FIGURE 4. Twelve lead electrocardiogram taken on the third hospital day. Note mild ST elevation in LA, L3, and aVF; prominent and broad R waves in V2-V4; small but wide R wave in V1; marked ST depression in VI-V3. These findings suggest the presence of acute "true" posterior wall myocardial infarction with diaphragmatic extension. The possibility of severe anterior wall ischemia seems unlikely because of the prominent and wide R waves in the anterior precordial leads.

electrocardiogram after the ventricular tachycardia had been abolished. However, the supraventricular origin of the tachycardia was apparent from the QRS configuration (which was similar to the one during sinus rhythm). The association of atrial tachycardias with acute myocardial infarction is unusual. Mintz and Katz, and Vazifdar and Levine could not find a single case of paroxysmal atrial tachycardia in large series of patients with acute myocardial infarction. In the cases reviewed by Calleja and Conn the rare association between atrial tachycardia and acute coronary occlusion was mostly due to digitals and carried very high mortality. Since nodal tachycardias are not infrequent in acute myocardial infarction, a nodal origin might therefore be suggested in the present case.

The relationship between the two ectopic foci is of some interest. The ventricular tachycardia was probably not "parasystolic" since it always started with a fixed coupling interval (Fig 2), while the supraventricular focus was independent most of the time. In one instance, however, it seems that the rate of the latter was altered as a result of a retrograde conducted ventricular impulse (Fig 3).

REFERENCES
4 Freiermuth LJ, Jick S: Paroxysmal atrial tachycardia with atrioventricular block. Amer J Cardiol 1:584-591, 1958
5 Schott A: Various arrhythmias due to digitalis intoxication recorded in the same patient in the course of one month. Dis Chest 38:585, 1960

Reprint requests: Dr. Elieser Kaplinsky, Heart Institute, Tel Hashomer Hospital, Israel

Giant Leiomyoma of the Esophagus and Cardia Weighing More Than 1,000 Grams*

Toshiharu Tsuzuki, M.D.;** Teruo Kakegawa, M.D., F.C.C.P.;** Masaki Arimori, M.D.;** Masaaki Ueda, M.D.;** Hiroshi Watanabe, M.D.;** Tetsuhiko Okamoto, M.D.;** and Ichiro Akakura, M.D., F.C.C.P.†

A patient with giant leiomyoma of the esophagus and cardia (weighing 1,160 gm) and esophageal hiatal hernia, is presented. Through thoraco-abdominal approach, successful resection was performed. This is the third heaviest leiomyoma of the esophagus so far reported in the worldwide literature.

*From the Keio University School of Medicine, Tokyo, Japan.
**Department of Surgery, Keio University School of Medicine.
†Professor of Surgery, Keio University School of Medicine.

CHEST, VOL. 60, NO. 4, OCTOBER 1971
GIANT LEIOMYOMA OF ESOPHAGUS

Although reports of successful resection of leiomyoma of the esophagus are encountered with increasing frequency, reports of giant tumors weighing more than 1,000 gm are rarely noted in literature. These tumors present many problems in comparison with small intramural tumors. This report concerns the successful resection of giant leiomyoma (weighing more than 1,000 gm) of the esophagus and cardia combined with an esophageal hiatal hernia.

CASE REPORT

A 19-year-old girl was admitted to the Keio University Hospital on February 11, 1969, with the chief complaint of dysphagia of five years' duration.

Physical examination showed normal findings except faint breath sound on the right side of the thorax.

Laboratory examination revealed anemia with the hemoglobin value 9.9 gm/100 ml and the red cell count 4.5 x 10^6 cu mm in the peripheral blood. Occult bleeding in the feces was strongly positive with the guaiac test and suggested the presence of gastrointestinal bleeding. X-ray film of the chest showed a shadow occupying most of the right pleural cavity. X-ray film in the right anterior chest revealed that the mass was situated in the posterior part of the pleural cavity. Bronchography demonstrated the abrupt interruption of B₉ with the incomplete filling of B₁₀. Bronchoscopy revealed the trachea and bronchi compressed from the posterior. Pulmonary function test revealed decreased vital capacity and maximal breathing capacity, each showing 69 percent and 58 percent of predicted value. Radiologic examination of the esophagus demonstrated dilated and tortuous esophagus with esophageal hiatal hernia. A niche was observed in the herniated stomach (Fig 1). On fluoroscopy primary peristalsis of the esophagus disappeared at the level of the clavicle, and the methacholine (Mecholy1) test was negative. Esophagoscopy disclosed a dilated esophageal lumen with an extrinsic tumor compressing the esophageal lumen from the outside 3 cm below the upper incisor. The histologic examination of the biopsy specimen showed normal squamous epithelium.

