

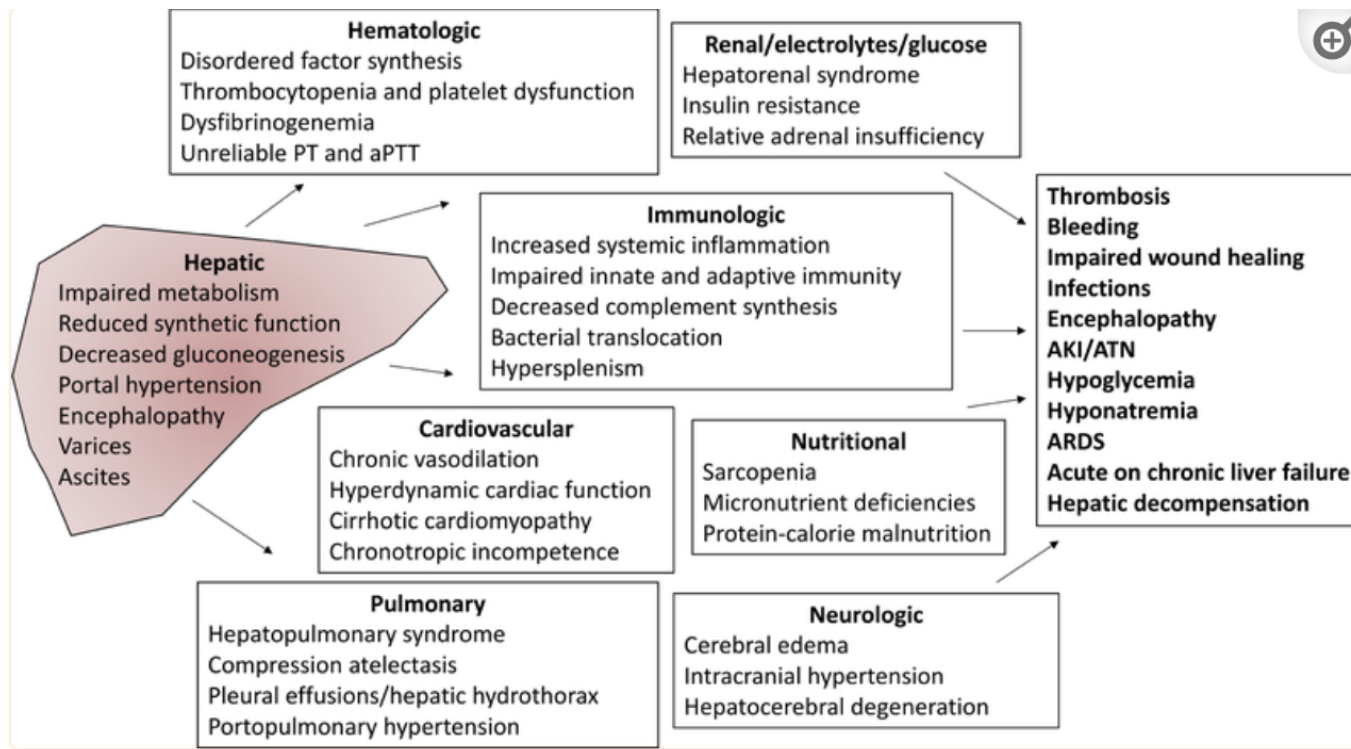
# Education

## **Abdominal drainage after liver resection for hepatocellular carcinoma in cirrhotic patients: a randomized controlled study**

Josep Fuster <sup>1</sup>, Josep M Llovet, Juan C Garcia-Valdecasas, Luis Grande, Constantino Fondevila, Ramon Vilana, Jordi Palacin, Jeanine Tabet, Joana Ferrer, Jordi Bruix, Josep Visa

# Perioperative Evaluation and Management of Patients with Cirrhosis: Risk Assessment, Surgical Outcomes, and Future Directions

[Kira L. Newman](#),<sup>3</sup> [Kay M. Johnson](#),<sup>4</sup> [Paul B. Cornia](#),<sup>4</sup> [Peter Wu](#),<sup>5</sup> [Kamal Itani](#),<sup>6</sup> and [George N. Ioannou](#)<sup>1,2</sup>



# Perioperative Care of Patients With Liver Cirrhosis: A Review

[Naeem Abbas](#),<sup>1</sup> [Jasbir Makker](#),<sup>2</sup> [Hafsa Abbas](#),<sup>3</sup> and [Bhavna Balar](#)<sup>2,4</sup>

Clinical areas to be addressed	Pathophysiological changes	Potential complications	Evaluation	Perioperative management
Nutrition and metabolism	Protein calorie malnutrition Depletion of glycogen storage	Muscle wasting, impaired mobility, increased need for postoperative ventilation, impaired wound healing, sepsis, and delay in recovery	Serum albumin Anthropometric measurement	Diet with high carbohydrate, high lipid content, and low in amino acid Protein intake of 1.0 to 1.5 g/kg daily Monitoring for hypoglycemia and hyperglycemia Vitamin B1 in alcoholics
Portal hypertension and ascites	Portal hypertension	Decreased quality of life, spontaneous bacterial peritonitis, increased risk of abdominal wound dehiscence, recurrence of abdominal wall hernia, and respiratory compromise	Clinical evaluation Ultrasonography	Salt and water restriction, Diuretics Ascitic fluid analysis SBP treatment and prophylaxis Large-volume paracentesis for uncontrolled ascites with albumin TIPS for refractory ascites
Renal	Low renal blood flow and low glomerular filtration rate Raised aldosterone	Acute kidney injury Hepatorenal syndrome	Serum creatinine, GFR, and urine analysis	Fluid and electrolyte balance Avoid nephrotoxic drugs including contrast agents Combination of albumin and terlipressin or octrotide with midodrine in HRS
Cerebral	Glial edema	Hepatic encephalopathy	Clinical assessment	Use of lactulose, metronidazole, and neomycin

Pulmonary	Pleural effusion Hepatopulmonary syndrome Portopulmonary hypertension	Hypoxemia Respiratory compromise	Chest imaging Bubble ECHO for HPS Pulmonary function tests	Optimize pulmonary functions Incentive spirometry Intravenous prostacyclin in selective cases
Cardiac	Increased cardiac output, Systemic vasodilation	Cardiomyopathy	Dobutamine stress ECHO	Optimization of fluid status ACC and AHA guidelines for noncardiac surgery <sup>104</sup> β-blockers in perioperative period (need reference)
Electrolytes and Metabolism	Hyponatremia (fluid overload) Hypoglycemia (depletion of glycogen stores)	Electrolyte disorders	Check the serum electrolytes	Monitor and correct hyponatremia and hypokalemia Blood sugar monitoring
Hematology	Thrombocytopenia, hypocoagulability, and hypercoagulability Bone marrow suppression	Anemia, bleeding, thrombocytopenia	Complete blood count, coagulation profile, thromboelastography	Maintain Hb >10 g/dL INR correction with intravenous vitamin K, FFP, and cryoprecipitate. May need DDAVP, recombinant factor VIIa, aprotinin, and tranexamic acid Prophylactic platelets transfusion for platelets <50 000

# Recommendations

- **Intra-operative drain placement for ascites management in decompensated cirrhotic patients**
- **Earlier intervention if suspicion for infection, pathology given increased risk for complications, organ dysfunction, and mortality in cirrhosis.**