

## BRIDGING OF ESOPHAGEAL DEFECT BY PEDICLED FLAP OF LUNG TISSUE\*

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GRAFTS OF LUNG TISSUE have been widely used for reinforcing sutures of the bronchial stump following lobectomy and pneumonectomy. In lobectomy, which as a rule is performed for benign lesions, preference is given to a pedicled flap. In pneumonectomy where the high level of bronchus dissection does not permit preservation of a pedicled flap, Churchill<sup>2</sup> was successful in securing the bronchial closure by a free graft of lung tissue taken from the periphery of the excised lung. The following case history will demonstrate that in surgery of the thoracic esophagus, lung tissue can be used for protecting critical areas in precisely the same way as omental grafts are used in abdominal surgery.

**Case Report:** A 56-year-old male patient was admitted to the Israel Zion Hospital with a brief history of esophageal obstruction. Roentgenographs (Fig. 1) revealed a half-moon shaped filling defect of the middle portion of the thoracic esophagus. Roentgenologic (Doctor Tolk) diagnosis was benign tumor, probably leiomyoma. Esophagoscopy (Doctor Silverstein) and biopsy revealed small ulcerations of the mucosa in the obstructed area. The impression of the endoscopist was also that of a submucous benign tumor.

At operation on June 20, 1947, the left thoracic cavity was entered through the bed of the 6th rib. A large tumor of the muscular sheath of the esophagus was found, extending from the inferior margin of the aortic arch to 2 inches below the level of the bifurcation. The tumor mass occupied the entire circumference of the esophagus. In order to expose and excise it, two segmental arteries arising from the descending aorta had to be severed. The muscle tube comprising the entire muscular wall of the esophagus was partly interwoven with and greatly thinned out by the tumor (Fig. 2). In order to insure radical removal, the entire muscular tube was removed with the neoplasm. Great care was taken not to pierce the mucosa, although at two points (apparently the areas from which the biopsy was taken) the remaining mucosal layer was extremely thin. After completion of the excision there remained a mucosal cylinder 10 cm. in length, deprived of its muscular sheath.

Since the vascular supply of this denuded area was probably insufficient because of the ligation of two segmental arteries and the scar formation in the mucosa, it was felt that the denuded area should be covered by viable tissue. Therefore, the adjacent upper segment of the lower lobe was mobilized and wrapped around this portion of the esophagus. A complete cover was thus obtained. The lung was fastened to the muscular sheath of the esophagus above and below the defect, in a manner demonstrated in the illustrations (Fig. 3). The phrenic nerve was crushed above the diaphragm, a rubber catheter inserted through a separate stab wound in the 9th intercostal space and the incision of the chest wall closed in layers. Microscopic examination of the specimen (Fig. 4) revealed leiomyoma.

Recovery was complicated by bronchitis and bronchopneumonia. There were at no time signs or symptoms of pleural or mediastinal infection. The intercostal drain was removed on the 3rd postoperative day and the sutures on the 10th day.

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## BRIDGING ESOPHAGEAL DEFECT

The patient was fed parenterally for the first five postoperative days, after which time he was permitted to swallow small sips of water. On the 7th postoperative day soft food was allowed, and on the 10th postoperative day, solid food.

Esophagograms taken 3 weeks after the operation revealed a normal delineation of the esophagus, with some bulging in the area where the tumor was formerly located (Fig. 5). This may have been due to the absence of the intrinsic esophageal musculature although the patient had no difficulty in swallowing.

