Leiomyosarcoma of the Esophagus: *

Review of the Literature and Report of Two Cases

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SINCE leiomyosarcoma of the esophagus is a rare neoplasm and its natural history differs from that of the more often encountered carcinoma, we believe that a review of the literature and the report of two additional cases would be of interest.

In a review of 935 cases of malignant esophageal neoplasms Jackson [8] found only seven sarcomas. According to Thorek and Neimann [21] the commonest sarcoma of the esophagus is a fibrosarcoma, and only eight of 58 collected cases were leiomyosarcomas. The first case of esophageal leiomyosarcoma was reported by Howard, in 1902.[7] In the latest review of leiomyosarcoma of the esophagus in 1958, Martin and Grisamore [12] collected 19 cases from the literature and added one case of their own. Four of this series were cited from Johnston *et al.*[9] and upon careful scrutiny we found that two were the same cases reported by Harrington.[6] Furthermore, Case No. A361, reported in 1949,[3] and the case of Ovens and Russell, reported in 1951,[17] are obviously the same patient. The case reported by Piaggio Blanco [19] was a fibrosarcoma. This leaves 16 bona fide cases of leiomyosarcoma in Martin and Grisamore's series. The case reported by Bauer,[2] in 1917, cited by Johnston *et al.*,[9] was really an esophageal leiomyoma. Search of the literature yielded reports of three other cases of leiomyosarcoma of the esophagus, one by Michaud,[15] in 1951, one by Resano and Hojman,[20] in 1952 and one by Badosa Gaspar and Lopez Fernandez Boado,[1] in 1953. Thus, with these deletions and additions, 19 cases of leiomyosarcoma have been collected to date. Only eight of these reported lesions have been removed.

We have encountered two leiomyosarcomas of the esophagus both of which were removed. One of these patients had a squamous cell carcinoma of the esophagus as well as the leiomyosarcoma. The simultaneous appearance of these two lesions in the esophagus has been previously reported by Ovens and Russell, in 1951.[17] Summaries of our two cases follow.

Case Reports

Case 1. A 69-year-old white woman had had difficulty in swallowing food for about 10 weeks. The dysphagia had progressed until she had difficulty swallowing liquids. She had lost about 20 pounds of weight before consulting her physician. She was admitted to another hospital where a barium swallow examination disclosed a defect in the upper third of the esophagus. Esophagoscopy and biopsy revealed a malignant esophageal tumor. She was transferred to the Jefferson Medical College Hospital on October 23, 1949. The past medical history and systemic review were noncontributory. The physical examination revealed nothing abnormal except evidence of malnourishment. Routine laboratory examinations were within normal limits. An x-ray of the chest revealed a mass in the right upper mediastinum which displaced the trachea forward. When barium was swallowed, the mass was seen to be a tumor of the esophagus located just above the

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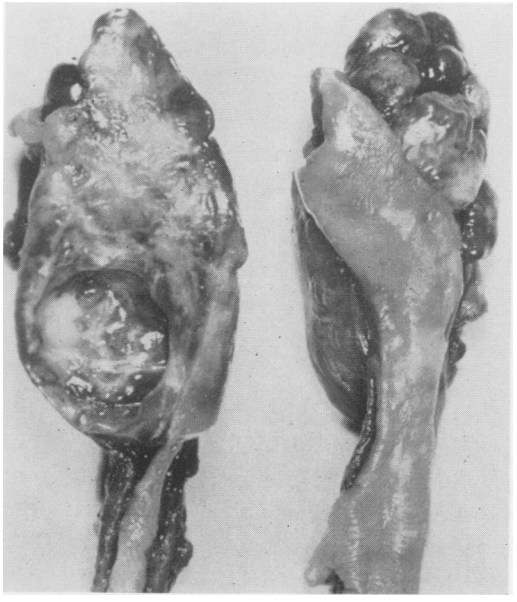

FIG. 1. The gross specimen from Case 1. The polypoid nature of the leiomyosarcoma and area of ulceration of the esophageal mucosa are evident.

aortic arch. A large gallstone in the gallbladder and a staghorn calculus in the right kidney were visualized by further x-rays. Esophagoscopy was repeated and demonstrated a very large nodular tumor arising in the upper third of the esophagus and almost completely obstructing the lumen. Histologic examination of several biopsy specimens revealed a leiomyosarcoma.

