Primary Mediastinal Choriocarcinoma*
Report of a Case

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Primary extragenital choriocarcinomas have been reported in a number of apparently unrelated sites. Well documented cases are rare and the existence of such tumors has been disputed. Fine et al. reviewed 109 cases in the world literature and found only 19 that were acceptable. This choriocarcinoma, in the mediastinum of a middle-aged Negro man, meets Fine’s rigid criteria for extragenital origin.

Occurrence of germinal tumors in such diverse sites as the pineal gland, mediastinum, liver, gastrointestinal tract, kidney, and bladder has been explained by auto-fertilization within primitive germ cell rests. This theory is embryologically sound and is corroborated by sex chromatin studies of germinal tumors.

The diagnostic challenge provided by extragenital choriocarcinomas is emphasized in this report, and their embryologic significance is discussed.

CASE REPORT

A 44-year-old Negro man entered the emergency room of the Oakland Kaiser Foundation Hospital complaining of loss of appetite, general fatigue, and swelling of the legs, of five days’ duration; he had lost five pounds within several weeks. His temperature was 103°F. (39.4°C); blood pressure, 110/60; pulse, 162. Neck veins were distended and there was slight pretrabial edema bilaterally. The thyroid was small, mobile, and symmetrical. Palpable nodules were present in the right supraclavicular space. Breath sounds were slightly diminished over the right upper thorax posteriorly. Nothing abnormal was detected in the heart or abdomen. The testes were small and symmetrical; the prostate was not unusual. A mass approximately 7 cm. in diameter was demonstrated in the anterior medias-

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Figure 1A: A postero-anterior roentgenogram of the chest taken three weeks before death. The mediastinal mass was located anteriorly.
The primary site of the metastatic tumor was not established. On the 34th hospital day, the cephalin flocculation test was negative; hematocrit 34 per cent; total bilirubin 0.55 mg. per 100 ml., direct bilirubin 0.5 mg per 100 ml. Serum electrolytes were: potassium 5.5 mg per 100 ml., sodium 125 mg per 100 ml., chlorides 95 mg per 100 ml., and carbon dioxide 22 mEq. per liter. Continued loss of blood from the gastrointestinal tract necessitated exploratory laparotomy on the 35th day. The jejunum was obstructed by a neoplasm which extended into the mesentery. It was resected and end-to-end anastomosis was performed. The segment of jejunum, after fixation, was 30 cm. long. Ten cm. from one resected margin was an ulcerated, bosselated tumor 3 x 5 x 6 cm. in diameter. Distal to the tumor the jejunum was filled with clotted blood.

Microscopically, the anaplastic, pleomorphic tumor was composed of sheets of focally necrotic, hyperchromatic syncytial cells; it was interpreted as choriocarcinoma.

Following the surgical procedure, the patient appeared to do well. A quantitative Ascheim-Zondek test revealed the urinary chorionic gonadotropin titer to be between 40,000 and 80,000 mouse units per liter. A frog test was also positive. While his renal function was being evaluated in preparation for chemotherapy, he suddenly expired, on the 35th day after admission.

Necropsy Report: This man, who appeared older than his stated age, had severe muscular wasting of the face, thorax, and extremities. His skin was dry and inelastic; the abdominal surgical incision was poorly healed. In spite of his emaciation breasts were not palpable; nipples and areolae were normal.

A 5 x 5 x 7 cm., well encapsulated, multilobular tumor in the anterior mediastinum extended from the bifurcation of the trachea to

![Figure 1B: Grossly, the bosselated, hemorrhagic, cystic, and focally necrotic anterior mediastinal choriocarcinoma compressed the superior vena cava. Mediastinal lymph nodes contained metastases. (Right and left sides of x-ray film are reversed of those in gross specimen.)](http://journal.publications.chestnet.org/pdfaccess.ashx?url=/data/journals/chest/21410/

![Figure 2: In the primary tumor, syncytial cells were layered upon, and intermingled with, smaller cells corresponding to cytotrophoblasts. Abnormal nuclei, with coarsely clumped chromatin, marked pleomorphism, and prominent nuclei, were evident.](http://journal.publications.chestnet.org/pdfaccess.ashx?url=/data/journals/chest/21410/)
the right sternoclavicular joint (Fig. 1B). The tumor was easily freed from the trachea, lungs, and pericardium, but was adherent to and compressed the superior vena cava. A 3 cm. right supraclavicular mass with numerous tumor-laden lymph nodes around its periphery was also present. Cut surfaces of the tumor were grey-white, lobulated, and bulging. Focal cystic change and hemorrhagic necrosis were prominent. Two 0.9 cm. lymph nodes at the hilus of the right lung contained tumor. Both lungs were fibrotic and moderately congested, but were free of tumor.