The diagnosis of submucosal tumor, possibly a leiomyoma, of the esophagus and cardia combined with esophageal hiatal hernia was made and operation was performed on April 8, 1969. Under endotracheal general anesthesia with halothane (Fluothane), right standard thoracotomy was performed. A large tumor, approximately the size of a child's head, bulged into the right pleural cavity from the mediastinum. The tumor was elastic, hard in consistency and circumscribed. There were no findings indicating infiltration to the surrounding structures. The tumor extended from the esophageal hiatus to the level 2 cm above the azygos vein. The esophagus was transected 3 cm apart from the upper border of the tumor with mobilization of the tumor along the entire length of the esophagus. Then the chest was closed.

On laparotomy it was found that one-fifth of the upper part of the stomach was incarcerated into the mediastinum. The tumor was so huge that it was necessary to enlarge the esophageal hiatus in order to extract the tumor into the abdominal cavity. Because of the extensive involvement of the tumor in the esophagus and cardia, enucleation was not possible. Therefore, one-fourth of the upper part of the stomach with the esophagus was resected and the remaining stomach was fashioned into the gastric tube. The gastric tube was pulled up through retrosternal tunnel and esophagogastrostomy was performed in the neck.

The resected specimen weighed 1,160 gm (Fig 2). Histologic examination of the tumor showed a typical picture of leiomyoma (Fig 3). There was no sign of malignancy in the lymph node resected from the mediastinum near the azygos vein.

The postoperative course was uneventful and the patient was discharged 40 days after the operation. One year later the patient is healthy and free from any swallowing difficulty.

DISCUSSION

With progress in esophageal surgery, a number of reports of successful resection of leiomyoma of the esophagus have appeared in literature. However, the majority of reports concern relatively small tumors that are easily removed by simple enucleation. Giant tumors weighing more than 1,000 gm are not frequent and only three authors have reported the successful removal of such tumors: namely, the cases of Schmidt et al,1 Kenny2 and Frank and associates,3 in which the tumors weighed 1,080 gm, 1,420 gm, and 5,000 gm respectively.

Giant tumors present many problems that are not shared with small tumors.

Other disease may present a similar appearance. The x-ray film showing the elongated esophagus with dilatation resembles that of achalasia in the advanced stage. Ellis and Olsen4 reported similar x-ray film findings in their monograph. Kenny2 reported the successful resection of giant leiomyoma of the esophagus and cardia combined with esophageal hiatal hernia, which had been diagnosed preoperatively as congenital short esophagus with diaphragmatic hernia, stricture and cardio-

CHEST, VOL. 60, NO. 4, OCTOBER 1971
figure shows very frequent occurrence in comparison with the rate of esophageal hiatus hernia of less than 0.1 percent of the general population. There is some controversy concerning the causal relationship of the two conditions. It is assumed that the esophageal hiatus hernia seems to predispose the formation of smooth muscle tumors at the lower third of the esophagus. On the other hand there is a possibility that the leiomyoma involving the lower esophagus causes the esophageal hiatus hernia by pulling up the cardiac portion of the stomach above the diaphragm.

Concerning the coexistence of the leiomyoma at both the lower part of the esophagus and cardiac portion of the stomach, Storey and Adams\(^5\) presented the frequency of 13.1 percent of 80 cases of their collected series. Tumors of this type are hard to enucleate and are usually treated by esophagogastrectomy.

Although Schmidt and co-workers\(^1\) reported successful enucleation of a giant leiomyoma weighing 1,080 gm, giant leiomyoma is usually treated by esophagectomy followed by esophageal reconstruction. Since the tumors are so huge, it is not unusual to open the contralateral pleural cavity intentionally or accidentally in order to resect the esophagus containing the tumor. Bilateral thoracotomy requires meticulous care in the postoperative period. Leaking anastomosis is another problem which may occur when the esophagogastrectomy is performed. The cause of leaking anastomosis seems to be the dilated and edematous esophagus as a result of chronic obstruction. Kenny\(^2\) reported that he found leaking anastomosis on the eighth postoperative day. Aigerg\(^7\) noticed leakage at the esophagogastrostomy performed at the right pleural cavity on the seventh postoperative day after he resected a giant tumor measuring 13 x 10 x 1.5 cm. Leaking anastomosis at the pleural cavity causes empyema which will lead to fatal outcome. Therefore, it is our opinion that the anastomosis should be performed outside the pleural cavity as shown in our case.

Although the histologic examination revealed the typical picture of leiomyoma without the findings of malignancy including the adjacent lymph node, it has been maintained that metastasis occurred after the resection of a giant tumor with the histologic diagnosis of leiomyoma of the stomach.\(^8\) According to this theory, there is a possibility that our case will have recurrence of tumor in the future. However, there is no sign of recurrence to date.

