Although this is generally a benign condition, the incidence of fetal distress, stillbirths, and prematurity is modestly increased. Perhaps most importantly, the pruritus resulting from retention of bile salts can be extremely distressing for the pregnant mother.

Nodules and Tumors

Hepatic masses may come to attention for a variety of reasons. They may generate epigastric fullness and discomfort or be detected by routine physical examination or radiographic studies for other indications. Hepatic masses include nodular hyperplasias and true neoplasms.

Nodular Hyperplasias

Solitary or multiple hyperplastic hepatocellular nodules may develop in the noncirrhotic liver. Two such conditions are *focal nodular hyperplasia* and *nodular regenerative hyperplasia.* The common factor in both types of nodules seems to be either focal or diffuse alterations in hepatic blood supply, arising from obliteration of portal vein radicles and compensatory augmentation of arterial blood supply.

MORPHOLOGY

Focal nodular hyperplasia appears as a well-demarcated but poorly encapsulated nodule, ranging up to many centimeters in diameter (Fig. 18-51*A*). It presents as a spontaneous mass lesion in an otherwise normal liver, most frequently in young to middle-aged adults. The lesion is generally lighter than the surrounding liver and is sometimes yellow indicating steatosis. Typically, there is a central gray-white, depressed stellate scar from which fibrous septa radiate to the periphery.

The central scar contains large vessels, usually arterial, that typically show fibromuscular hyperplasia with eccentric or concentric narrowing of the lumen. The radiating septa show variable ductular reactions along septal margins. The parenchyma between septa is comprised of normal hepatocytes separated by thickened sinusoidal plates (Fig. 18-51*B*). The vascular lesion, congenital or acquired, is probably the initiating insult. Resulting areas of hypoperfused parenchyma collapse to become the septa, while hyperperfused regions undergo hyperplasia.

Nodular regenerative hyperplasia denotes a liver entirely transformed into nodules—grossly similar to micronodular cirrhosis—but without fibrosis. Microscopically, plump hepatocytes are surrounded by rims of atrophic hepatocytes. **Nodular regenerative hyperplasia can lead to the development of portal hypertension** and occurs in association with conditions affecting intrahepatic blood flow, including solid-organ (particularly renal) transplantation, hematopoetic stem cell transplantation, and vasculitis. It also occurs in HIV-infected persons and in association with rheumatologic diseases such as SLE. Most such patients are asymptomatic and the condition is found at autopsy.

Benign Neoplasms

Cavernous hemangiomas, blood vessel tumors identical to those occurring elsewhere, are the most common benign liver tumors (Chapter 11). They appear as discrete red-blue, soft nodules, usually less than 2 cm in diameter, generally located directly beneath the capsule. Histologically, the tumor consists of vascular channels in a bed of fibrous connective tissue (Fig. 18-52). Their chief clinical significance is that they might be mistaken radiographically or intraoperatively for metastatic tumors.

Hepatocellular Adenomas

Benign neoplasms developing from hepatocytes are called hepatocellular adenomas (Fig. 18-53). They may be detected incidentally with abdominal imaging or when they cause abdominal pain from their rapid growth, causing pressure on the liver capsule, or following hemorrhagic necrosis as the lesion outstrips its blood supply. Rupture of hepatocellular adenomas may lead to intraabdominal bleeding that is a surgical emergency. Three large subtypes have been defined on the basis of molecular analysis and associated clinical and pathologic findings, each

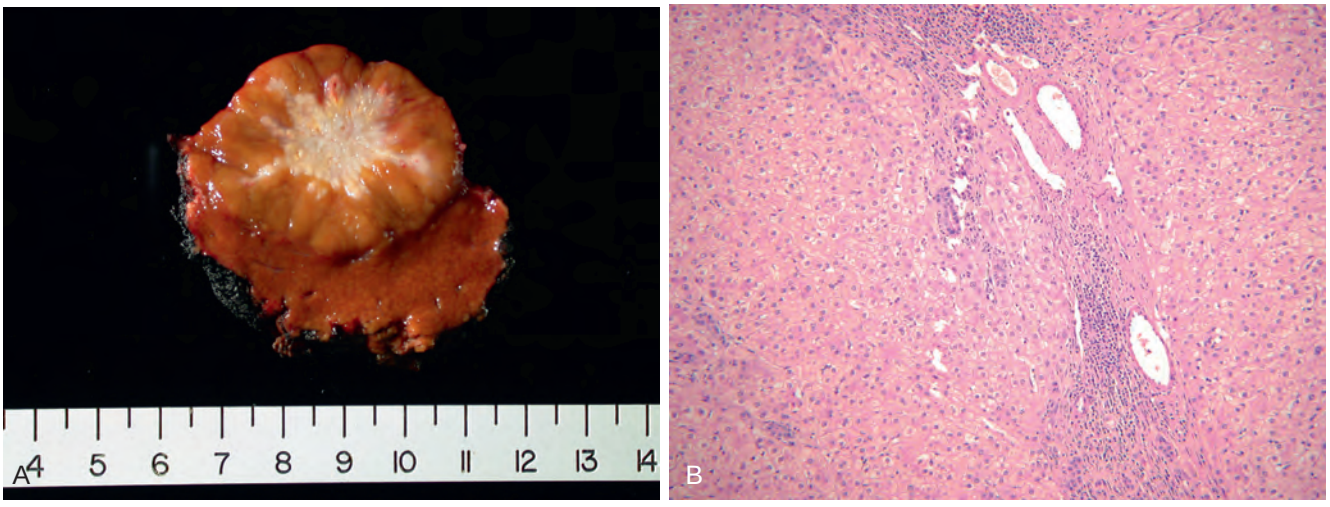

Figure 18-51 Focal nodular hyperplasia. **A,** Resected specimen showing lobulated contours and a central stellate scar. **B,** Low-power micrograph showing a broad fibrous scar with hepatic arterial and bile duct elements and chronic inflammation present within parenchyma that lacks normal architecture due to hepatocyte regeneration.