LEIOMYOMA OF THE INFERIOR VENA CAVA

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Leiomyomas occur very rarely in the large arteries or veins. Since Aufrecht's report of a leiomyoma of the right saphenous vein in 1868, 30 cases of the primary smooth muscle tumors of the blood vessels have been reported in literature. In 9 cases out of the 30, they occured in the inferior vena cava.

Cope and Hunt[8] reported the first case of a surgically successfully treated leiomyosarcoma of the inferior vena cava. In this paper the second surgically successfully treated case is presented with a review of the literature.

CASE REPORT

C. G., a 50-year-old woman, was admitted to Hospital of Nagoya University School of Medicine on July 1. 1960, complaining of a mass in the right hypochondriac region and of a epigastric pain.

Family history was noncontributory.

Past history revealed that she had always had good general health, except pleurisy about 14 years ago.

About 5 years ago, the patient had an attack of upper epigastric pain. She has occasionally had a dull pain in the right hypochondriac region and the back for 4 years. Seven months prior to admission, she had an attack of an epigastric pain accompanied by nausea and vomiting, which was thought to be "cholecystolithiasis" in nature by her family docter. Four months ago she first noted a mass in the hypochondriac region. Three days prior to admission, she suffered of a severe back pain and an epigastric distress.

On her physical examination, temperature, puls-rate and respiration were normal. The patient was a well nourished and moderately obese femal. Lungs were clear to percussion and auscultation. The heart showed no enlargement nor murmurs. The abdomen looked slightly distended. There was no rigidity nor tenderness, but there found a firm mass in the right upper quadrant, measuring about 12 by 6 cm in size, which had no tenderness. This abdominal mass was movable only horizontally but not vertically. The liver, spleen and kidneys were not palpated. There was no dilation of the

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vein on the abdominal wall, nor edema of the lower extremities.

Hematological examination revealed red blood cell count 4.6 million, hemoglobin 14.5 mg, white blood cell count 5,200, jaundice index 5. Serum protein were 6.4 Gm per 100 ml, serum cholesterol was 231 mg per 100 ml and serum alkaline phosphatase was 3.7 units (Shinowara-Jones-Reinhart's methode). B.S.P. retention was 10% at 30 minutes. Albumine in urine was negative, and urinary sediment was unremarkable. The amount of B-bile aspirated following the administration of magnesium sulfate was 170 ml. The bilirubin content of this bile was 200 in index.

A plain roentgenogram of the abdomen disclosed a shadow of the mass in the right upper quadrant. Intravenous cholangiography demonstrated normal bile duct, but failed to show the gallbladder.

On July 12, 1960, surgical exploration was done under general anesthesia. The abdominal cavity was entered through an upper midline incision with additional right subcostal incision. A fist-sized mass was found surrounded by the liver, the pancreas and the right kidney. The duodenum appeared being pushed forward and inward by the tumor. The gallbladder was also pushed up, but it contained no stone. The tumor with a thin capsule was easily detached from surrounding tissues. However, the tumor was adherent to the inferior vena cava in the area of approximately 3 by 0.5 cm, it could not be separated from the inferior vena cava; it seemed to have developed from the vena cava (Fig. 1). The tumor was removed carefully. But at that time, the vena cava was torn to bleed, so the ruptured wall was repaired by interrupted silk sutures.

Her postoperative course was uneventful. She was discharged on 49th postoperative day.

She has been followed for 14 months since the surgery and has been in good health without sign of recurrence.

Pathological Findings; the tumor in an ovoid shape, slightly nodular in some part, was 11 by 7 by 6 cm in size, and weighed 230 Gm. Its surface was smooth and was covered by a thin capsule membrane except the attached site to the vena cava. The mass was solid and moderately firm with scanty vessels. The cut surface, containing a necrotic cystic areas in the center, showed a yellow-gray tint with a whorl-formations (Fig. 2).

Microscopically, the tumor consisted of interlacing bundles of spindle-shaped cells with pale eosinophilic cytoplasm (Fig. 3). There were few interstitial tissues and blood vessels throughout the tumor. In a few areas, the tumor cells were atypical with relatively large hyperchromatic nuclei and revealed an somewhat epithelial appearace, which was considered to be on the borderline of malignancy (Fig. 4). On the whole, however, the tumor was a well-differentiated typical leiomyma.