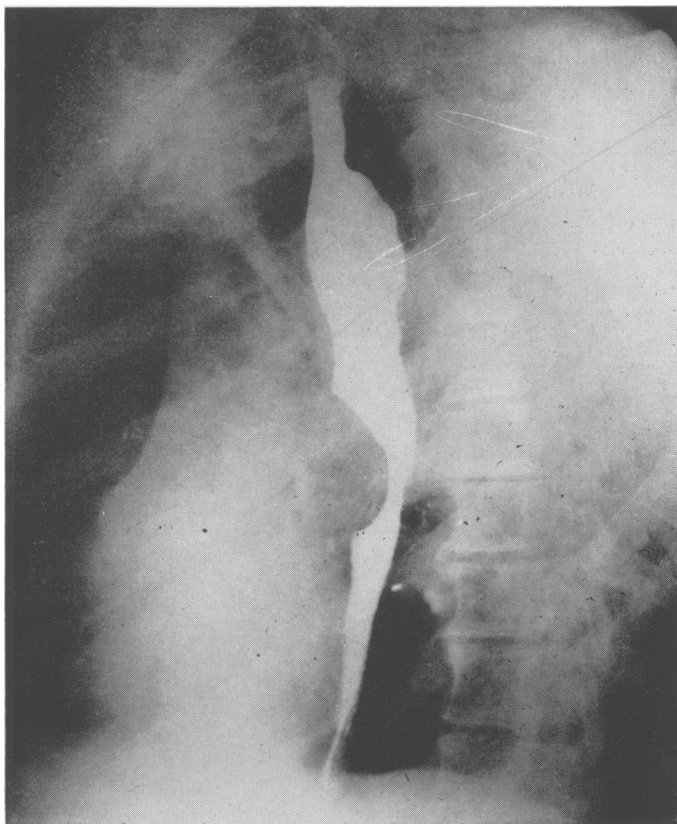


FIG. 1.—Large defect of the middle portion of the thoracic esophagus.

When seen 11 (eleven) months after operation the patient appeared to be in perfect condition. An esophagogram taken at this time was essentially the same as the previous one.

COMMENT. The choice of operation in this case was between esophagectomy and the plastic procedure described above. Allowing the denuded and poorly vascularized mucosa to remain without proper protection was hazardous because of the possibility of necrosis and perforation.

Esophagectomy was deemed inadvisable for the following reasons:

1. The risk of the operation would have been out of proportion to the benign character of the lesion.

2. Roentgen-ray pictures taken previous to the operation revealed a rather short stomach. It seemed questionable whether the entire length of the thoracic esophagus could be replaced by the mobilized stomach.

