General Surgery or Procedure GRG

GRG: SG-GS (ISC GRG)

MCG Health
General Recovery Care
30th Edition
Surgical Admission Case Management GRG GRG

Note: An appropriate Optimal Recovery Guideline (ORG) should be identified and used whenever possible. This General Recovery Guideline (GRG) is intended to aid only in situations in which no ORG appears applicable.

Care Planning - Inpatient Admission and Alternatives

Clinical Indications for Procedure

- Surgery or other procedure covered by this guideline is indicated for **1 or more** of the following:
  - General abdominal procedure needed, as indicated by **1 or more** of the following:
    - Exploratory laparotomy(1)(2)
    - Trauma evaluation or repair(1)(2)
    - Biopsy or resection of mass (eg, tumor, lymph node)(3)(4)
    - Evaluation and treatment of infectious processes (eg, abscess unresponsive to antibiotics, or peritoneal signs)(5)(6)
    - Evaluation and treatment of suspected mesenteric ischemia(7)
    - Peritoneal signs
  - Repair or reconstruction of abdominal wall defects (eg, congenital defects)(3)(8)(9)(10)
  - Procedure on stomach needed, as indicated by **1 or more** of the following:
    - Perforation repair(4)(11)(12)
    - Drainage of abscess(6)
    - Gastric outlet obstruction repair(4)(13)
    - Control of ulcer bleeding (eg, not controlled by endoscopy)(4)(11)(14)
    - Control of non-ulcer bleeding (eg, bleeding not controlled by saline lavage or vasopressin infusion)(14)
    - Removal of gastric restrictive device (eg, for band slippage, obstruction, dehiscence, or erosion; or for intractable gastroesophageal reflux or esophagitis)(15)(16)
    - Segmental or wedge resection (eg, for gastrointestinal stromal tumor, benign tumor, Dieulafoy lesion)(4)(17)
    - Endoscopic full-thickness resection (for subepithelial gastrointestinal lesions)(18)
    - Other gastric surgery needed (eg, gastropexy for volvulus, gastrostomy, gastric bezoar with failure of enzymatic or endoscopic management)(4)(19)
  - Diaphragmatic hernia repair[A](10)(20)
  - Total gastrectomy needed, as indicated by **1 or more** of the following:
    - Gastric cancer deemed potentially resectable for cure (eg, without evidence of locoregional involvement of the root of the mesentery, para-aortic lymph nodes, or invasion or encasement of major blood vessels, and without distal involvement of

peritoneum or distant metastases)(4)(21)
- Prophylactic total gastrectomy for patient with pathogenic CDH1 gene mutation(21)(22)(23)
- Life-threatening gastric hemorrhage refractory to nonsurgical treatment (eg, endoscopic therapy, transcatheter embolization) and not amenable to less extensive procedure (eg, mucosal oversewing, partial gastrectomy)(4)(24)
- Hypertrophic gastritis (Menetrier disease) with ongoing massive protein loss despite nonsurgical therapy (eg, acid suppression, high-protein diet, octreotide, and treatment of associated cytomegalovirus or *Helicobacter pylori* infection)(4)

− Gastrectomy with biliopancreatic diversion (with or without duodenal switch) or single-anastomosis duodeno-ileal bypass needed, as indicated by **1 or more** of the following[B](27):
- Patient is candidate for biliopancreatic diversion as primary bariatric surgical procedure, as indicated by **ALL** of the following(27)(28)(29):
  - Severe obesity (eg, BMI of 60 or greater)[C] BMI Calculator
  - Patient has tried and failed to achieve and maintain sufficient weight loss with nonsurgical treatment.[D]
  - Correctable cause for obesity not identified (eg, hypothyroidism, Cushing syndrome)
  - Current substance abuse not identified
  - Not currently pregnant and no planned pregnancy within 18 months of surgery[E]
  - Expectation that patient will be able to adhere to postoperative care requirements (eg, judged to be committed and willing to participate and adhere to postoperative instructions)
  - No current untreated eating disorder
  - No serious untreated or uncontrolled medical, psychiatric, psychosocial, or cognitive condition that would interfere with adherence to postoperative instructions and self-management
  - Patient is receiving treatment in multidisciplinary program experienced in metabolic surgery that can provide appropriate care (eg, preoperative medical or mental health consultation, nutritional counseling, patient support programs).
- Patient had prior alternative bariatric procedure (eg, laparoscopic sleeve gastrectomy) with need for conversion to biliopancreatic diversion, as indicated by **ALL** of the following(26)(32)(33)(34):
  - BMI greater than 35[F] (32.5 in Asian patients)[G] BMI Calculator(31)(41)
  - Insufficient weight loss or excessive weight regain 1 year or longer after prior bariatric procedure BMI Calculator[H](26)(32)(44)
  - Patient remains candidate for bariatric surgery, as indicated by **ALL** of the following:
    - Current substance abuse not identified
    - Not currently pregnant and no planned pregnancy within 18 months of surgery
    - Expectation that patient will be able to adhere to postoperative care requirements (eg, judged to be committed and willing to participate and adhere to postoperative instructions)
    - No current untreated eating disorder
    - No serious untreated or uncontrolled medical, psychiatric, psychosocial, or cognitive condition that would interfere with adherence to postoperative instructions and self-management
    - Patient is receiving treatment in multidisciplinary program experienced in metabolic surgery that can provide appropriate care (eg, preoperative medical or mental health consultation, nutritional counseling, patient support programs).

