameter of the thyroid masses was 6.0cm with a range of 2.5 to 13.0cm, and the mean length of the tracheal wall invasion was 2.5 tracheal rings with a range of 1.0 to 4.5 rings. The histologic diagnosis in these cases included papillary carcinoma in 14 patients, and follicular carcinoma in 2 patients. In all of these patients, the tracheal invasion was managed by a cartilage shaving procedure, removing all gross invasion. For the thyroid lesion itself, total or near-total thyroidectomy was the most common procedure(11 cases), followed by subtotal thyroidectomy(3 cases), and debulking surgery(2 cases).

Adjacent lymphnode(central compartment nodes) dissection was done in 10 patients. In 6 patients whose neck nodes were clinically positive, ipsilateral modified neck dissection was carried out in addition to central compartment node dissection. Direct extension of tumor into adjacent neck structures in addition to the tracheal wall was found in 10 patients at the time of initial surgery. The neck structures additionally resected, the most common being recu-

rrent laryngeal nerve, are shown in Table 1.

All patients received adjuvant therapy in the postoperative period. Radioactive iodine(<sup>131</sup>I) was administered to 11 patients; 9 received therapeutic dose of 100 to 200 mCi <sup>131</sup>I and 2 received an ablative dose of 30 mCi <sup>131</sup>I. Five other patients who had subtotal thyroidectomy or debulking surgery received external-beam radiotherapy(4500~6000 cGy) to the neck and thyroid area. Lifelong thyroid hormone replacement therapy was instituted in all patients. Each patient outcome was assessed by periodic check-ups of computed tomography, <sup>131</sup>I whole body scan, measurement of serum thyroglobulin, and other radiologic studies whenever needed.

The follow-up period ranged from 33 to 119 months with a mean of 67.7 months.

### Results

Four patients(25%) were clinically free of disease at 46 to 109 months(mean 67.8). There was failure to control disease in 12 patients, 5 of whom were alive with evidence of persistent or recurrent disease at 40 to 119 months(mean 67.5) and the remaining 7 patients eventually died from disease 22 to 82 months(mean 43.2) after initial surgery.

Their death was most often due to airway obstruction from extensive local disease in the neck or superior mediastinum.

The central compartment of the neck was the most common site of treatment failure(12 patients), followed by the lateral neck(4 patients), the superior mediastinum(3 patients), and distant metastases(3 patients) (Table 2).

Eight patients showed more than one recurrence

Table 1. Adjacent neck structures resected(N=10)

Organs	No. of patients
Recurrent nerve	6
Strap muscle	4
Esophageal wall	2
Sternocleidomastoid muscle	2
Jugular vein	2

or persistent disease. The modalities of retreatment given and responses are shown in Fig. 1. Most of these patients with treatment failure were not amenable to salvage surgery due to extensive infiltration, radiation fibrosis of the structures in the central

neck or patient's refusal for reexploration. Reexcision was attempted in only 3 patients but complete excisions were not possible in any. In 5 patients a tracheostomy was performed to alleviate airway obstruction.

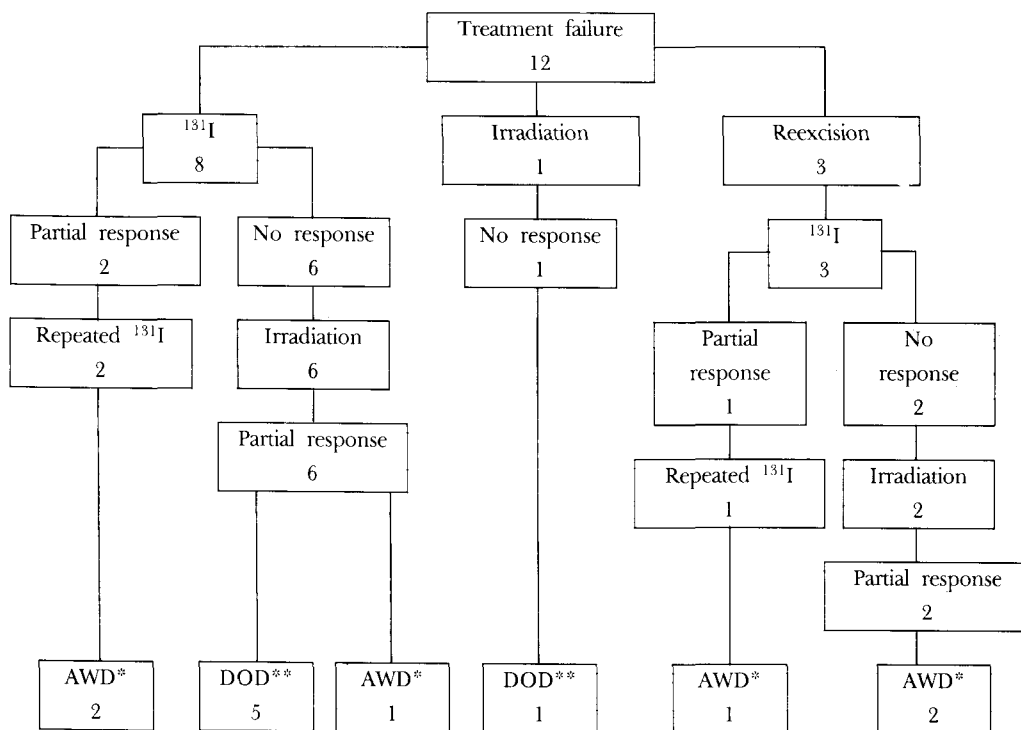
**Table 2.** Pattern of treatment failure(N=12)

