

## Polymorphous Hemangioendothelioma of the Neck

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Polymorphous hemangioendotheliomas are rare, low-grade borderline malignant vascular tumors of endothelial cell origin. To the best of our knowledge (MEDLINE 1966-2002), there have been nine cases of polymorphous hemangioendothelioma reported in the English literature. Most of the initial patients reported were men, but we present the third case in a woman. Her previous radiation history to the neck makes this report unique. Polymorphous hemangioendothelioma is characterized by the variety of patterns of growth within and between tumors, making histologic recognition of the tumor difficult. Because management remains conservative via wide local excision, the misdiagnosis of this lesion as a malignancy has possible treatment implications. Alternatively, the high propensity for local recurrence underscores the necessity for accurate classification of the neoplasm and close clinical follow-up.

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**V**ASCULAR NEOPLASMS encompass a broad family of tumors with a wide range of histologic appearances and behavior, from innocuous benign hemangiomas to metastasizing angiosarcomas. Within the spectrum of vascular neoplasms is a histologically polymorphous neoplasm, the term chosen to emphasize the varied histomorphologic patterns present in variable proportions within this lesion: solid, spindled, retiform, and angiomatous areas intermingled with one another.

In 1992, Chan et al<sup>1</sup> were the first to describe three cases of a previously unrecognized neoplasm arising in inguinal, axillary, and supraclavicular lymph nodes, which they termed "polymorphous hemangioendothelioma" (PH). Since then, an additional six new cases of this neoplasm have been

reported: two each in the intrathoracic lymph nodes<sup>2,3</sup> and axillary lymph node<sup>4,5</sup>; one in the paravertebral soft tissues<sup>2</sup>; and another in the spinal cord.<sup>6</sup> Persistent lymphadenopathy with local recurrence is frequent, with a single case of lung metastasis<sup>1</sup> confirming its malignant potential. We report an additional case arising in an Asian woman with previous radiation exposure, suggesting a possible etiologic relationship for PH.

### Case Report

A 50-year-old Chinese woman presented for evaluation of an asymptomatic submandibular mass that had gradually enlarged over the past year. Her medical history was remarkable for nasopharyngeal carcinoma treated with radiation therapy 20 years before in China. The patient had also been treated for an asymptomatic left upper cervical mass, which on biopsy proved to be fibrosis only, 7 years before the current presentation. She denied a history of alcohol or tobacco use, other head and neck complaints, or constitutional symptoms.

Physical examination revealed a 3 cm firm but freely mobile left submandibular mass. The remainder of the head and neck examination was normal. Axial computed tomographic imaging with contrast (Fig 1) confirmed a heterogeneous soft tissue mass in the left anterior paramedian neck measuring 2.7 cm in maximum dimension. Chest radiographs and laboratory tests were all within normal limits. Given the patient's history, the submandibular mass was completely excised without complications and a nasopharyngoscopy with biopsy was per-

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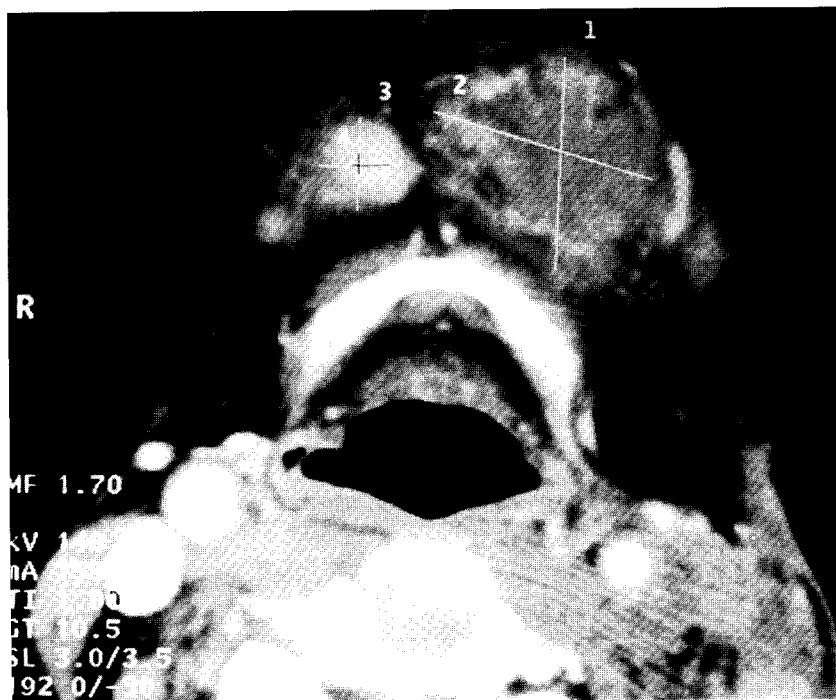
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**Figure 1.** Axial computed tomography of the neck with contrast depicting heterogeneous soft tissue mass in the left anterior paramedian neck appearing to obliterate a lymph node.

formed. The nasopharyngeal biopsy was negative for tumor. Intraoperatively, the neck mass appeared to be anterior to the submandibular gland and the hyoid bone and did not infiltrate the strap muscles. At last follow-up (1 year), the patient is disease free without recurrence.