− Other reoperative bariatric surgery procedure needed, as indicated by **ALL** of the following[I](16)(26)(27)(33)(42)(43):
- Revision procedure appropriate, as indicated by **1 or more** of the following:
  - Complications from, or failure of, initial procedure, as indicated by **1 or more** of the following:
    - Band slippage, obstruction, dehiscence, or erosion (from laparoscopic adjustable gastric band, nonadjustable gastric band, or vertical banded gastroplasty procedure)(44)
    - Anastomotic leak(44)
    - Anastomotic stricture or ulcer
    - Gastric pouch dilation or stricture
    - Gastric fistula
    - Sleeve stricture or dilation(44)
    - Gastroesophageal reflux disease(45)
    - Dumping syndrome (postprandial rapid stomach emptying with cramping and diarrhea) uncontrolled by dietary changes
    - Excessive weight loss
    - Metabolic derangements (eg, severe malnutrition, vitamin deficiency, refractory hypoglycemia or hypocalcemia following Roux-en-Y bariatric procedure)(44)
    - Other complication that requires surgical revision(44)
  - Insufficient weight loss or excessive weight regain 1 year or longer after prior bariatric procedure,[H] as indicated by **1 or more** of the following:
    - Adult patient with BMI of 35 or greater (32.5 or greater in Asian patients)[G] BMI Calculator
    - Adult patient with BMI of 30 to 34.9 (27.5 to 32.4 in Asian patients)[G] and clinically serious condition related to obesity (eg, type 2 diabetes, obesity hypoventilation, obstructive sleep apnea, metabolic

dysfunction-associated steatotic liver disease (formerly nonalcoholic fatty liver disease), metabolic dysfunction-associated steatohepatitis (formerly nonalcoholic steatohepatitis), pseudotumor cerebri, polycystic ovary syndrome, severe osteoarthritis, treatment-resistant hypertension[J])

 BMI Calculator(31)

- Patient remains candidate for bariatric surgery, as indicated by **ALL** of the following:
  - Current substance abuse not identified
  - Not currently pregnant and no planned pregnancy within 18 months of surgery
  - Expectation that patient will be able to adhere to postoperative care requirements (eg, judged to be committed and willing to participate and adhere to postoperative instructions)
  - No current untreated eating disorder
  - No serious untreated or uncontrolled medical, psychiatric, psychosocial, or cognitive condition that would interfere with adherence to postoperative instructions and self-management
  - Patient is receiving treatment in multidisciplinary program experienced in metabolic surgery that can provide appropriate care (eg, preoperative medical or mental health consultation, nutritional counseling, patient support programs).

− Procedure on intestinal tract (eg, small intestine, large intestine, rectum) needed, as indicated by **1 or more** of the following(5)(46)(47)(48):

- Clinically significant bleeding not controlled by endoscopy, embolization, or vasopressin(14)
- Perforation(11)(12)(49)
- Foreign body not amenable to observation with serial imaging or endoscopic removal(49)
- Gallstone ileus(50)(51)(52)
- Congenital abnormalities (eg, atresia, Hirschsprung disease, malrotation)(53)
- Surgical hemorrhoidectomy, as indicated for **1 or more** of the following(48)(54):
  - Thrombosed external hemorrhoid(48)(54)
  - Symptomatic combined external and internal hemorrhoid(48)(54)
  - Internal hemorrhoid with failure or contraindication to banding or other office-based procedure(54)
  - Grade III (prolapsed but can be manually reduced) or IV (prolapsed and irreducible) hemorrhoid(48)
- Rectal prolapse(47)(48)
- Anal fissure with failure of medical treatment (eg, topical nitrates, oral calcium channel blocker, botulinum toxin A injection)(48)(55)
- Abscess requiring drainage (eg, diverticular abscess)(6)
- Obstruction or fecal incontinence (eg, diverting colostomy, anal sphincteroplasty)(56)(57)(58)
- Endoscopic full-thickness resection (for subepithelial gastrointestinal lesions, duodenal adenomas)(18)(59)
- Other abnormality of intestinal tract requiring surgery

