Extrahepatic portal vein obstruction may be may idiopathic (approximately one-third of cases) or may arise from the following conditions:

- Subclinical occlusion of the portal vein, from neonatal umbilical sepsis or umbilical vein catheterization, presenting as variceal bleeding and ascites years later.
- Intraabdominal sepsis, caused by acute diverticulitis or appendicitis, leading to pyelophlebitis in the splanchnic circulation
- Inherited or acquired hypercoagulable disorders, including those arising in myeloproliferative disorders such as polycythemia vera (Chapter 13)
- Trauma, surgical or otherwise
- Pancreatitis and pancreatic cancer that initiate splenic vein thrombosis, which propagates into the portal vein
- Invasion of the portal vein by hepatocellular carcinoma
- Cirrhosis, which is associated with portal vein thrombosis in about 25% of patients. Many such patients have an underlying thrombophilic genotype

Intrahepatic portal vein radicles may be obstructed by acute thrombosis. The thrombosis does not cause ischemic infarction but instead results in a sharply demarcated area of red-blue discoloration called *infarct of Zahn*. There is no necrosis, only severe hepatocellular atrophy and marked stasis in distended sinusoids.

Small portal vein branch diseases include a variety of pathogenetically distinct conditions that are characterized by noncirrhotic portal hypertension with portal fibrosis and obliteration of small portal vein branches. *The most common cause of small portal vein branch obstruction is schistosomiasis*; the eggs of the parasites lodge in and obstruct the smallest portal vein branches. The other diseases in this group are now collectively referred to as *obliterative portal venopathy*, although regional and clinical differences suggest several related but independent diseases. In India, non cirrhotic portal fibrosis has been reported to account for approximately 23 % of cases of portal hypertension but the incidence seems to be declining. The patients often present with upper gastrointestinal bleeding. In East Asia, particularly Japan, there is a female predominance and patients present with splenomegaly, often in association with rheumatologic diseases. The disease is seen in untreated HIV disease and in those being treated with anti-retroviral therapy, in whom it may represent a complication of treatment. Liver transplantation may be necessary to avoid fatal sequelae of the portal hypertension in all these forms.

Impaired Blood Flow Through the Liver

The most common intrahepatic cause of blood flow obstruction is cirrhosis, as described earlier. In addition, physical sinusoidal occlusion occurs in a small group of diseases: *sickle cell disease* (Fig. 18-45), *disseminated intravascular coagulation*, *eclampsia* (discussed later), and diffuse intrasinusoidal *metastatic tumor*. In all of these, obstruction of blood flow may lead to massive necrosis of hepatocytes and acute hepatic failure.

Peliosis hepatis is a peculiar form of sinusoidal dilation that occurs in any condition in which efflux of hepatic blood is impeded. The liver contains blood-filled cystic spaces, either unlined or lined with sinusoidal endothelial cells. The pathogenesis of peliosis hepatis is unknown.

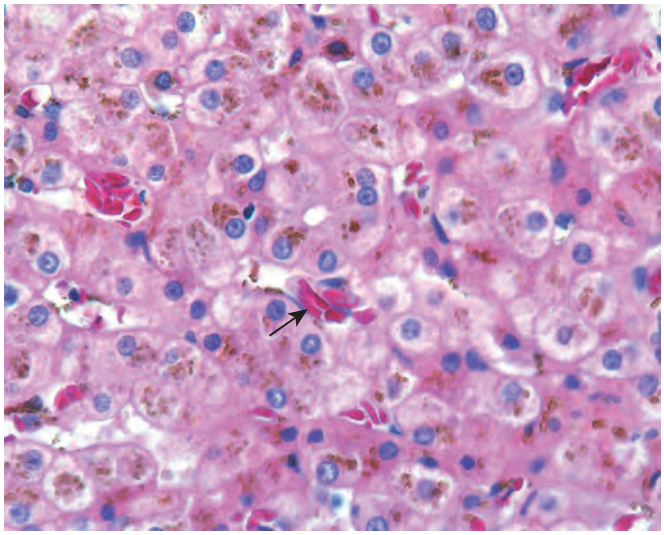

Figure 18-45 Sickle cell crisis in liver. The photomicrograph shows several sinusoids containing "sickled" red cells *(arrow)*.

Bartonella species have been seen in the sinusoidal endothelial cells in AIDS-associated peliosis, but peliosis is also seen in cancer, tuberculosis, and posttransplantation immunodeficiency. Sex hormone administration (e.g., anabolic steroids, oral contraceptives, danazol) sometimes causes peliosis as well. While clinical signs are generally absent, potentially fatal intraabdominal hemorrhage or hepatic failure may occur. Lesions usually disappear after correction of the underlying causes.

Hepatic Venous Outflow Obstruction

Hepatic Vein Thrombosis

The obstruction of two or more major hepatic veins produces liver enlargement, pain, and ascites, a condition known as Budd-Chiari syndrome. Obstruction of a single main hepatic vein by thrombosis is clinically silent. Hepatic damage is the consequence of increased intrahepatic blood pressure. Hepatic vein thrombosis is associated with myeloproliferative disorders such as polycythemia vera (Chapter 13), inherited disorders of coagulation (Chapter 4), antiphospholipid antibody syndrome, paroxysmal nocturnal hemoglobinuria (Chapter 14), and intraabdominal cancers, particularly hepatocellular carcinoma. In pregnancy or with oral contraceptive use, it occurs through interaction with an underlying thrombogenic disorder.

MORPHOLOGY

In the Budd-Chiari syndrome, the liver is swollen and red-purple and has a tense capsule (Fig. 18-46). There may be differential areas of hemorrhagic collapse alternating with areas of preserved or regenerating parenchyma, the patterns are dependent on which small and large hepatic veins are obstructed. Microscopically the affected hepatic parenchyma reveals severe centrilobular congestion and necrosis. Centrilobular fibrosis develops in instances in which the thrombosis is more slowly developing. The major veins may contain totally occlusive fresh thrombi, subtotal occlusion, or, in chronic cases, organized adherent thrombi.