

Intrathoracic Application of the Latissimus Dorsi Muscle for Esophageal Cancer Operation

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ABSTRACT: In order to reinforce the difficult closure of the bronchial stump, or esophageal anastomosis, a pedicle flap, taken from the latissimus dorsi muscle, was applied to 7 patients with tracheal repairs, and 11 patients with extensively dissected areas, at the time of esophageal cancer surgery. Utilizing this technique, the complications associated with extended esophagectomy could be minimized. Intrathoracic application of the latissimus dorsi muscle flap is a useful method of supporting extended esophagectomy for esophageal cancer.

KEY WORDS: esophageal cancer operation, latissimus dorsi muscle flap

Intrathoracic muscle transposition, to close a bronchopleural fistula, was first described in 1911 by Abrashanoff.¹ Since then, muscle flaps have been used to reinforce bronchial stump closures and to obliterate associated empyema cavities. More recently, this technique has been extended to reinforce anastomosis at the trachea,² esophagus,³ heart⁴ and great vessels.⁵ The purpose of this report is to describe the operative technique and to review our experience of the intrathoracic transposition of the latissimus dorsi muscle when used for esophageal cancer operation.

The latissimus dorsi muscle is utilized through a standard thoracotomy during the esophageal cancer operation (Fig. 1). Following the posterolateral skin incision, an additional longitudinal incision is made. A

muscle flap, 7 to 10 cm wide and 25 to 28 cm long, is then created. The bloodflow to this muscle is supplied by the thoracodorsal artery. The second or third rib, 5 cm in length, beside the pedicle of muscle flap, is resected, and the muscle flap introduced into the thoracic cavity through this space. The tracheal defect, or suture line, is covered by the inner side of the muscle flap which is fixed to the edge of the defect or suture line. Subsequently, the flap is placed around the posterior 2/3 to the entire trachea.

Between May, 1982 and June, 1984, intrathoracic transposition of the latissimus dorsi muscle was performed on 18 patients with esophageal cancers. The clinical experiences of intrathoracic application of the latissimus dorsi muscle are summarized in Fig. 2. In one patient with esophageal cancer, who underwent esophagectomy and combined resection of the trachea, 10 rings long, the latissimus dorsi muscle flap was applied to reinforce the tracheal anastomosis. In 2 patients, the flap was utilized to close the tracheal defect following partial resection of the tracheal membrane at the carina. The muscle flap was applied to another patient to

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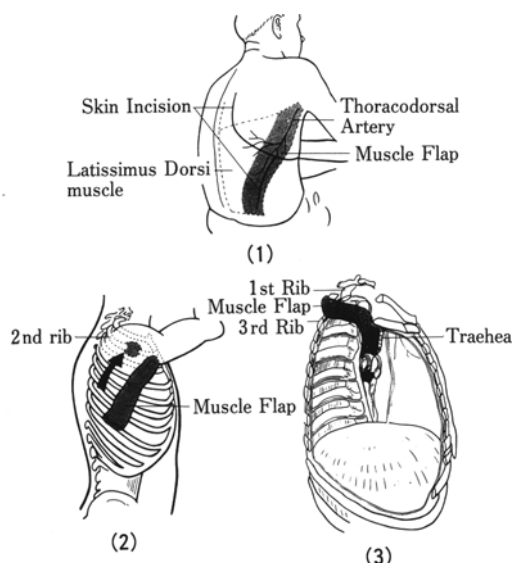


Fig. 1. Illustrations of intrathoracic transposition of the latissimus dorsi muscle. (1) Donor site of the latissimus dorsi muscle flap. The relation of the muscle flap to the thoracodorsal vessels and the skin incision is shown. (2) A small thoracotomy for muscle transfer. The second rib was partially resected (arrow). (3) Intrathoracic muscle transposition and muscle coverage around the trachea.