− Anorectal abscess requiring operative management, as indicated by **1 or more** of the following[K](61):

- Systemic symptoms (fever)
- Large, complicated (eg, loculated) abscess, or abscess involving deeper structures (eg, intersphincteric, ischiorectal, or supralevator)(60)(61)
- Abscess with associated fistula(47)(61)
- Abscess involving the anal sphincter(60)(61)
- Immunosuppressed patient(47)
- Recurrent abscess(47)(60)

− Breast procedure needed, as indicated by **1 or more** of the following(62):

- Biopsy(62)
- Abscess drainage(62)
- Resection of small benign lesions (eg, fibroadenoma, papilloma, recurrent cyst)(62)(63)
- Injury repair
- Reduction mammaplasty(64)
- Delayed breast reconstruction after mastectomy (eg, as separate procedure, not done at time of mastectomy)[L](65)(66)
- Removal of hardware (eg, implants, expanders)(67)
- Treatment of recurrent breast cancer (eg, recurrence after complete mastectomy)
- Other breast condition requiring surgery(62)

− Resection of hepatocellular carcinoma, as indicated by **ALL** of the following(68)(69):

- Child-Pugh class A or B
- Portal hypertension absent or mild
- Resectable mass (eg, solitary mass without major vascular invasion)[M]
- Adequate future liver remnant

− Procedure on liver or biliary tract needed, as indicated by **1 or more** of the following(52)(70)(71)(72):

- Liver biopsy(73)
- Resection of cholangiocarcinoma(70)(74)
- Resection of metastatic carcinoma(73)(75)

- Resection of hepatoblastoma(76)
- Resection of hepatocellular adenoma greater than 5 cm in diameter(76)(77)
- Drainage of intrahepatic abscess(6)
- Cholecystostomy(78)
- Partial hepatectomy
- Bile duct resection, biliary tree repair or reconstruction
- Uncontrolled bleeding
- Other liver or biliary tract condition requiring surgery(76)

− Procedure on pancreas needed, as indicated by **1 or more** of the following(79)(80)(81):
- Biopsy(82)
- Drainage of pancreatic fluid collection or pseudocyst(83)(84)
- Resection and closure of pancreaticoenteric fistula(85)
- Drainage of obstructed dilated pancreatic duct associated with chronic pancreatitis, with or without partial pancreatic resection(79)(80)(81)(86)
- Drainage of abscess
- Partial resection for mass (eg, inflammatory from chronic pancreatitis, suspected or confirmed malignancy) or cyst(79)(81)(82)(84)(86)

− Procedure on spleen needed, as indicated by **1 or more** of the following(87):
- Biopsy(88)
- Repair[N](89)(90)
- Partial resection (eg, for tumor, cyst, hematologic disease, trauma)(89)(91)

- Ostomy procedure needed (eg, revision, repair, closure)(92)(93)
- Drainage or closure of fistula tract needed(94)

− Intestinal transplant needed, as indicated by **1 or more** of the following(95)(96)(97)(98):
- Intestinal failure or short gut syndrome with failure of home parenteral nutrition, as indicated by **1 or more** of the following[O]:
  - Twin, HLA identical match, or other acceptable living intestinal donor available(99)(100)
  - Frequent hospitalizations(98)
  - Impending or overt liver failure due to parenteral nutrition liver injury (eg, total bilirubin greater than 3 mg/dL (51 micromoles/L), progressive thrombocytopenia, splenomegaly, portal hypertension)(98)
  - Total bilirubin greater than 4.4 mg/dL (75 micromoles/L) despite lipid infusion modification that persists for more than 2 months(95)(97)(98)
  - Loss of, or impending loss of, venous access (eg, central venous catheter-related thrombosis affecting multiple subclavian or internal jugular veins)(97)(98)
  - Severe central venous catheter-related sepsis (ie, multiple hospitalizations per year, or a single episode of fungemia, septic shock, or acute respiratory distress syndrome)(98)
  - Child with 2 or more ICU admissions requiring mechanical ventilation or inotrope infusion due to complications of intestinal failure(95)
  - Frequent episodes of severe dehydration despite addition of IV fluid to parenteral nutrition(98)
  - Patient unwilling to accept long-term parenteral nutrition
- Invasive intra-abdominal desmoid tumors(97)(98)
- Congenital mucosal disorder(95)
- Ultra-short bowel syndrome (residual bowel less than 10 cm in infants or less than 20 cm in adults)(97)
- Need for multivisceral organ transplant (eg, portomesenteric thrombosis, intestinal infarction with hepatic failure, tumor involving mesentery and other solid organ)(95)(97)(98)
- Failure of first intestinal transplant(95)(98)(101)

