ANGIOSARCOMA
CASE REPORT AND REVIEW OF THE LITERATURE
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A great deal of confusion exists today with regard to the so-called angio-
blastic sarcomas. For many years this term was loosely applied to certain
endotheliomas. The present tendency, however, is to limit the term to cel-
lular angiomas in which the unit is the vessel and not the endothelial cell.
For our purpose we call a tumor an angiosarcoma when, upon careful micro-
scopic study, the neoplastic tissue reveals distinct vasoformation tendencies.

True angioblastic sarcomas are not commonly encountered. In the litera-
ture as far back as 1918 only twenty-nine cases are recorded. Though sev-
eral instances are reported of angiosarcoma arising from osseous tissue, as
the femur and the clavicle, no record of an angiosarcoma of the scapula was
found.

CASE REPORT

In June 1933, a male, sixty-one years of age, experienced pain in the right shoulder and
arm. A diagnosis of rheumatism was made and dental extraction advised. On failure of
the gum tissue to heal following the extraction, a biopsy specimen was excised, and a prob-
able diagnosis of epithelioma was made. The condition responded satisfactorily to radium
therapy.

On Aug. 18, 1933, the patient was seen at the Cook County Hospital, complaining of
pain in the right shoulder and arm. At this time a mass was observed in the right supra-
clavicular region. X-ray study by Dr. Warfield revealed a suggestive area of destruction
in the superior border of the right scapula, with a swelling of the soft tissue. On Aug. 22,
the supraclavicular mass, 300 c.c. of a soft, beefy, bloody tissue, was removed.

The specimen was examined in the pathologic laboratories of the Cook County Hospital.
It measured 5.5 × 5 × 4.5 cm. It was nodular, firm, yellow gray streaked with purple
brown, and friable. The microscopic report by Dr. Jaffe, pathologist at the Cook County
Hospital, was as follows:

"The tumor is of great cellularity, and in many areas the cells are densely packed to-
gether (Fig. 1). In these areas, the contours of the cells are indistinct and no ground
substance nor interstitial substance can be detected between the cells. There are short oval
nuclei with a distinct nuclear membrane and moderately rich in medium-sized chromatin
granules. The nuclei are surrounded by a narrow rim of homogeneous cytoplasm. Mitoses
are frequently found and their chromosomes are short and plump. The cellular areas are
traversed by a varying number of wide, thin-walled blood spaces which are lined by a flat
endothelium.

"In places in which the cells are less densely massed together they assume a stellate
shape, the branched processes of the cells fusing together. Thus, a net of cells results, the
meshes of which appear empty (Fig. 2). In other places the blood vessels are very numer-
ous and may even excel the strands of cells. The vessels now are less sharply differentiated
from the cells surrounding them, and transitions can be found between the cells in solid
strands and those lining the blood spaces. Finally, a loose, spongy tissue results which
consists only of thin-walled blood vessels.

"Since the undifferentiated, neoplastic mesenchyma reveals distinct vasoformation
tendencies, the microscopic diagnosis is angiosarcoma."
## Reported Cases of Angiosarcoma (1918–1934)

