

resulted in 83% to 91% 1-year survival rates in many large hospital centers ([Kamath and Olthoff, 2010](#)). The policy governing the allocation of livers for transplantation by the United Network for Organ Sharing allows pediatric patients younger than 12 years old, those with acute fulminant liver failure, or those with chronic liver disease to be placed at the top of the network's transplantation lists ([Kamath and Olthoff, 2010](#)). Although this change has benefited many pediatric patients, the shortage of available donors for children continues to dictate transplantation decisions, and many children continue to die while waiting for a suitable donor.

Nutritional support is an important therapy for children with cirrhosis and malnutrition. Supplements of fat-soluble vitamins are often required, and mineral supplements may be indicated. In some instances, aggressive nutritional support in the form of enteral feedings or PN may be necessary.

Esophageal and gastric varices can be life-threatening complications of portal hypertension. Acute hemorrhage is managed with IV fluids, blood products, vitamin K if needed to correct coagulopathy, vasopressin or somatostatin, and gastric lavage. If acute hemorrhage persists, the most common secondary approach is endoscopic sclerotherapy or endoscopic banding ligation ([El-Tawil, 2012](#)). Balloon tamponade with a Sengstaken-Blakemore tube may be indicated for the unstable patient with acute hemorrhage ([El-Tawil, 2012](#)). Ascites can be managed by sodium and fluid restrictions and diuretics. Severe ascites with respiratory compromise can be managed with albumin infusions or by paracentesis.

Although the full mechanism of hepatic encephalopathy is unknown, failure of the damaged liver to remove endogenous toxins, such as ammonia, plays a role. Treatment is directed at limiting the ammonia formation and absorption that occur in the bowel, especially with the drugs neomycin and lactulose. Because ammonia is formed in the bowel by the action of bacteria on ingested protein, neomycin reduces the number of intestinal bacteria so that less ammonia is produced. The fermentation of lactulose by colonic bacteria produces short-chain fatty acids that lower the colonic pH, thereby inhibiting bacterial metabolism. This decreases the formation of ammonia from bacterial metabolism of protein.