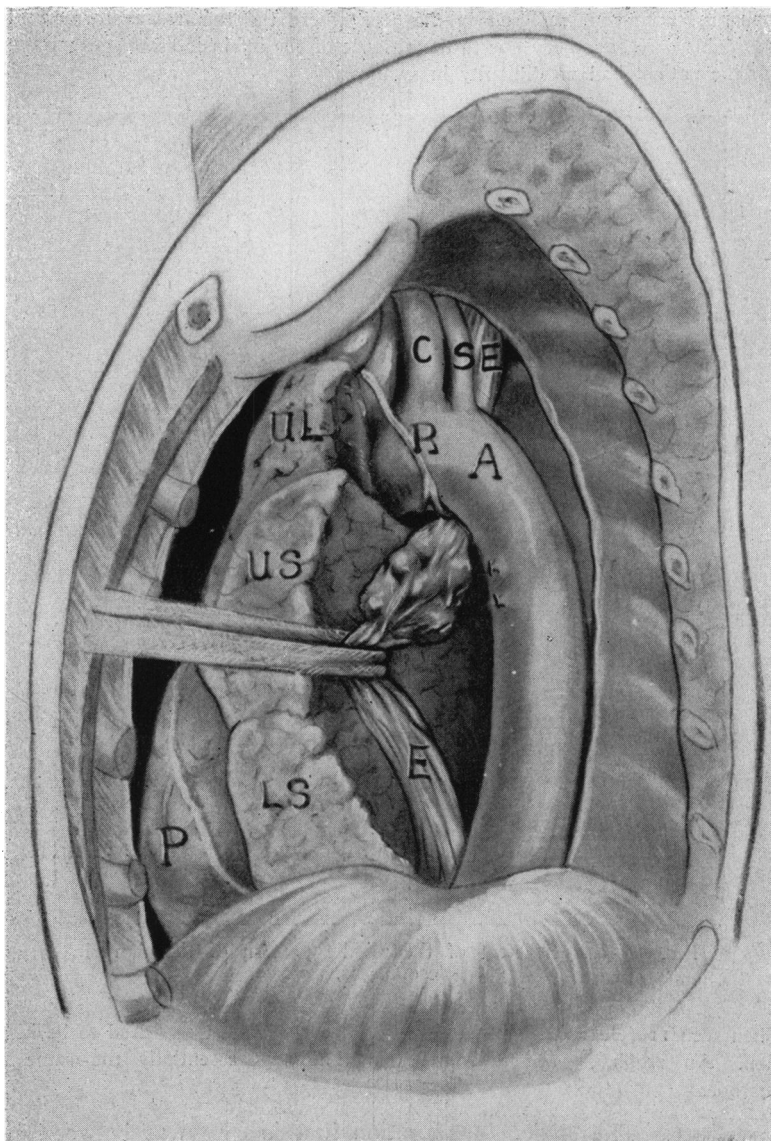


FIG. 2.—Sketch of the leiomyoma in situ.

- |                                 |                                   |
|---------------------------------|-----------------------------------|
| A. Aorta                        | LS. Lower Segment of Lower Lobe   |
| R. Recurrent Laryngeal Nerve    | P. Pericardium with Phrenic Nerve |
| UL. Upper Lobe                  | E. Esophagus                      |
| US. Upper Segment of Lower Lobe | C. Arteria Carotis comm. sin.     |
|                                 | S. Arteria Subclavia sin.         |

3. Intrathoracic displacement of the partly devascularized and denerated stomach is followed by well known functional disorders. These may

be disregarded in the presence of a carcinoma, but should be taken into account if removal of a benign lesion is planned.

In muscular or mucosal defects of the *lower* esophagus conditions are different. A pedicled flap taken from the diaphragm or a pedicled omental graft

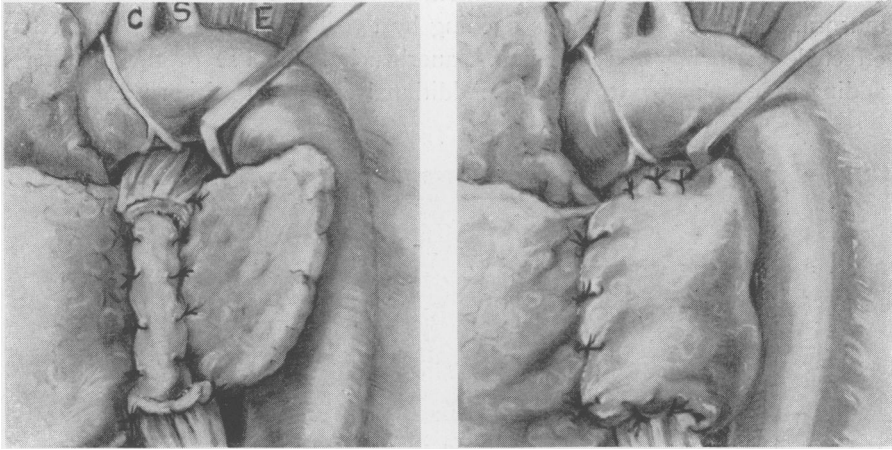


FIG. 3.—Sketch of the operative procedure. The denuded portion of the esophagus is covered by a pedicled flap of the upper segment of the lower lobe of the left lung.