Failure site	No. of patients
Central neck	12
Trachea or paratracheal	( 10)
Esophagus	( 3)
Larynx	( 2)
Carotid artery	( 2)
Lateral neck	4
Nodes	( 4)
Soft tissue	( 2)
Mediastinum	3
Distant metastasis	3
Vertebra	( 1)
Lung	( 1)
Rib	( 1)

The major retreatment modalities were  $^{131}\text{I}$  therapy and/or external-beam radiotherapy. Response rate following external-beam radiotherapy seemed more favorable compared with that of  $^{131}\text{I}$  therapy in general. However, as shown in Fig. 1, none of these retreatment modalities was satisfactory to control the disease in terms of curability.

### Discussion

Local invasion of the upper aerodigestive tract, particularly airway invasion, by thyroid carcinoma has been recognized as a source of significant morbidity and mortality. The reported incidence of this



\*Alive with disease    \*\*Dead of disease

**Fig. 1.** Retreatment modality and response.

unhappy occurrence accounts for 1~13% of all thyroid carcinoma<sup>4,7)</sup>.

The extent of invasion into the trachea varies from perichondrial invasion to extensive laryngotracheal or tracheoesophageal invasion.

Generally, the intraluminal invasion can be suspected and detected by clinical symptoms such as dyspnea, hemoptysis or dysphonia and by use of several diagnostic tools of computerized tomography, xeroradiography, tracheal laminogram or endoscopy<sup>8)9)</sup>, whereas in cases with more superficial invasion, the invasion is more commonly identified by the surgeon at the time of exploration<sup>10)</sup>. But even with operative findings, accurate assessment of extent of invasion into the tracheal wall is difficult. A superficial invasion may be indistinguishable from the full thickness invasion or intraluminal invasion, making it difficult to make a decision on the extent of tracheal resection necessary.

The general consensus is that a tracheal resection by means of sleeve or window resection is the preferred method of treatment for the intraluminal invasion when technically feasible<sup>7)10-12)</sup>. On the contrary, the extent of surgery for those patients with superficial invasion remains controversial. The choice of extent of resection often depends on the personal experience of the individual surgeon.

Some have appealed for aggressive local resection<sup>7)11)12)</sup> and others have suggested conservation surgery<sup>3)13)14)</sup>. In practice, however, when a surgeon is confronted with a tracheal invasion at operation, there is a tendency to shave the tumor off the trachea and depends on adjuvant therapy such as radioactive iodine or external-beam radiotherapy for control of possible residual disease<sup>10)13)</sup>.

In our experience for this type of treatment, the treatment outcomes were disappointing. Only 4 of the 16 patients with cartilage shaving were alive without evidence of disease. Due to persistent or recurrent disease along the trachea or paratracheal space, the most common site of treatment failure was central compartment of the neck. This high

treatment failure rate may result from underestimation of the extent of diseases in complete resection and also from poor response to subsequent adjuvant treatment.

Most of these treatment failures are thought to be preventable because most of the invaded tracheal rings were considered to be amenable to resectional therapy at the time of initial surgery.

The results of retreatment with radioactive iodine, external-beam radiotherapy or salvage surgery were also disappointing. These unfavorable outcomes suggest that thyroid carcinoma with tracheal invasion is biologically more aggressive and histologically more dedifferentiated than ordinary well-differentiated carcinoma<sup>11)15)</sup>.

Therefore, we feel that the cartilage shaving procedure is inappropriate for control of tracheal cartilage invasion and more aggressive resectional therapy, rather than cartilage shaving, should be considered even for those patients with superficial invasion to increase the disease-free survival rate.

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