<table>
<thead>
<tr>
<th>No.*</th>
<th>Sex and Age</th>
<th>Primary Tumor</th>
<th>Diagnosed</th>
<th>Metastases</th>
<th>Surgery</th>
<th>Result</th>
<th>Duration</th>
<th>Autopsy</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>M55</td>
<td>Angioleiomyosarcoma of pancreas</td>
<td>Surgical removal of pancreatic cyst</td>
<td>—</td>
<td>+</td>
<td>Died (pancreatic-duodenal fistula)</td>
<td>6 months</td>
<td>—</td>
<td>Pain in lower part of chest; left abdominal and epigastric tumor; loss of weight</td>
</tr>
<tr>
<td>2.</td>
<td>F60</td>
<td>Hemangiosarcoma of jejunum</td>
<td>Surgical removal</td>
<td>Regional nodes</td>
<td>+</td>
<td>Died (shock)</td>
<td>Several days</td>
<td>—</td>
<td>Anemia, fatigue; G.I. upsets; lower abdominal pain</td>
</tr>
<tr>
<td>3.</td>
<td>M3½</td>
<td>Angiosarcoma of kidney</td>
<td>Surgical removal</td>
<td>—</td>
<td>+</td>
<td>Recovered</td>
<td>3 years</td>
<td>—</td>
<td>Anemia; catheter could not be passed</td>
</tr>
<tr>
<td>4.</td>
<td>M63</td>
<td>Telangiectatic sarcoma of femur</td>
<td>Biopsy</td>
<td>—</td>
<td>—</td>
<td>Recovered</td>
<td>8 months</td>
<td>—</td>
<td>Pain in rt. hip; nocturnal attacks of sciatic pain</td>
</tr>
<tr>
<td>5.</td>
<td>F38</td>
<td>Angiosarcoma of retroperitoneal tissue</td>
<td>Autopsy</td>
<td>Mesentry connective tissue of pelvis, rectum, lungs</td>
<td>+</td>
<td>Died (cardiac collapse)</td>
<td>6 months</td>
<td>+</td>
<td>Hemoptysis with clinical evidences of pulmonary tuberculosis</td>
</tr>
<tr>
<td>6.</td>
<td>M60</td>
<td>Angiosarcoma of spleen</td>
<td>Autopsy</td>
<td>—</td>
<td>—</td>
<td>Died (acute anemia)</td>
<td>—</td>
<td>+</td>
<td>Large spleen; edema of face; large abdomen</td>
</tr>
<tr>
<td>7.</td>
<td>F36</td>
<td>Angiosarcoma of liver</td>
<td>Biopsy</td>
<td>Lungs and stomach</td>
<td>—</td>
<td>Died (acute anemia)</td>
<td>2 months</td>
<td>—</td>
<td>Pain in liver region; anorexia, jaundice; headache</td>
</tr>
<tr>
<td>8.</td>
<td>F38</td>
<td>Systemic angiosarcoma</td>
<td>Autopsy</td>
<td>—</td>
<td>—</td>
<td>Died (acute anemia)</td>
<td>3 months</td>
<td>+</td>
<td>Anemia; large spleen</td>
</tr>
<tr>
<td>9.</td>
<td>M60</td>
<td>Angiosarcoma of clavicle</td>
<td>X-ray; biopsy</td>
<td>—</td>
<td>+</td>
<td>Recovery</td>
<td>6 months</td>
<td>—</td>
<td>Pain and swelling in left shoulder</td>
</tr>
<tr>
<td>10.</td>
<td>F36</td>
<td>Angiosarcoma of anterior mediastinum</td>
<td>Autopsy</td>
<td>—</td>
<td>—</td>
<td>Died (heart failure)</td>
<td>—</td>
<td>+</td>
<td>Cough, G.I. upsets and clinical evidences of an exudative pleurisy</td>
</tr>
<tr>
<td>11.</td>
<td>F62</td>
<td>Angiosarcoma of right rectus muscle</td>
<td>Exploratory puncture and biopsy</td>
<td>—</td>
<td>+</td>
<td>Recovery</td>
<td>3 months</td>
<td>—</td>
<td>Pain in the right leg and foot; palpable tumor of the thigh</td>
</tr>
<tr>
<td>12.</td>
<td>F18</td>
<td>Lymphangiosarcoma in popliteal region</td>
<td>Biopsy</td>
<td>—</td>
<td>+</td>
<td>Recovery</td>
<td>6 months</td>
<td>—</td>
<td>Small cyst in popliteal region</td>
</tr>
<tr>
<td>13.</td>
<td>M1½</td>
<td>Angiosarcoma of forehead</td>
<td>Biopsy</td>
<td>Regional nodes</td>
<td>+</td>
<td>Died</td>
<td>4 months</td>
<td>—</td>
<td>Tumor on right forehead</td>
</tr>
</tbody>
</table>

*The numbers correspond to the references in the bibliography.*

[Cont. on p. 272]
On Dec. 15, 1933, the patient was again admitted to the Cook County Hospital because of a mass in the right breast, of four weeks' duration. Physical examination, except for this mass, was negative. The mass was excised and proved to be an adenofibroma.