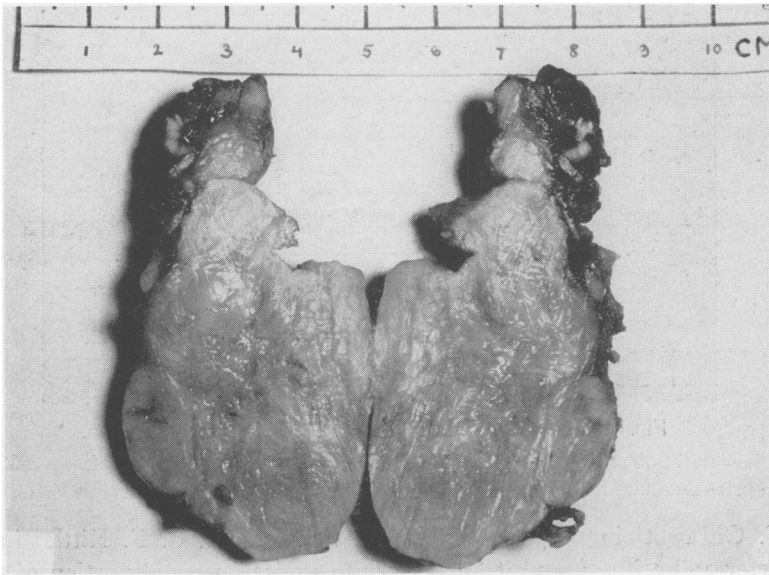


FIG. 4.—Photography of the specimen.

brought into the thoracic cavity through a small transdiaphragmatic laparotomy can be used to reinforce the esophageal wall. Excision of the lower esophagus, which is less hazardous than total esophagectomy may be considered in these cases. However, out of three cases of resection of the lower

esophagus for myoma of the cardio-esophageal region (S. W. Harrington and H. J. Moersch,<sup>3</sup> B. Dick<sup>7</sup> and R. C. Brock<sup>1</sup>), two died from pulmonary complications. Only Brock's case survived.

Simple excision of a leiomyoma of the lower esophagus was first performed by Sauerbruch<sup>5</sup> in 1932. At operation an accidental tear was made into the mucosa. Since closure of this opening by two layers of sutures would have effected narrowing of the lumen, Sauerbruch made use of the opening in adding an esophagogastrostomy. Additional cases of excision were reported

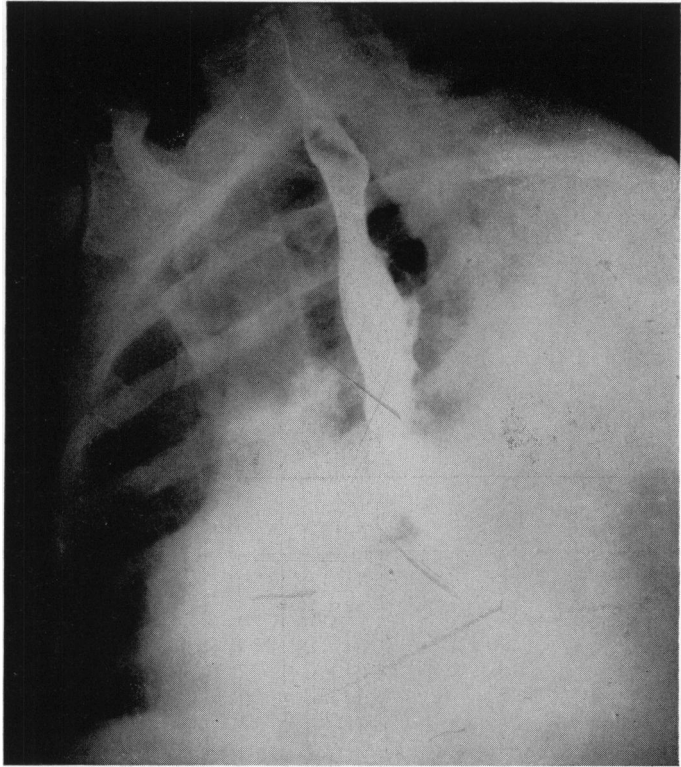


FIG. 5.—Esophagogram taken 3 weeks after the operation.

by T. Ohsawat<sup>4</sup> in 1933 and by P. W. Schafer and C. F. Kittle<sup>6</sup> in 1947. Schafer and Kittle found it "necessary to excise an ovoid portion of the left posterolateral wall measuring 3 by 7 cm. This defect was closed longitudinally by two rows of interrupted O chromic catgut sutures." In these patients, where simple excision of leiomyoma of the lower esophagus was performed, recovery was uneventful.

Our case appears to be the first surgically treated leiomyoma of the middle portion of the esophagus.

SUMMARY

An extensive muscular defect of the middle portion of the thoracic esophagus was covered by pedicled flap of lung tissue.

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