COMMENT

In this case, the tumor was adherent closely to the inferior vena cava alone in the area of approximately 3 by 0.5 cm, and not be separated from it.

TABLE 1

Case No.	Author Year	Pt. Sex Age, Yr.	Type tumor	Location tumor	Size tumor	Treatment Result
1	Aufrecht 1868	M 23	Leiomyoma	Rt. saph. vein at ankle	2.5×2.5×1.5 cm	Resect. Cure
2	Boettcher 1869	F 30	Leiomyoma	Ulnar vein at flexor surface wrist	Bean size	Resect. Cure
3	Perl 1871	F 34	Leiomyosarc.	Mid. i.v.c.	Fist-sized mass extend into renal vein and rt. atrium	Autopsy
4	Cornil 1896		Myoma	Vein of arm		Resect.
5	Cernezzi 1903	M	Leiomyoma	Spermatic plexus vein	6 cm	Resect. Cure
6	Niederle 1913		Leiomyoma	Basilic vein	Egg-size	Resect.
7	Schnyder 1914	F 27	Leiomyoma	Dorsal metatarsal vein	1.4×0.9–1.0 cm	Resect. Cure
8	Ecoffey 1917	M 40	Fibroleio-myoma	One branch of saph. vein		Resect.
9	van Ree 1919	F 42	Leiomyosarc.	Saph. vein leg	Pencil size with intralumi. spread	Amputat. No recur 15 mos. post op.
10	Natali 1923	M 68	Fibroleio-myoma	Femoral vein		Resect.
11	Marri 1927	M 45	Fibroleio-myoma	Axillary vein	Fist size	Resect. Cure
12	Melchior 1928	F 24	Fibrosarc.*	Lower i.v.c.	12×5 cm	Resect. Pt. died 2 wks. post op.
13	Kaplan 1932	3	Leiomyofibrom	Pulmonary vein	6.5×5.5×4.5 cm	Autopsy
14	Hallock *et al.*	F 31	Leiomyosarc.	Upper i.v.c.	5×10×5 cm	Autopsy
15	Nagai 1943	F 37	Leiomyoma	Rt. saph. vein		Resect. Cure
16	Puig-Sureda *et al.* 1947	F 61	Leiomyosarc.	Lt. infer. colic vein	Orange size	Resect. No recur. 5 mos. post op.
17	Roussak and Heppleston 1950	M 60	Leiomyosarc.	Lower i.v.c.	17.5×2–5 cm	Autopsy
18	Abdullaeva 1951	F 31	Leiomyoma	I.v.c.	12×8×6 cm	Autopsy
19	Haug and Losli 1954	M 51	Leiomyosarc.	Rt. fem. vein	5×4×3 cm	Hemipelvect. Lung metast. 28 mos. lat.
20	Cope and Hunt 1954	F 33	Leiomyosarc.	Lower i.v.c.	6×3×3 cm	Resect. and 4800-r X ray Recur. on 2 occas. loc.
21	Font and Noer 1955	M 50	Leiomyosarc.	Lt. antecub. vein	1.5 cm	Resect. No recur. 1 yr. post op.

TABLE 1 (continued)

Case No.	Author Year	Pt. Sex Age, Yr.	Type tumor	Location tumor	Size tumor	Treatment Result
22	Becker 1956	F 56	Leiomyosarc.	Lt. saph. vein	9×6×4 cm	Laparotomy Pt. died 12 days post op. Autopsy
23	Abell 1957	F 54	Leiomyosarc.	Upper i.v.c.	7×7×3.5 cm mass exts. into liver and rt. atrium	Autopsy
24	Abell 1957	M 64	Leiomyosarc.	Lower i.v.c.	13×10×9 cm	Autopsy
25	Chalant 1957		Leiomyosarc.	Femoral vein		
26	DeWeese *et al.* 1958	M 54	Leiomyoma	Lt. great saph. vein	6×3×3 cm	Resect. Cure
27	Sashida 1960	F 67	Leiomyosarc.	Lt. renal artery	2 cm	Autopsy
28	Thomas and Fine 1960	F 64	Leiomyosarc.	I.v.c.	2.5×1.5×1.5 cm	Autopsy
29	Thomas and Fine 1960	M 27	Leiomyosarc.	Rt. int. jugular vein	4×4.3×3 cm	Radical right neck dissection. Pt. died 6 mos. after prim. tumor excis.
30	Light *et al.* 1960	M 42	Leiomyosarc.	Rt. femoral vein	7×5.5×4 5 cm	Resect. No recur. 1 yr. post op.
31	Hachisuka *et al.* 1962	F 50	Leiomyoma	Mid. i.v.c.	11×7×6 cm	Resect. Cure

* Reviewed by Abell and diagnosed as leiomyosarcoma.