On May 13, 1934, the patient was admitted to the Mount Sinai Hospital of Chicago, complaining of loss of weight, weakness, anorexia, swelling of the abdomen, vomiting, and persistent hiccough. The temperature on admission was 98.8°, pulse 100, respiration 20, blood pressure 152/90. The gums appeared injected, with no visible growth. The chest was moderately emphysematous with supraclavicular and infraclavicular retraction of both apices. Impaired resonance was elicited over both apices and the base of the left lung. A soft, freely movable mass, about the size of a large walnut, was palpated in the right supraclavicular region behind the mid-portion of the clavicle and in the line of the old scar. Harsh bronchovesicular breathing was heard in the region of the right apex with diminished breath sounds at the left base.

The mass was excised and proved to be an adenofibroma.

The heart was normal in size and action. The abdomen was distended, and free fluid (ascitic) was demonstrable. The liver was easily palpable, as were several masses in the lower right quadrant. The extremities were slightly edematous and pitted on pressure.

X-ray study showed numerous nodules at the base of the left lung and areas of density in both apices. Indications of diaphragmatic involvement were present.

All serologic tests were negative. The urine was repeatedly negative. Stool examinations revealed the presence of blood. A blood count showed hemoglobin 80 per cent; red cells 3,600,000; white cells 12,500, with 72 per cent polymorphonuclear leukocytes. Blood chemistry tests showed 87 mg. sugar and 19 mg. urea nitrogen per 100 c.c. of blood.

The tentative diagnosis was epithelioma of the gum; angioblastie sarcoma of the right scapula with metastases to the peritoneum, gastro-intestinal tract, diaphragm and lungs; an old fibroid pulmonary tuberculosis.

The patient responded poorly to all forms of supportive therapy, including multiple paracentesis and occasional therapeutic thoracentesis. The course was persistently downhill and death occurred on June 9, 1934.

Autopsy was done by Dr. E. F. Goodman. The body, about 170 cm. in length, was emaciated. The skin showed a subicteric tinge, with pallor of all the mucous membranes.

FIG. 1. ANGIOSARCOMA, SHOWING GREAT CELLULARITY, NUMEROUS BLOOD VESSELS, AND DISTINCT TENDENCY OF THE UNDIFFERENTIATED MESENCHYMA TO VASOFORMATION. × 90
# Reported Cases of Angiosarcoma (1918–1934)—Continued