The patient was operated upon on October 31, 1949. A partial esophagectomy and cervical esophago-gastrostomy were performed. The patient recovered from the operation without complications.

The resected segment of the esophagus was 16 cm. in length. The large, firm egg-shaped tumor measured $9 \times 4.9 \times 3.7$ cm. The surface of the lesion was fungating and hemorrhagic with a variegated red, white, and yellow appearance. Cut section revealed irregular interlacing fine white fibrils with abundant hemorrhagic foci and occasional small yellow nodules. A few small cystic spaces were present. There was one large cystic space, 3 cm. in diameter which was filled with blood. The tumor had eroded the mucosa over an area of approximately 5.5×4 cm. The remainder of its bulk was in the wall of the esophagus extending beneath the mucosa, causing marked bulging (Fig. 1).

Histologically, the tumor was made up of interlacing bundles of smooth muscle fibers. In some fields, their nuclei were regular, elongated, with blunted ends. In others, the smooth muscle cells showed large, hyperchromatic nuclei, with bizarre forms and a high rate of mitoses, some of them atypical. Areas of degeneration and hemorrhage with ulceration of overlying mucosa were present. The diagnosis was leiomyosarcoma (Fig. 2). The patient was followed for a period of six years and nine months until she died at home of unknown cause. No autopsy was obtained.

Case 2. This 54-year-old white man had had difficulty in swallowing and a substernal burning sensation for three to four months. He had lost 18 pounds in weight over this period. At another hospital, a barium swallow examination revealed a filling defect in the middle third of the esophagus. Esophagoscopy confirmed the presence of a tumor, the biopsy of which was reported as leiomyosarcoma. On January 30, 1959, he was transferred to the Jefferson Medical College Hospital. The past medical history and systemic review were non-contributory. The patient appeared emaciated and chronically ill. The liver edge was palpable 3 to 4 cm. below the right costal margin and felt soft and smooth. The spleen was not palpable. Examination of the extremities revealed pre-tibial edema. Routine laboratory studies were normal except for an

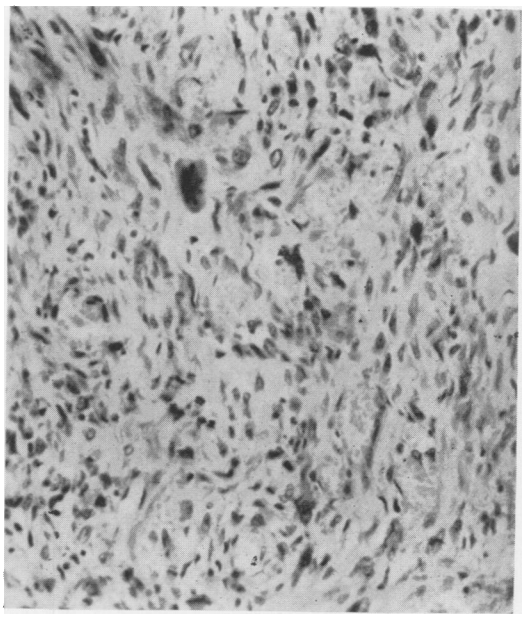

FIG. 2. Histologic section of the leiomyosarcoma in Case 1. The interlacing bundles of smooth muscle fibers, the irregular, hyperchromatic nuclei and the frequent mitoses can be seen.

electrophoretogram that revealed a total serum protein of 5.1 Gm.% with albumin 1.8 Gm.% and globulin 3.3 Gm.%. The hypoproteinemia was thought to be the result of malnutrition. Five hundred ml. of blood and 50 Gm. of salt free serum albumin were given preoperatively to the patient with a resultant rise in serum albumin to 3.19 Gm.%.