According to these findings, including the microscopical examinations, it is obvious that this tumor arose from the inferior vena cava.

The symptoms of "cholecystopathy" in this patient seemed to be caused by the tumor pushing the gallbladder.

Primary tumor of the vascular system are extremely rare. Hallock, Watson and Berman[13] reported that in the examination of the records of 34,000 necropsies, not a single case of primary tumor of the inferior vena cava was encountered. Abell[2] described 2 cases of leiomyosarcoma of the vena cava in 14,000 necropsies. Light, Peskin and Ravdin[16] could find no lesions on the vena cava noted during a 25-year period of their investigation.

Of the 31 cases avaiable in the world literature, including our own, 15 were in female patients, 12 were in male and 4 were not described (Tab. 1). The tumors were seen on an average in every decade of life except the first decade. Only one of the cases occured in the left renal artery, the remaining 30 cases were all in the venous system. Ten tumors occured in the inferior vena cava, 6 tumors in the saphenous vein and 4 in the femoral vein. Thirteen tumors were benign, 17 tumors were malignant. Metastasis to other organs

were proved in 6 cases.

The clinical signs and sysmptoms are a mass, pain or discomfort over the area of the lesion, swelling of the extremity distally and collateral venous vessels. Those lesions that occure in the inferior vena cava, produce various clinical signs depending on the localization, extent, rapidity of growth and completeness of obstruction. Since diagnosis of the tumors in the inferior vena cava is difficult, there are few cases of surgical removal of the tumors in those in literatures.

The venograms are useful in diagnosis of the tumors arising in the veins. The venograms of leiomyosarcoma have been reported by Roussak and Hepleston[24] in the inferior vena cava and by Light *et al.*[16] in the femoral vein. De Weese *et al.*[10] emphasized the value of venography in the preoperative survey of the exact location and extent of tumors.

Recent advances of the vascular surgery will facilitate diagnosis and treatment of tumors arising from the blood vessels.

SUMMARY

A case of leiomyoma arising in the wall of the inferior vena cava, surgically successfully removed, is presented.

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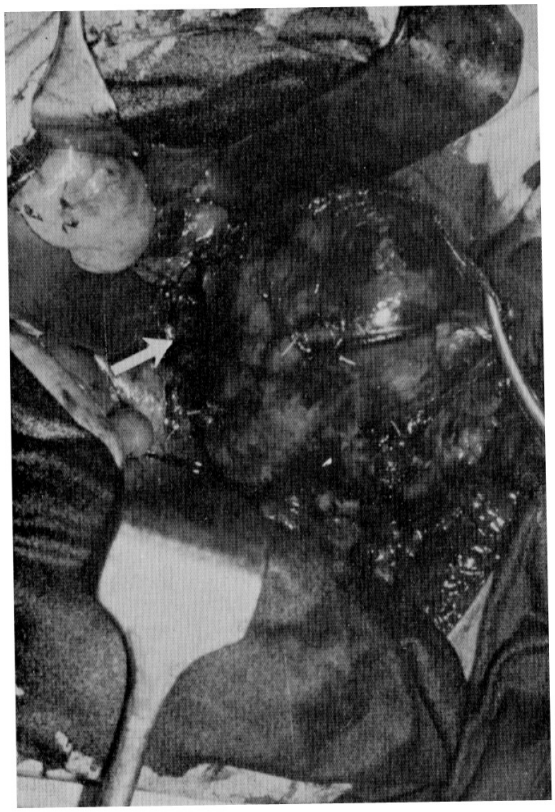

FIG. 1. Operative exposure of the tumor arising from the inferior vena cava. Arrow indicates the vena cava.

