

## Clinical Significance of Combined Resection with Tracheobronchial Trees for Advanced Esophageal Cancers

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It was confirmed that combined resection of the trachea and the bronchus is feasible and available for advanced cancer patients on the basis of 9 patients of our clinical experience. However, meticulous postoperative cares are necessary for prevention of fatal outcome of postoperative complications.

Anatomical drawback of tracheobronchoplastic operation is able to be overcome in combination with the procedure of omentopexy which facilitates neovascularity to the reconstructed trachea and bronchus.

### Introduction

It is now accepted that refinement of surgical technique, development of absorbable suture material and enlightenment of intraoperative respiratory cases make it possible to perform an extensive operation of combined resection of the air way with the esophagus. However, surgical radicality is not infrequently impaired by difficulty in complete resection when involving adjacent organs for advanced cancer patients. It is presumed that grave operative insult brings a surgical immunodepressive state which tends to spread cancer extension and promote distant metastasis. At present a satisfactory result is not necessarily predicted by an extensive operation even though the full dosis of adjuvant chemotherapy had been prescribed in the postoperative course.

The purpose of this study is to clarify the significance of the combined resection of the trachea and the bronchus on the basis of a result of our clinical experiences.

### Patients

During the past 10 years from January 1980 to December 1989, 9 patients with advanced esophageal cancer underwent combined resection with the trachea and the bronchus. The combined resection with the trachea was done in 3 with the membranous portion in 3, with the carina in 1 and with main bronchus in 2, in whom one underwent

Patient profil				
Sex	Age	combined resection organ	op. method	surgical outcome
M	66	trachea and left main Br	Sleeve resection End to end anastomosis	24D death air leak (dehescence of anastomosis)
M	54	trachea	Sleeve resection of the trachea (3 rings) direct anastomosis	3D renal failure
M	65	right main Br	r-main bronchus sleeve resection and anastomosis	11 months local metastasis
M	54	trachea	Sleeve resection of the trachea (5 rings) direct anastomosis	3 months local metastasis
M	63	trachea	resection of the membranous portion	8 months local metastasis
M	64	trachea	resection of the membranous portion pericardial patch	7 months local metastasis
M	63	trachea	resection of the membranous portion	12 days air leak
M	52	trachea bifurcation	carina resection end to end and end to side anastomosis	5 months local metastasis
M	62	Ascending AO and left main bronchus	sleeve resection of aorta and left main Br	2 months bile peritonitis due to purulent cholecystitis

concomitantly the circumferential resection of the wall of the descending aorta and the sleeve resection of the left main bronchus.

Carcinomas of the esophagus in this series belonged to stage IV (A<sub>3</sub>N<sub>2</sub>M<sub>0</sub>) in all patients. The operative methods were the resection of the trachea of 3 rings in 2, 5 rings in 1 and the carina in 1, respectively. On the other hand, the

resection of the membranous portion and a patch plasty was applied in 3 and the sleeve resection of the main bronchus in 2.

Surgical outcome was apparently unsatisfactory. The cases of early deaths were due to renal failure in 1 on the third day of the operation and anastomosis insufficiency in 2 within 30 days after surgery. In addition, one expired of panperitonitis due to purulent cholangitis, reflecting a delay in early treatment. These early postoperative deaths directly related to surgery were associated with anastomosis insufficiency. It is a reflection of difficulty in wound healing at bronchial anastomosis in case that the trachea was simultaneously resected with the esophagus.

The other deaths were due to local recurrence and/or distant metastasis, reflecting the fact that carcinomas of the esophagus tended to metastasize to distant organs and/or to recur locally even though combined resection with the trachea and the bronchus had been carried out for far advanced carcinoma, stage IV (A<sub>3</sub>N<sub>2</sub>M<sub>0</sub>) without exception.

On the other hand, the patients who had overcome the postoperative crisis and complications enjoyed having a high quality of life without any respiratory distress such as dyspnea and bloody sputum as well as relief of dysphagea with the feeling of pleasant eating.