The peritoneal cavity contained approximately 650 ml. of bloody fluid. Serosal surfaces were bloodstained. The jejunal anastomosis was patent and intact. A 4 cm. nodule of tumor was in the suture line of the mesentery. Approximately one-half of the congested 1500-gm. liver was replaced by bulging, grey-white, focally hemorrhagic nodules of metastatic tumor, 0.5 cm. to 5 cm. in diameter. The kidneys were arteriosclerotic, and a typical 0.4 cm. yellow-grey tubular adenoma was in the cortex of the left kidney. Each testis weighed 15 gm. Eleven longitudinal sections, 0.2 cm. thick, of each testis revealed no gross evidence of abnormalities.

Microscopically, the tumor was similar in its primary and metastatic sites. Pleomorphic, hyperchromatic, multinucleated syncytial cells predominated. Occasionally, they were intermingled with or layered upon clumps of smaller cells with scanty cytoplasm, distinct cytoplasmic membranes, and smaller, oval, regular nuclei. Bizarre nuclei and coarsely clumped chromatin were present in the syncytial cells (Fig. 2). Many areas of the tumor were necrotic, with only occasional islands of intact cells beneath the capsule. No sex chromatin (Barr body) was identified in the neoplastic cells. The biopsy specimen from the supraclavicular lymph node, taken before death, was reviewed. Here the neoplasm was more orderly, less pleomorphic, had fewer mitotic figures, and a much less prominent syncytial pattern than the other metastases (Fig. 3). The slight tendency for cells to arrange themselves in loose alveoli, suggesting a glandular pattern, accounted for the original diagnosis of adenocarcinoma.

Thirty-five evenly spaced sections from each testis revealed no scars or tumors. The tubules were atrophic. Interstitial cells were diffusely hyperplastic; many were arranged in large clumps. Representative fields yielded a ratio of 14 interstitial cells per tubule, approximately twice the normal value for the patient's age.

**DISCUSSION**

Most tumors in the mediastinum are metastases to lymph nodes. The identity of primary mediastinal tumors may be suspected from their location. In order of diminishing frequency, those in the anterior mediastinum are germinal tumors, thymomas, intrathoracic thyroid adenomas, pericardial cysts, lipomas, lymphangiomas, and parathyroid adenomas. The clinical manifestations of mediastinal tumors include chest pain, obstruction of circulation, hoarseness, Horner's syndrome, dysphagia, cough, stridor, dyspnea, hemoptysis, and pleural effusion.

The patient with a primary mediastinal choriocarcinoma is usually a young Caucasian man with cough, chest pain, and gynecomastia. Although there is little therapy to offer male patients with extragonadal

**FIGURE 3:** The tumor was more orderly in the supraclavicular lymph node, excised before death. Syncytial cells were less prominent and the loose arrangement suggested a glandular pattern.
choriocarcinoma, the correct diagnosis might be made more frequently if it were kept in mind that germinal tumors, while rare, are the most common primary tumors of the anterior mediastinum.

The rigid requirements of Fine et al. for establishing the validity of an extragenital germinal tumor undoubtedly exclude some valid reports, but also serve to substantiate the existence of an entity which is still doubted by some. Microscopic foci of choriocarcinoma in the testis have been associated with widespread metastases and small testicular scars or cysts associated with alleged extragenital choriocarcinomas have been regarded as remnants of such a microscopic tumor which has spontaneously regressed. It has been suggested that scars, cysts, or benign tumors of the testis do not mitigate against the possibility of an extragenital germinal tumor arising in the mediastinum, because tumors of the testis seldom metastasize to that site. However, Lyons et al. found that in young men metastasis to the mediastinum from testicular tumors was common.

The extragenital origin of germinal tumors is perhaps best explained by the theory of primitive germ cells. Germ cells, in their migration from the yolk sac along the dorsal mesentery to the primitive gonad, are believed to go astray and fail to complete their journey. Extragenital tumors usually appear along the midline in the mediastinum, retroperitoneum, abdominal viscera, and pelvic viscera, a circumstance that supports this theory of their origin.

Germinomas usually arise from fetal trophoblastic tissue in pregnant women, but gonadal and extragenital choriocarcinomas occur in both sexes. Their development is probably initiated by the fusion of two haploid germ cells.

<table>
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<tr>
<th>Germinoma (Germ cell)</th>
<th>&quot;Embryonal&quot; Carcinoma (Primitive cell)</th>
<th>Biphasic potency</th>
<th>Teratoma (Somatic)</th>
<th>Teratogenesis</th>
<th>Teratoma</th>
<th>Choriocarcinoma (Trophoblastic)</th>
<th>Trophogenesis</th>
<th>Choriocarcinoma</th>
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References

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