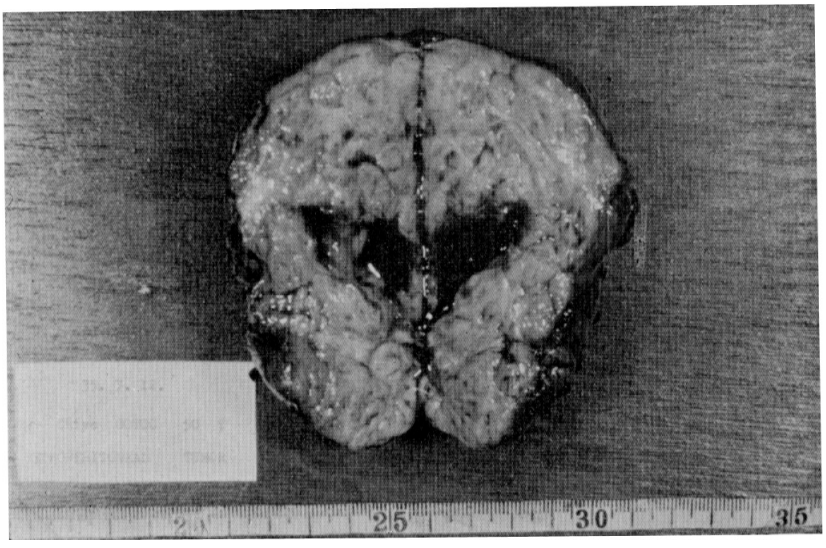

FIG. 2. Gross appearance of the tumor.

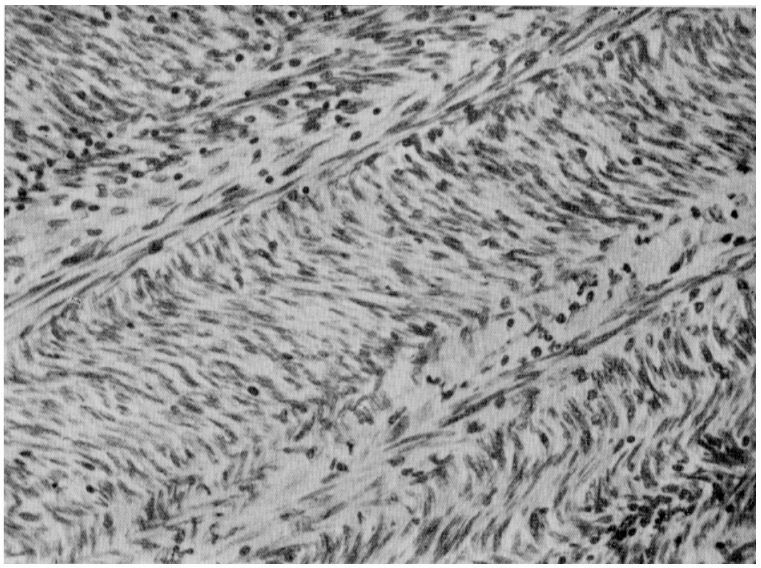

FIG. 3. Microscopic appearace of the tumor. The tumor consists of interlacing bundles of spindle-shaped cells.

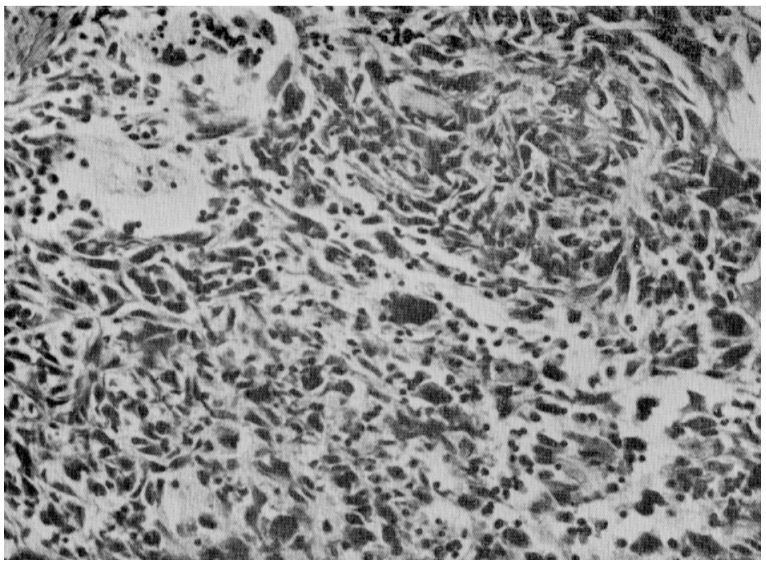

FIG. 4. Microscopic appearance of the tumor. The tumor cells are atypical with relatively large hyperchomatic nuclei.