Nevertheless, a comfortable postoperative life had been interfered with local recurrence within one year after surgery.

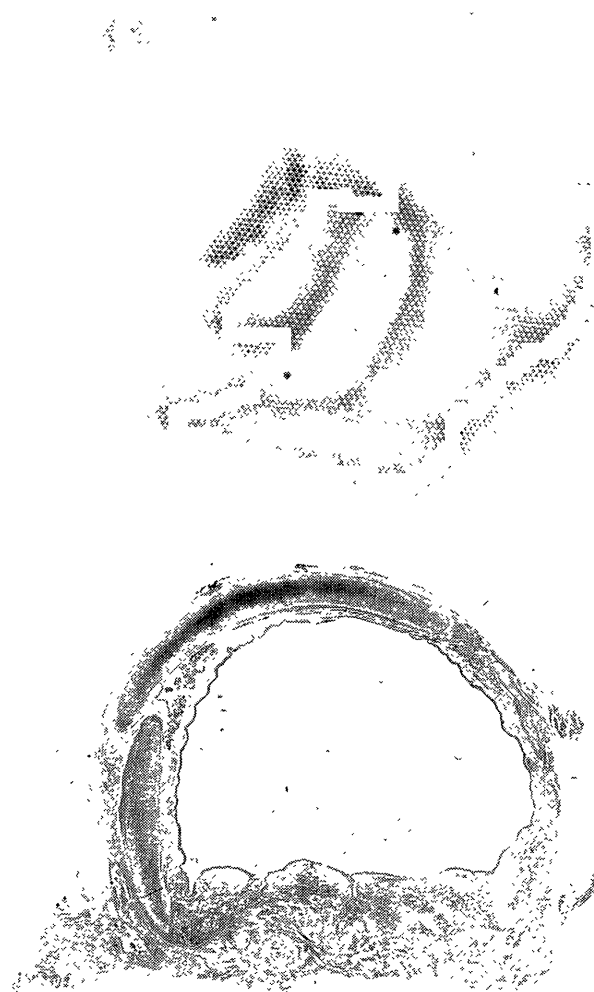
There is a limit of surgery for advanced carcinoma of the esophagus even though combined resection with adjacent involved organs had been attempted. Adjuvant therapy is required for improvement of the surgical outcome. In fact, it is very difficult to apply for clinical application of an effective and a sufficient full-course adjuvant therapy for patients who underwent a combined resection because of grave operative insult with a delay in recovery.

In this series, no patient received satisfactory full dosis of adjuvant therapy. The survivors of more than 6 months were the patients with less operative insult of patch plasty for the defect of the membranous portion of the trachea.

When involving the membranous portion of the trachea, cancer infiltration used to frequently reach the lateral wall of the trachea extending the membranous portion as shown in Fig. 1.

In this series, sleeve resection of the left main bronchus was performed. Fig. 2 showed the endoscopic finding with the elapse of time following surgery. On day 7, the anastomotic line was edematous but it looked like seeing a good healing. On day 14, edematous change at anastomosis had become manifest and the mucosa showed the ischemic appearance in dark red color. On day 21, anastomosis was completely detached and it was confirmed to happen to occur anastomosis dehescence. Three days later, massive hemoptysis abruptly occurred and he was suffocated in a moment.

From the experience with the patient of anastomotic

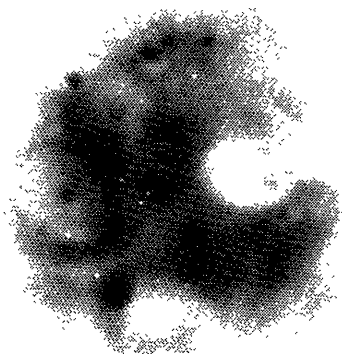


**Fig. 1.** (upper) endoscopic finding which shows involved membranous portion of the trachea  
(lower) histologic finding which involves the lateral wall extending the membranous portion.

dehiscence, bronchoplasty with esophagectomy is handicapped by impaired blood supply for wound healing at anastomosis.

