Hemangioma, Liver, Rat

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**Synonym.** Hemangioendothelioma

**Gross Appearance**

Hemangiomas appear macroscopically as dark, raised foci or small nodular areas and are generally soft in texture. They occasionally occur in association with hepatocellular neoplasms and tend to hemorrhage easily, which may result in fatal intra-abdominal bleeding.

**Microscopic Features**

The diagnosis of hemangioma is made upon evidence of a primary proliferation of endothelial cells, which is initially apparent in association with cords of liver cells, but subsequently hepatocytes are excluded from the neoplasm except for clumps of liver cells trapped during expansive growth. Eventually, these trapped hepatocytes become atrophic and degenerate and are replaced by fibrous tissue. In other areas, a definite connective tissue stroma is evident in association with the proliferating endothelial cells.

Variability is an obvious feature in the micromorphology of hemangiomas of the liver, even within individual tumors. Frequently, cords of liver cells lined by neoplastic endothelium give rise to pseudoglandular, papillary, and cystic structures. These areas contrast with those of more solid appearance containing none or only a very few hepatocytes, but characterized by a prominent connective tissue stroma. The endothelial lining is usually only one cell thick, but locally the depth can be greater. Sinusoids within the neoplasm develop to a variable degree and become filled with blood. In some instances, cystic blood-filled spaces are a prominent feature.

Neoplastic endothelial cells are larger than normal, but are occasionally oval or round rather than flattened. The nucleus is generally large in proportion to cell size, with only scant cytoplasm in most cases. Benign neoplastic endothelial cells are easily recognizable as endothelial in origin, in contrast to the malignant variants, which have a more diverse morphology. Mitotic figures are only rarely observed within the neoplasm and there is never invasive growth, although such lesions are not always clearly delineated from...
surrounding tissue by any distinct capsule (Figs. 58, 59).

**Differential Diagnosis**

The differential diagnosis of hemangioma can be quite difficult when such neoplasms occur in the liver. In particular, hemangioma must be distinguished from morphological forms of hepatocellular proliferation, those of hepatocellular alteration, and hemangiosarcoma. Usually, the characteristic epithelial appearance of cholangioma does not lead to confusion in the diagnosis of hemangioma. Within hepatocellular adenomas and carcinomas, there are occasionally hemangiomatous areas in which sinusoidal dilatation is conspicuous. The associated endothelial cells are, however, quite normal and without neoplastic features.

Foci or areas of telangiectasis, peliosis hepatis, and spongiosis hepatis can each be confused with early neoplastic lesions of vascular origin (see pp. 104, 154). In areas of telangiectasis, the vessels undergo dilatation without proliferation of the endothelium or hepatocytes, and both elements are morphologically normal except for dilatation of sinusoids. Peliosis hepatis is characterized by blood-filled cystic spaces bounded by hepatocytes and having no endothelium, and in spongiosis hepatis, a lesion described by Bannasch et al. (1981) (see p. 104) in which there is an extracellular accumulation of mucopolysaccharides and/or protein, no proliferation of endothelial cells is seen, although there may be proliferation of surrounding hepatocytes. The morphological features of the malignant endothelial cells observed in hemangiosarcomas are usually sufficient to delineate this from hemangioma. In general, malignant endothelial

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**Fig. 58.** Hemangioma, liver, rat. Cords of hepatocytes are lined by plump, but otherwise normal, endothelial cells. H&E, ×1720

**Fig. 59.** Hemangioma, liver, rat. Vascular spaces lined by endothelium; hepatocytes are sparse, and those present are atrophic. H&E, ×1720