<table>
<thead>
<tr>
<th>No.*</th>
<th>Sex and Age</th>
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<th>Result</th>
<th>Duration</th>
<th>Autopsy</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.</td>
<td>F32</td>
<td>Cavernous angiosarcoma of maxillary sinus</td>
<td>Biopsy</td>
<td>—</td>
<td>+</td>
<td>Recovery</td>
<td>1 month</td>
<td>—</td>
<td>Swelling left half of face; pain, nasal discharge</td>
</tr>
<tr>
<td>15.</td>
<td>F44</td>
<td>Angiosarcoma of lip</td>
<td>Biopsy</td>
<td>—</td>
<td>+</td>
<td>Recovery</td>
<td>—</td>
<td>—</td>
<td>Visible tumor of the lip</td>
</tr>
<tr>
<td>16.</td>
<td>F37</td>
<td>Perirenal angiosarcoma of abdomen</td>
<td>Biopsy</td>
<td>—</td>
<td>+</td>
<td>Recovery</td>
<td>1 year</td>
<td>—</td>
<td>Palpable tumor rt. side abdomen</td>
</tr>
<tr>
<td>17.</td>
<td>M53</td>
<td>Angiosarcoma of tongue</td>
<td>Biopsy</td>
<td>Cervical nodes</td>
<td>+</td>
<td>Recovery</td>
<td>1 month</td>
<td>—</td>
<td>Papules on tongue</td>
</tr>
<tr>
<td>18.</td>
<td>M5</td>
<td>Angiosarcoma of tongue</td>
<td>Biopsy</td>
<td>—</td>
<td>+</td>
<td>Recovery</td>
<td>2 years</td>
<td>—</td>
<td>Tumor of tongue; dysphagia</td>
</tr>
<tr>
<td>19.</td>
<td>F6</td>
<td>Angiosarcoma of brain (?)</td>
<td>Biopsy</td>
<td>—</td>
<td>+</td>
<td>Died</td>
<td>2 years</td>
<td>—</td>
<td>Pain over rt. ear with cerebral symptoms</td>
</tr>
<tr>
<td>20.</td>
<td>M25</td>
<td>Angiosarcoma of ribs</td>
<td>Biopsy</td>
<td>—</td>
<td>+</td>
<td>Recovery</td>
<td>2½ years</td>
<td>—</td>
<td>Pain in left chest; nodules of rt., left ribs</td>
</tr>
<tr>
<td>21.</td>
<td>M53</td>
<td>Hemangiosarcoma of liver</td>
<td>Autopsy</td>
<td>—</td>
<td>—</td>
<td>Died (anemia)</td>
<td>1 year</td>
<td>+</td>
<td>Tender rt. upper quadrant; large abdomen</td>
</tr>
<tr>
<td>22.</td>
<td>M19</td>
<td>Angiosarcoma of lung</td>
<td>X-ray, exploratory puncture</td>
<td>—</td>
<td>—</td>
<td>Died</td>
<td>1 year</td>
<td>—</td>
<td>Pain in rt. chest; cough; hemoptysis and physical signs of consolidation</td>
</tr>
<tr>
<td>23.</td>
<td>F48</td>
<td>Angiosarcoma of epiglottis</td>
<td>Laryngoscopic examination and biopsy</td>
<td>Skull, ribs, spine</td>
<td>+</td>
<td>Recovery</td>
<td>5 months</td>
<td>—</td>
<td>Dysphagia; regurgitation; hoarseness</td>
</tr>
<tr>
<td>24.</td>
<td>F52</td>
<td>Hemangiosarcoma of spleen</td>
<td>Biopsy</td>
<td>—</td>
<td>+</td>
<td>Recovery</td>
<td>—</td>
<td>—</td>
<td>Large painful spleen; tumor left hypochondrium</td>
</tr>
<tr>
<td>25.</td>
<td>M28</td>
<td>Angiosarcoma of thymus</td>
<td>X-ray, autopsy</td>
<td>—</td>
<td>+</td>
<td>Died</td>
<td>—</td>
<td>+</td>
<td>Symptoms referable to central nervous system</td>
</tr>
<tr>
<td>Author's case</td>
<td>M61</td>
<td>Angiosarcoma of scapula</td>
<td>Biopsy, autopsy</td>
<td>Lungs, spleen, liver, diaphragm, axillary, supraclavicular, retroperitoneal nodes</td>
<td>+</td>
<td>Died</td>
<td>1 year</td>
<td>+</td>
<td>Pain in rt. shoulder and arm; loss of weight; hiccough</td>
</tr>
</tbody>
</table>

* The numbers correspond to the references in the bibliography.
Small palpable nodes, up to 1 cm. in diameter, were present in both supraclavicular regions. In the right supraclavicular region a mass, about the size of a large walnut, was palpable in the outer third of the clavicle and extending into the right axilla. Nodes were also palpable in both inguinal regions. A pedunculated mass (fibroma) was present at the angle of the right scapula posteriorly. The liver extended to four fingers below the xiphoid at the midline. The right pleural cavity contained about 75 to 100 c.c. of bloody fluid. Diffuse fibrous adhesions were present at both the right and left pulmonary apices. The abdominal cavity contained about 1800 c.c. of a hemorrhagic fluid.

The left lung weighed 932 gm. Adhesions were present at the apex and the lower lobe. At the apex were irregular areas of consolidation, measuring up to 50 mm. On section areas of atelectasis were observed. Deep within the lung were several firm nodules, up to 1 cm. in diameter. These were filled with a yellow cheesy material. In the extreme base, posteriorly, was a purplish pink bulging area measuring $80 \times 40 \times 30$ mm. On section it appeared to be outside the lung parenchyma. Other subpleural masses, up to 1 cm. in diameter and soft in consistence, were present. The right lung weighed 845 gm. The apex showed the same tuberculous changes. No subpleural nodules were present.

The spleen showed an area of old infarction. There were few changes in the liver. A nodule about 5 mm. in diameter, white, soft, and not encapsulated, was observed.

The entire peritoneal cavity was studded with a multitude of nodules, up to 1 cm. in diameter, matting together the intestines and peritoneum into one conglomerate mass.