### **Pathology**

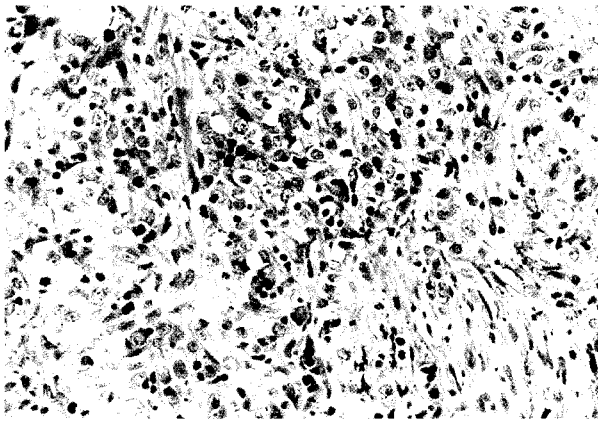
Histologically, residual lymph node architecture was identified at the periphery of the lesion, with a vascular proliferation replacing much of the node. A varied histologic pattern ranged from a kaposiform (Fig 2) to epithelioid to spindle cell pattern (Fig 3). The kaposiform pattern was characterized by slit-like, poorly formed vascular channels with extravasated red blood cells. Globules and significant nuclear pleomorphism were not appreciated. A more epithelioid and spindle-cell pattern intersected the kaposiform areas and was characterized by intracytoplasmic vacuoles containing erythrocytes. These vacuolated structures may sometimes be confused with mucin, but are mucicarmine negative. Furthermore, the presence of red blood cells within these vacuoles clearly identifies a vascular tumor. Mitotic figures were identified, but were not increased in number; atypical mitotic figures, tumor necrosis, and significant nuclear pleomorphism were absent.

The lesional cells were immunoreactive for CD34 (Fig 4), and *ulex europeaus*, while nonreactive for CD31 and factor VIII-Rag.

### **Discussion**

Polymorphous hemangioendotheliomas are rare, low-grade, borderline malignant vascular tumors of endothelial cell origin that were first described in 1992.<sup>1</sup> The term "hemangioendothelioma" is used to suggest an intermediate behavior between hemangioma and angiosarcoma. Although PH has a high propensity for local recurrence, it appears unlikely that it metastasizes unless there is malignant transformation.<sup>2,3,5,6</sup> Because of the limited number of case reports in the literature, an etiology remains elusive. However, radiation exposure is well known to result in the development of angiosarcoma.<sup>4</sup> It is curious to note the history of radiation in our case, suggesting that perhaps radiation may be an etiologic agent.

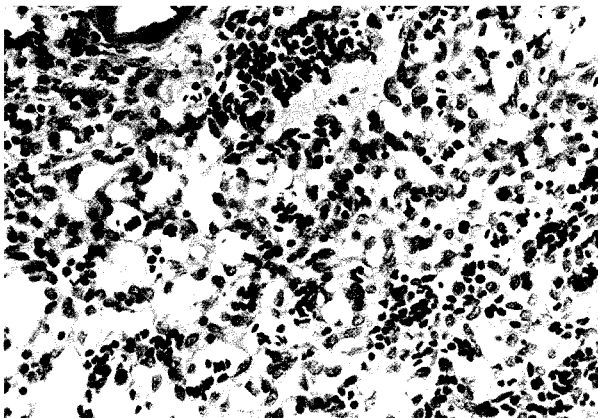
The exact location of PH is difficult to determine with absolute accuracy. A primary lymph node lesion rather than a soft tissue primary has been suggested in previous reports,<sup>5</sup> although soft tissue involvement has also been reported.<sup>2</sup> The replacement of lymph node by the tumor cells in our case lends support to the lymph node origin of this lesion. Further study of PH is needed before a definitive statement about location can be proposed.



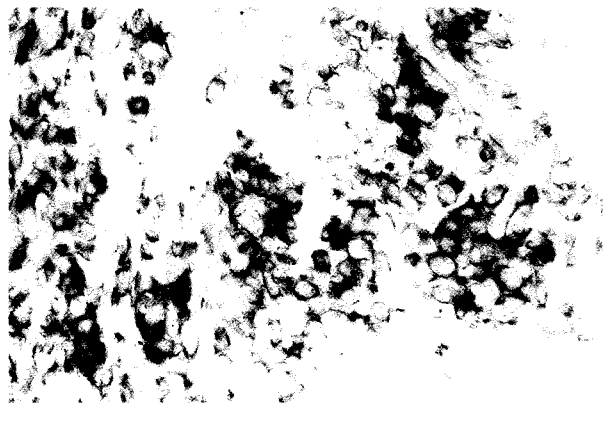
**Figure 2.** Kaposiform pattern with extravasated red blood cells as well as blood cells within neolumina. Cellular atypia is mild and mitotic activity is not appreciated.