Comparative study was performed with respect to recanalization of interrupted bronchial flow at bronchoplasty between with and without esophagectomies.

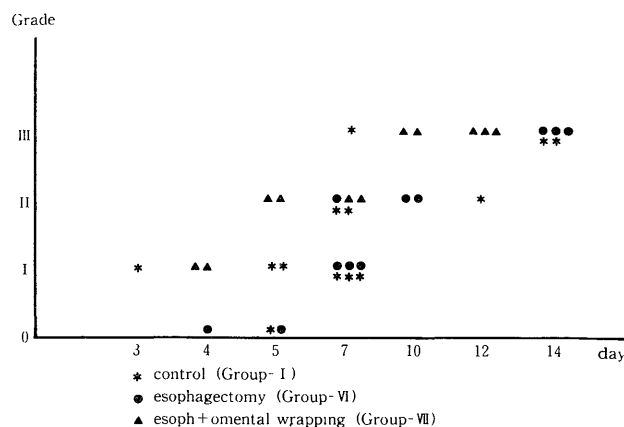
When bronchoplasty had been made, recanalization was seen on day 5 to 7 and completed on day 14 as shown in Fig. 3. In contrast, when bronchoplasty in combination with esophagectomy had been accomplished, delay in the start of recanalization was seen on day 7 to 10. Therefore, it was defined that concomitant esophagectomy with bronchoplasty retarded the start of recanalization of the bronchial arteries and ensued in ischemia at anastomosis for a considerably long time enough to result in anastomosis insuffi-



**Fig. 2.** Endoscopic finding in patients with anastomosis dehiscence  
 upper On day 7, demonstrates adematous anastomosis  
 middle On day 14, shows marked edematous change at anastomosis  
 lower On day 21, indicates detached anastomosis

ciency.

On the contrary, it was shown that omentopexy at anastomosis facilitates regeneration of the bronchial arteries and benefited from the improvement of the bronchial flow. Omentopexy is indispensable for a combined resection of



**Fig. 3.** Recanalization of interrupted bronchial arteries in comparison with concomittant esophagectomy and omentopexy

the esophagus with the trachea and the bronchus to make up with the impaired bronchial blood supply for preventing anastomosis insufficiency. It is emphasized that combined resection of the esophagus with the trachea and bronchus is clinically feasible. However, early postoperative complications were more often encountered on account of grave insult of surgery and impaired blood supply at bronchial anastomosis.

Meticulous postoperative care was mandatory. Less operative insult is of great value to reduce the frequency of postoperative complications and to prevent early postoperative deaths.

**Discussion**

Since 1680, the extensive operation for advanced esophageal cancer has become prevalent.<sup>1,2)</sup> However, it is a major item of concern to overcome grave surgical insult and the extensive operation as well as to manage operative complications.

With respect to a combined resection with the trachea, it is not accepted an extended operation has become prevalent in the field of the treatment of carcinoma of the esophagus. In contrast, sporadic successful reports have been reported since 1973.<sup>1)</sup>

It is well known that the nutritional blood supply of reconstructed trachea comprises of the branches of the inferior thyroid artery, the upper branches of the intercostal artery and lateral longitudinal anastomosis as reported by salassa<sup>3)</sup> et al. And also these arteries are distributed to the esophagus as the nutritional arteries. Therefore, the blood supply to the trachea was tremendously impaired when esophagectomy was concomittantly combined.

Recent studies have clarified that omentopexy is of great use in an increase in blood supply and in antiinflammatory effect on wrapped organs.

However, surgeons should be aware of advanced cancer patients who necessitate combined resection with the trachea and the bronchus. It is needless to say that the indication of this operation is limited to the selected patients.

There are many problems to extend the clinical use with a wide and safe expanse. On the basis of our clinical experience, it is concluded that combined resection with the trachea and the bronchus is clinically feasible and applicable whenever necessary. It is essential to manage scrupulous postoperative cares.

## References

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