REFERENCES

4 Ellis FH, Olsen AM: Achalasia of the Esophagus. Phila-

---

**FIGURE 2.** Photograph of the resected specimen. The tumor is composed of upper and lower parts which are connected to each other with the intervening flat part. The upper part is a flat tumor marked "esophagus" in this photograph. The lower part extends from the lower part of the esophagus to the stomach across the esophagogastric junction. The arrow indicates the esophagogastric junction in this photograph. An ulcer is visible on the lesser curvature (left side in this photograph).

**FIGURE 3.** Photomicrograph of the tumor. Note the interlaced fascicular bundle of myofibrils. The cells are round or oval in shape without the findings of pleomorphism. The nuclei are oval and present no atypism. Hematoxylin and eosin; x 140.
FATAL PULMONARY EDEMA AND PNEUMONITIS

Pneumonitis After Reexpansion of Chronic Pneumothorax*

Richard D. Sautter, M.D.;‡** William H. Dreher, M.D.;†
John H. Moclndoe, M.D.;§ William O. Myers, M.D.;** and
George E. Magnin, M.D.§

In some instances, the reexpansion of a chronic pneumothorax results in pulmonary edema and, in the case presented, resulted in a fatality. The exact mechanism is unknown; however, the condition seems to be associated with (1) the chronic collapse of an entire lung, (2) sudden re-expansion of the lung, and (3) edema involving the chronically collapsed lung. Hypoxia was the cause of the patient's death and is related to perfusion of a lung without gaseous exchange. This condition can be treated by allowing the pneumothorax to recur or reducing perfusion of the involved lung by means of a balloon catheter placed in the pulmonary artery.

Treatment of a near complete pneumothorax by closed thoracotomy has in our hands been completely satisfactory in more than 100 patients with one recent exception. An elderly patient with chronic cardiopulmonary disorders suffered acute, predominantly unilateral, pulmonary edema following reexpansion and died.

TECHNIQUE

Our standard technique consists of introducing a trocar through the second intercostal space of the affected pleural cavity and inserting an 18-French rubber catheter through the second intercostal space of the affected lung, and, in so doing, carries the catheter to the apex of the pleural space.

*From the Marshfield Clinic and the Marshfield Clinic Foundation for Medical Research and Education, Marshfield, Wisconsin.
**Department of Thoracic and Cardiovascular Surgery, Marshfield Clinic, Marshfield, Wisconsin.
†Resident, Internal Medicine, University of Wisconsin Medical School, Madison (Marshfield Teaching Service).
‡Intern, Internal Medicine, University of Wisconsin Medical School, Madison (Marshfield Teaching Service).
§Department of Medicine, Marshfield Clinic, and Director, University of Wisconsin Department of Medicine Teaching Service, Marshfield.

Reprint requests: Dr. Tsuzuki, Department of Surgery, Keio University Hospital, 35 Shinanomachi, Shinjuku-ku, Tokyo, Japan

FATAL PULMONARY EDEMA AND PNEUMONITIS

8 Masley PM: Leiomyosarcoma of the stomach. A review of ten cases. Amer J Digest Dis 4:792, 1959

CHEST, VOL. 60, NO. 4, OCTOBER 1971

FIGURE 1. Roentgenogram of the chest showing right pneumothorax.

the most desirable position. Then suction of about 20 to 25 cm of water is maintained to the intercostal tube.

CASE REPORT

A 69-year-old man suffered spontaneous pneumothorax June 13, 1969. Initial treatment was expectant, but reexpansion did not occur. The patient entered his local hospital for a short time, during which period 500 ml of air was aspirated from the right pleural space. Improvement was brief, but progressive shortness of breath prompted referral to us and admission to St. Joseph's Hospital, Marshfield, Wisconsin on September 3, 1969. A chest film immediately afterward confirmed this mild obstructive deficit of the airway. The patient had smoked cigarettes since he was nine years old but had not smoked for the past 18 years.

The physical findings on admission included mild distention of the neck veins while the patient sat upright, lack of breath sounds over the right chest, grade III diastolic murmur heard best in the third and fourth intercostal space, and pretibial edema (+1) of both ankles. The pulse was 72 beats per minute. The blood pressure was 150/60. The patient was not cyanotic. He was moderately dyspneic but not uncomfortable. Mild congestion was thought to be present.

A chest film (Fig 1) revealed nearly complete right pneumothorax.

As a precaution, oxygen was given by nasal catheter throughout the night. At noon the next day, closed thoracotomy promptly reexpanded the right lung, and a chest film (Fig 2) immediately afterward confirmed this.

Little more than one hour later, the patient was cyanotic and in respiratory distress. Pulse rate was 120, and blood pressure...