The patient was operated upon on February 9, 1959. The left pleural cavity was entered through the bed of the sixth rib. Small posterior segments of the fifth and seventh ribs were resected to provide additional exposure. On exploration the liver was found to be enlarged but normal in appearance. A small wedge of liver was removed for histologic examination. The lower half of the esophagus was removed and an esophagogastrostomy performed just cephalad to the aortic arch. There were no postoperative complications and the patient was discharged on February 23, 1959.

The specimen of esophagus measured 7 cm. in length. It contained a pedunculated, ovoid tumor 6 cm. in length along the longitudinal axis, 3.5 cm. in width and elevated 2.5 cm. above the mucosal surface. The tumor was hemorrhagic and nodular in appearance (Fig. 3, 4).

Histologically, the tumor was formed of cords of fibers with elongated, blunt ended nuclei,

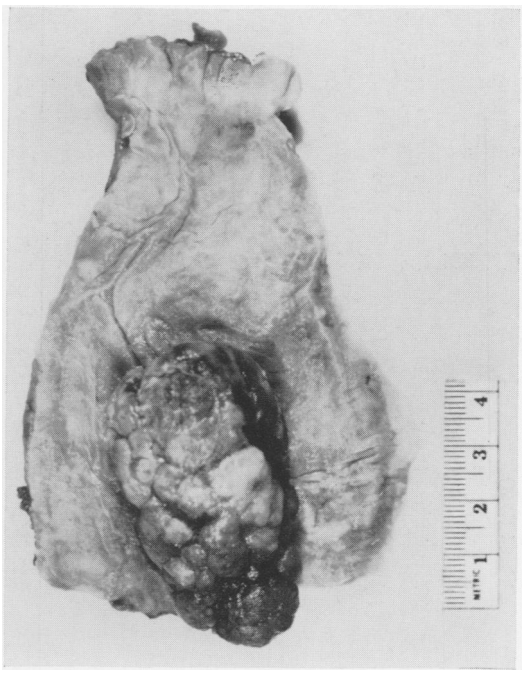

FIG. 3. The gross specimen from Case 2.

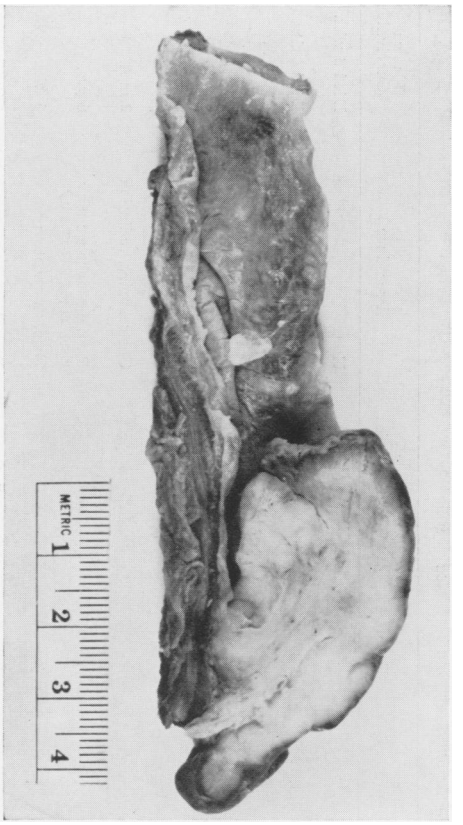

FIG. 4. A sagittal section of the gross specimen from Case 2. The pedunculated tumor is well demonstrated.

characteristic of smooth muscle cells. Masson's Trichrome Stain confirmed the diagnosis of smooth muscle tumor.

The leiomyocytes were well differentiated but more than occasional mitoses were present. The epithelium overlying the tumor showed complete loss of normal stratification. The squamous cells had large, irregular hyperchromatic nuclei and areas of superficial invasion were present. The diagnosis was leiomyosarcoma of the esophagus with a concomitant squamous cell carcinoma (Fig. 5). Three of 13 periesophageal lymph nodes were involved by metastasis from the leiomyosarcoma. The biopsy of the hepatic tissue was histologically normal in appearance.