The distinguishing histologic features of PH include a noninfiltrative growth of a polymorphous population of spindle to oval shaped cells arranged in both a solid, diffuse sheet-like architecture. These cellular arrangements are intersected by vascular channels lined by endothelial cells with only focal cytologic atypia and rare mitotic figures. The polygonal cells are fairly uniform, with small nucleoli and scant, slightly eosinophilic cytoplasm. There is a lack of necrosis and anastomosing vascular channels.<sup>2,6</sup>

The remarkable variability in patterns of growth and cellularity raise a broad differential diagnosis, which includes benign vasoformative neoplasms



**Figure 3.** Epithelioid and spindle patterns with intracytoplasmic vacuoles containing erythrocytes. The epithelioid pattern predominates the lower right corner, while the spindle pattern is more pronounced in the upper left corner.



**Figure 4.** CD34 immunoreactivity of the lesional cells, confirming the vascular nature of the neoplasm.

and reactive conditions, hemangiopericytoma, Kaposi's sarcoma, angiosarcoma, melanoma, and even metastatic adenocarcinoma.<sup>4,7,8</sup> The solid pattern of growth in PH can make the vascular nature of the neoplasm difficult to recognize. However, the remarkable variability in patterns of growth, a lack of cytologic atypia, no necrosis, a low mitotic index, and involvement of a lymph node should help with the differential diagnosis. Immunohistochemical analysis will exclude a melanoma (S-100 protein, HMB45, tyrosinase) or adenocarcinoma (mucicarmine positive; keratins, including differential keratins).<sup>1</sup> Kaposi's is usually positive with HHV-8; hemangiopericytoma is immunoreactive with CD31 and actin, usually displaying a different pattern of growth. CD34 identifies the more primitive nature of this neoplasm, but the lack of cytologic atypia, necrosis, and mitotic activity (including atypical mitotic forms) should help to separate PH from angiosarcoma. Unfortunately, there are no reliable histologic features that can be used to predict malignant transformation of PH.<sup>4,9</sup>

The need for accurate diagnosis of PH is important because treatment varies considerably based on the spectrum of neoplasms included in the differential diagnosis. Since the management of PH remains conservative via wide local excision without adjuvant therapy, misdiagnosis has possible treatment implications.<sup>2,4</sup> The present case illustrates a low-grade vascular neoplasm with a generally good prognosis. Further studies are required to clarify the possible etiology of the neoplasm, the exact point of origin, and the long-term clinical outcome with appropriate clinical management.

## References

1. Chan JK, Frizzera G, Fletcher CD, et al: Primary vascular tumors of lymph nodes other than Kaposi's sarcoma. Analysis of 39 cases and delineation of two new entities. *Am J Surg Pathol* 1992;16:335-350
2. Nascimento AG, Keeney GL, Sciort R, et al: Polymorphous hemangioendothelioma: A report of two cases, one affecting extranodal soft tissues, and review of the literature. *Am J Surg Pathol* 1997;21:1083-1089
3. Rehring TF, Deutchman A, Cross JS: Polymorphous hemangioendothelioma. *Ann Thorac Surg* 1999;68:1396-1397
4. Weiss SW, Goldblum JR: Hemangioendothelioma: Vascular tumors of intermediate malignancy, in Weiss SW, Goldblum JR (eds): *Enzinger and Weiss's Soft Tissue Tumors* (4th ed). St Louis, MO, Harcourt, 2001, pp 891-915
5. Ross RA, Monteith PR, McAdam JG: Case report: Polymorphous haemangioendothelioma, a rare cause of persistent lymphadenopathy. *J R Nav Med Serv* 1993;79:80-82
6. Roncaroli F, Scheithauer BW, Papazoglou S: Primary polymorphous hemangioendothelioma of the spinal cord. Case report. *J Neurosurg* 2001;95:93-95
7. Zukerberg LR, Nickoloff BJ, Weiss SW: Kaposiform hemangioendothelioma of infancy and childhood. An aggressive neoplasm associated with Kasabach-Merritt syndrome and lymphangiomatosis. *Am J Surg Pathol* 1993;17:321-328
8. Dufau JP, Pierre C, Saint Maur PP, et al: Retiform hemangioendothelioma. *Ann Pathol* 1997;17:47-51
9. Calonje E, Fletcher CD, Wilson-Jones E, et al: Retiform hemangioendothelioma. A distinctive form of low-grade angiosarcoma delineated in a series of 15 cases. *Am J Surg Pathol* 1994;18:115-125