The supraclavicular and axillary nodes formed a soft mass of homogeneous, apparently malignant tissue. The retroperitoneal nodes presented the same picture.

Microscopic studies were carried out by Dr. I. Davidsohn, pathologist of the Mount Sinai Hospital of Chicago, as follows:

**Lungs:** Sections from one of the cellular nodes showed the same structure as the tumor in the right supraclavicular region. Sections from the mass attached to the lung tissue also showed a similar structure, and the parenchyma of the lung was invaded by sarcomatous cells, which infiltrated the alveolar walls. Extensive necrosis was present (Fig. 3).

**Spleen:** The trabeculae were prominent and thick. The arterioles showed marked sclerosis. Rich deposits of brown pigment were present, for the most part within the follicles. Sections from the area of the old infarct showed fibrosis and in places hyaline
changes with preservation of the splenic structure. In one area a nodule was attached to the capsule, showing the same changes as the tumor.

Liver: Sections from the nodes which were mentioned in the gross description showed a similar structure to the supraclavicular tumor, but a greater variety in the appearance of the cells, most of these being elongated and spindle-shaped. The invasion of the liver parenchyma was pronounced. Small groups and chains of liver cells were surrounded by proliferating sarcomatous tissue. The parenchyma of the liver in the vicinity showed disturbance of the circulation and diffuse deposits of a brown pigment which was present between the acini and also the liver cells proper.

Stomach: Sections of the node in the wall of the stomach showed the structure of a fibroma.

![FIG. 3. SARCOMATOUS METASTASES IN THE LUNG. × 90](image)

The structure is similar to that of the primary tumor. Vascular spaces are numerous.

Tumor Mass in Right Supraclavicular Region: The structure was very cellular, the cells varying considerably in shape. Most of them were long and spindle-shaped; some showed various transitions between the round and the oval. The cytoplasm was scanty; in some places it was more abundant and distinct; it was pink and fairly homogeneous. The nuclei were hyperchromatic and varied only slightly in their staining qualities; many of them were long and wavy, similar to those seen in neurinomas. The nucleoli were not very distinct and mitotic figures were rare. There was very little intracellular tissue. Where present, it was pink and granular or fibrillar. Vascular spaces were numerous. On cross-section they varied in shape from round, through oval, to polygonal. They had no definite walls, but only a lining of flat endothelial cells on a base of scanty loose connective tissue. Most of them were empty. Some contained a thin, serous, coagulated material and some contained blood. The structure was that of a fibroblastic sarcoma. The vascular structures were regarded as part of the sarcomatous process.

**DISCUSSION**

This case offers several points of interest. The morphology of the biopsy specimen from the supraclavicular region was somewhat different from that of the metastases found at autopsy. This sort of variation is not uncommonly
seen when primary tumors and their metastases are compared. The patient, in this case, exhibited a definite tumor tendency, a sort of a tumor diathesis. Four tumors were present: an angiosarcoma of the scapula with metastasis, adenofibroma of the breast, fibroma of the stomach, and fibroma of the skin.

In the literature since 1918, we find that 29 cases of angiosarcoma have been reported. Reports of 26 were available (see Table). Thirteen of these cases occurred in males, and an equal number in females. Eleven cases occurred in the age group between forty and seventy; 8 cases between twenty and forty; 6 cases between one and twenty years, and one case in a child one and a half months old.

Considering the primary sources of these 26 cases, we found 2 arising in the liver, 2 in the spleen, 2 in the renal and perirenal tissue, 2 in the tongue and 2 in the brain; one each in the pancreas, jejunum, femur, skin of the forehead, mediastinum, right rectus muscle, popliteal region, lip, thymus, epiglottis, lungs, ribs, clavicle, maxillary sinus, and retroperitoneal region. One was a systemic angiosarcoma appearing in the liver, spleen, and bone marrow.

In the great majority of cases the diagnosis was made by biopsy, but in 5 instances it was made post mortem. Only 6 cases showed metastases. Twelve cases went on to a fatal termination with or without surgical attention. Only 6 patients came to autopsy, so that in most cases the cause of death could not be accurately determined.

The symptoms were dependent in most instances upon the size and location of the tumor.

Bibliography