On March 7, 1959, the patient was readmitted to the Jefferson Medical College Hospital with a bronchopneumonia of the left lower lobe of the lung. He also had a small subcutaneous abscess in the thoracotomy scar. The abscess was drained and healed promptly. Appropriate antibiotic therapy resulted in resolution of the broncho-

TABLE 1. *Cases of Leiomyosarcoma Reported*

Case No.	Author and Year	Age, Sex	Symptoms	Duration	Location	Gross Characteristics	Procedure	Known Survival
1.	Howard (1902)	51 M	Dysphagia	Sev. wks.	Lower third	Infiltrating	None	Died 3 wks.
2.	von Hacker (1908)	70 M	"	8 das.	" "	Polypoid	None	Died 5 das.
3.	Mallory (1935)	61 M	Regurgitation	10 yrs.	" "	Infiltrating	Exploratory laparotomy	Died 1 da.
4.	Menne and Birge (1937)	38 M	Dysphagia	7 yrs.	Upper third	"	Gastrostomy, radiation	3 mos.
5.	French and Garland (1941)	70 M	"	2 mos.	Lower third	Polypoid	None	6 mos.
6.	Pennes (1942)	53 M	"	6 mos.	Middle third	Infiltrating	Gastrostomy, radiation	2 mos.
7.	Harrington (1949)	60 F	Dysphagia Pain	1 yr.	Lower third	Polypoid	Partial esophagectomy Esophagogastrostomy	6 yrs.
8.	Harrington (1949)	60 F	Dysphagia	3 wks.	" "	"	Expl. thoracotomy	6 wks.
9.	Ovens and Russell (1951)	56 F	"	8 mos.	" "	"	Partial esophagectomy Esophagogastrostomy	25 mos.
10.	Lyons and Garlock (1951)	58 F	"	1 yr.	Middle third	"	Partial esophagectomy Esophagogastrostomy	7 yrs.
11.	Michaud (1951)	50 M	"	2 mos.	Lower third	Infiltrating	Partial esophagectomy Esophagogastrostomy	2 mos.
12.	Resano and Hojman (1952)	50 M	"	1 mo.	Upper third	Polypoid	Partial esophagectomy Esophagogastrostomy	Recov.
13.	Neil and Horne (1953)	54 M	Dysphagia Hoarseness	1 mo.	" "	"	Gastrostomy	Died 3 wks.
14.	Johnston *et al.* (1953)	64 M	Dysphagia	2 yrs.	Middle third	Infiltrating	Perforated esophagus Drainage of abscess	Died 1 wk.
15.	Johnston *et al.* (1953)	60 F	"	1 yr.	Upper third	"	None	?
16.	Badosa Gaspar and Boado (1953)	46 M	Dysphagia; retrosternal pain	6 mos.	Middle third	"	Partial esophagectomy Esophagogastrostomy	Died 6 das.
17.	Lipschultz and Fisher (1954)	32 M	Sore throat	2 wks.	Upper third	"	None	Died 2 wks.
18.	Creech *et al.* (1955)	62 M	Dysphagia	3 mos.	Middle third	Polypoid	Partial esophagectomy Esophagogastrostomy	3 mos.
19.	Martin and Grisamore (1958)	75 F	Dysphagia; respiratory obst.	1 yr.	Upper third	"	Local excision	22 mos.
20.	Camishion *et al.* (1960)	67 F	Dysphagia	3 wks.	" "	"	Partial esophagectomy Esophagogastrostomy	Died 6¾ yrs.
21.	Camishion *et al.* (1960)	54 M	Dysphagia: substernal burning	4 mos.	Middle third	"	Partial esophagectomy Esophagogastrostomy	Died 8 mos.

pneumonia and the patient was discharged on April 19, 1959. He was followed until he died on September 21, 1959, after developing severe headaches and neurologic symptoms suggestive of cerebral metastasis.