− Pancreas transplant needed, as indicated by **1 or more** of the following(38)(102)(103):
- Recurrent severe diabetic ketoacidosis despite optimized glycemic management(38)
- Recurrent severe hypoglycemia or hyperglycemia despite optimized glycemic management(38)
- Significant diabetic hypoglycemia unawareness
- Severe problems (eg, inability to tolerate) with exogenous insulin therapy
- Significant pancreatic destruction or dysfunction (eg, pancreatitis, cystic fibrosis, hemochromatosis)
- Significant pancreatic resection (eg, trauma, neoplasia)

− Dual liver-renal transplant in adult, as indicated by **ALL** of the following:

− Liver transplant in adult, as indicated by **ALL** of the following(104):

− Liver transplant needed, as indicated by **1 or more** of the following:
- Cardiac cirrhosis[P]
- Congenital heart disease with associated hepatic injury (eg, Fontan-associated liver disease or other single-ventricle congenital disorders)(104)(105)(106)

− Metabolic liver disorder with associated cardiac complications, including **1 or more** of the following(104)(105):
- Familial hypercholesterolemia

- Variant transthyretin amyloidosis
- Hemochromatosis
- Glycogen storage disease
- Alcohol-associated cirrhosis with concurrent alcohol-associated cardiomyopathy

− Acute liver failure (also known as fulminant liver failure), as indicated by **ALL** of the following(107):
- Acute liver disease (ie, 56 days' duration or less)[Q](109)
- Hepatic encephalopathy of any degree[R](108)
- Severe manifestation of liver disease, as indicated by **1 or more** of the following:
  - Acute need for mechanical ventilation(108)
  - Acute need for renal replacement therapy(108)
  - INR of 2.0 or more(108)

− Severe chronic liver disease, as indicated by **1 or more** of the following(109)(111)(112)(113)(114):
- Model for End-Stage Liver Disease (MELD) score greater than or equal to 15[S]
- − Complication of liver disease, as indicated by **1 or more** of the following(111)(116):
  - Budd-Chiari syndrome(111)
  - Spur cell hemolytic anemia not attributed to acute infection or alcohol use(111)
  - Chronic recurrent hepatic hydrothorax(111)
  - Variceal bleeding that persists despite treatment (eg, beta-blocker therapy, band ligation)(111)(116)
  - Ascites that persists or recurs despite diuresis and low-sodium diet(111)(116)
  - Hepatic encephalopathy that persists despite treatment (eg, lactulose, rifaximin)(111)(116)
  - Hepatorenal syndrome(116)
  - Progressive protein-calorie malnutrition(116)

− Acute-on-chronic liver disease, as indicated by **1 or more** of the following(117):
- European Association for the Study of the Liver-Chronic Liver Failure Consortium (EASL-CLIF-C) score of 2 or 3[T](117)
- Acute-on-chronic liver failure grade of 3[U](119)
- − Multiorgan failure, as indicated by **2 or more** of the following[V](117):
  - Liver failure as indicated by bilirubin of 12 mg/dL (205 micromoles/L) or higher
  - Hepatic encephalopathy grade III or higher by West Haven criteria[R][W]
  - Renal failure as indicated by serum creatinine of 2 mg/dL (177 micromoles/L) or greater, or need for renal replacement therapy
  - Coagulation failure as indicated by INR of 2.5 or greater
  - Circulatory failure with need for vasoconstrictor or inotropic agent
  - Respiratory failure with either a PaO_2 to FiO_2 ratio between 150 and 200 mm Hg or an SpO_2 to FiO_2 ratio between 150 and 214[X]