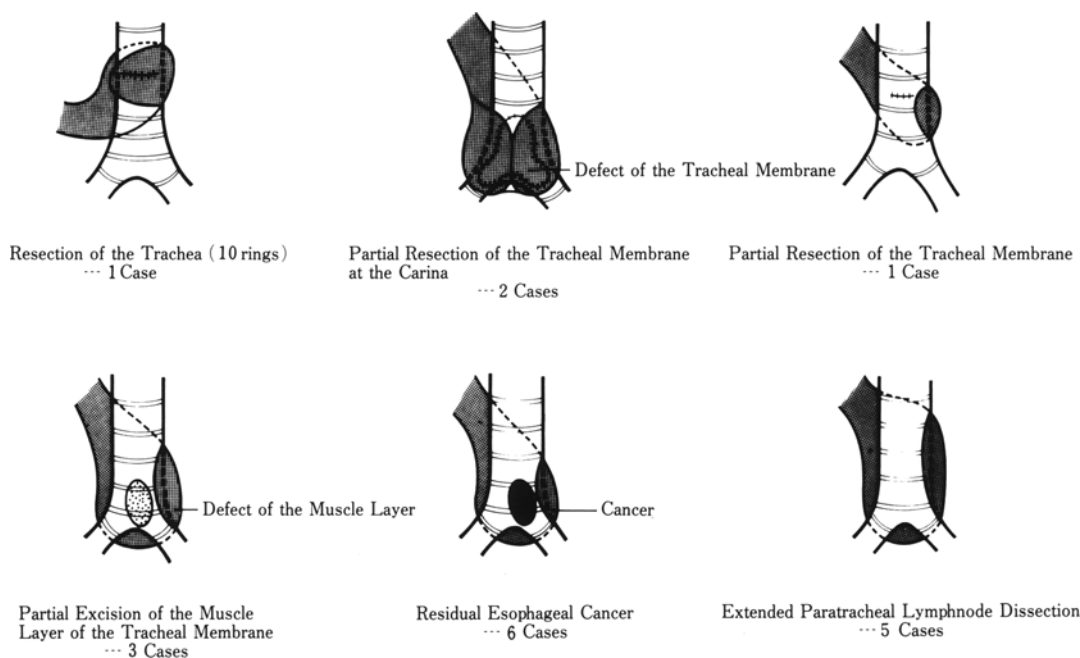


Fig. 2. Illustrations showing the method of intrathoracic applications of the latissimus dorsi muscle and the types and number of operations.

reinforce the suture line of the trachea following a partial resection of the tracheal membrane. In 3 patients, it was used to support the tracheal membrane following partial excision of its muscle layer. In 6

patients, following palliative esophagectomy, the flap was utilized to wrap the residual cancer tissue, where solid anti-cancer agents were placed. The muscle flaps were also utilized in 5 patients with upper thoracic

esophageal cancer, to support the tracheal membrane following extended paratracheal lymphnode dissection.

Leakage at the tracheobronchial anastomosis, or perforation of the tracheal wall, will become catastrophic once it occurs following esophagectomy. For this reason, we used the muscle flap coverage to reinforce the tracheal suture line following resection of the trachea, and to support the tracheal membrane following resection of the tracheal muscle layer, or extended paratracheal lymphnode dissection. It was also utilized to wrap the residual cancer together with anticancer agents in order to enhance the drug effect and to prevent pyothorax.

Although the latissimus dorsi muscle flap must be formed before the thoracotomy, this muscle can be transferred to anywhere in the mediastinum because of a single dominant vascular blood supply and a wide mobility. The size and shape of the muscle can be adjusted according to the requirements. In contradistinction to the latissimus dorsi, the pectoralis major muscle flap can be formed after thoracotomy. However, the disadvantage of the pectoralis major muscle flap is that it is limited in terms of length and mobility. The intercostal muscle flap can also be formed after thoracotomy, however, this muscle has the disadvantages that the blood

supply is poor and that the muscle volume is insufficient.

Based on the results of our experience, we concluded that the intrathoracic application of the latissimus dorsi muscle is a valuable technique for the combined resection of the tracheobronchial tree, or extended paratracheal lymphnode dissection during esophagectomy, in order to increase resectability and curability, or to prevent postoperative severe complications.

(Received for publication on Jan. 28, 1986)

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