Discussion

Sarcomas may arise from any of the mesenchymal tissues which form the wall of the esophagus. Each sarcoma has a benign counterpart, but to prove that the malignant tumor arose from a previously benign lesion is most difficult. Leiomyosarcoma is a very rare type of esophageal lesion despite the fact that the leiomyoma is probably the most common benign tumor encountered in this location. It is interesting that seven of the reported leiomyosarcomas occurred in the upper third of the esophagus where striated muscle is present. Of the remaining 14 cases, eight were located in the lower third and six in the middle third of the esophagus (Table 1). Grossly, the tumors are either infiltrating or pedunculated. Apparently, these characteristics are of no significance as resection of either type has resulted in long-term survival.

The lesion was found twice as commonly in men as in women. All five long-term survivors have been women. The commonest symptom reported has been dysphagia. Other less common complaints have been retrosternal pain or burning, regurgitation, hoarseness, and sore throat. The lesion was visualized in all cases either by a barium swallow x-ray examination or by esophagoscopy. However, the only method of determining that the tumor was a leiomyosarcoma was by biopsy.

Occasionally, the mucosa is intact over the tumor and biopsy during esophagoscopy may be hazardous because of the possibility of perforation of the esophagus or of hemorrhage which may be difficult to control. If the diagnosis is not obtained preoperatively, it is justifiable to biopsy the lesion at time of operation since leiomyoma is a common benign tumor of the esophagus and may be treated by simple enucleation.

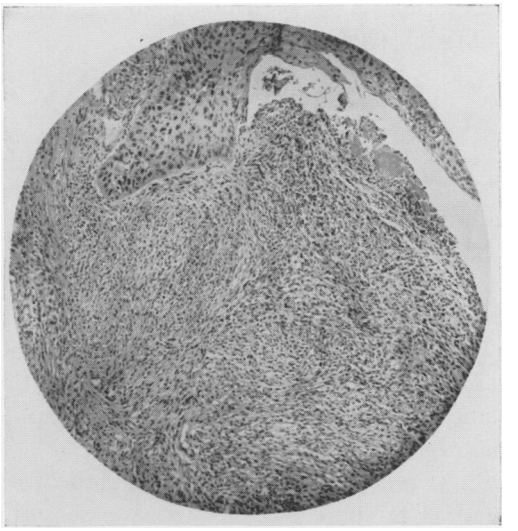

FIG. 5. On the left, the squamous-cell carcinoma can be seen. The remainder of the specimen illustrates the typical interlacing smooth muscle bundles. Atypical nuclei and frequent mitoses are present.

Once the diagnosis of leiomyosarcoma of the esophagus is made, the tumor should be removed radically by esophagectomy. Lyons and Garlock erroneously reported in 1951,[11] that they had performed the first successful resection of a leiomyosarcoma of the esophagus in 1946. The first successful resection of a leiomyosarcoma of the esophagus had been performed by Harrington in 1945 and reported in 1949.[6] This patient survived for at least six years. Continuity of the alimentary tract may be restored by esophago-gastrostomy or by interposing a segment of gut between the remaining esophagus and the stomach. Unless distant metastasis is present, the prognosis in this disease seems to be better than for carcinoma of the esophagus. The tumors were removed from ten of the patients listed in Table 1. At least five of the ten patients were long term survivors. Resection of the primary lesion in the presence of metastasis seems justified since

the tumor is slow growing and excellent palliation should be obtained.

Summary

1. A review of the world literature yielded 19 cases of leiomyosarcoma of the esophagus. Two additional cases have been added. One of these is the second concurrent leiomyosarcoma and carcinoma of the esophagus to be reported.

2. Carcinoma of the esophagus and sarcoma of the esophagus may produce the same symptomatic and radiographic picture.

3. If no metastasis is present, radical resection is indicated. In these cases, the prognosis is better than it is for carcinoma of the esophagus without metastasis.

4. If metastasis is present, palliative resection should be performed because of the characteristic slow growth of these tumors.

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