− Hepatocellular carcinoma and **ALL** of the following(68)(69)(124):
- Alpha-fetoprotein 1000 ng/mL (mcg/L) or less(108)
- Imaging is negative for extrahepatic disease and macrovascular involvement (eg, portal or hepatic vein invasion).(108)(125)
- Tumor size appropriate for transplant as indicated by a single lesion 2 to 5 cm in diameter or 2 or 3 lesions of 1 to 3 cm in diameter(108)(125)

− Cholangiocarcinoma and **ALL** of the following(126):
- Tumor 3 cm in diameter or smaller(70)(108)(125)
- Unresectable due to location (eg, perihilar, vital vessel involvement), extent (eg, multifocal, bilobar disease), or severe underlying hepatic disease(108)(125)
- No metastatic or nodal disease(70)(108)(125)
- Neoadjuvant chemoradiation planned prior to transplant(70)(108)

− Neuroendocrine tumor and **ALL** of the following(127):
- Primary tumor and extrahepatic disease resected with curative intent 6 months or more prior to transplant(125)
- Stable disease for 6 months or more prior to transplant
- Tumor not amenable to resection(125)
- No evidence of extrahepatic metastases(125)

− Colorectal liver metastases and **ALL** of the following(127)(128)(129)(130):
- Primary tumor resected with clear margins(125)(129)
- Histology is not signet ring cell carcinoma or undifferentiated adenocarcinoma.(129)
- No evidence of extrahepatic metastatic disease on PET-CT scan(125)(128)
- Liver metastases are not resectable.(125)(127)(128)
- Molecular marker BRAF V600E is absent.(125)(128)
- Patient is not immunotherapy candidate.(129)

- Metastatic lesions do not progress during at least 6 months of observation following bridging chemotherapy.(125)(129)

- Polycystic liver disease and **ALL** of the following(111):
  - Surgical therapy (removal of cysts, fenestration) not effective or not possible(111)
  - Severe disease, as indicated by **1 or more** of the following:
    - Hepatic decompensation (eg, ascites, hepatic encephalopathy)(111)
    - Concurrent hemodialysis or GFR less than 20 mL/min/1.73m^2 (0.33 mL/sec/1.73m^2) eGFR - Adult Calculator(111)
    - Prior kidney transplant(111)
    - Moderate to severe protein-calorie malnutrition(111)
    - Severe sarcopenia (eg, skeletal muscle index of less than 39 cm^2/m^2 in women or less than 50 cm^2/m^2 in men)(111)
- Primary or secondary sclerosing cholangitis and **ALL** of the following(111):
  - Cirrhosis on imaging or liver biopsy
  - In past year, 2 or more episodes of cholangitis leading to bacteremia or hypotension necessitating IV vasopressor support(111)
  - Transplant necessary due to **1 or more** of the following:
    - Biliary tract stricture not responsive to alternative intervention(111)
    - Resistant organism causing cholangitis (eg, vancomycin-resistant *Enterococcus*, extended spectrum beta-lactamase (ESBL)-producing Gram-negative organisms, carbapenem-resistant *Enterobacteriaceae*, multidrug-resistant *Acinetobacter*)
- Familial (transthyretin) amyloidosis(131)
- Hepatopulmonary syndrome and[Y] **ALL** of the following:
  - Sequelae of portal hypertension (eg, ascites, varices, splenomegaly, thrombocytopenia)
  - PaO_2 less than 60 mm Hg (8.0 kPa) (on room air) not otherwise explained by underlying pulmonary disease (eg, COPD)
  - Right to left cardiac shunt demonstrated by contrast echocardiogram ("bubble study") or nuclear perfusion lung scan
- Portopulmonary hypertension and **ALL** of the following(108)(134):
  - Portal hypertension
  - Pulmonary hypertension on right heart catheterization with **ALL** of the following:
    - Mean pulmonary artery pressure 35 mm Hg or greater at rest
    - Pulmonary vascular resistance 3 Wood units (240 dynes*sec/cm^5) or greater
  - Other causes of pulmonary hypertension not a significant contributor to pulmonary hypertension (eg, heart failure, valvular heart disease, parenchymal pulmonary disease)
  - Satisfactory response to pulmonary hypertension treatment (eg, vasodilators, endothelin receptor antagonist), as indicated by **1 or more** of the following[Z](119)(133)(134):
    - Post-treatment mean pulmonary artery pressure is less than 35 mm Hg and pulmonary vascular resistance is less than 5 Wood units (400 dynes*sec/cm^5).
    - Post-treatment mean pulmonary artery pressure is more than 35 mm Hg and less than 45 mm Hg and pulmonary vascular resistance is less than 3 Wood units (240 dynes*sec/cm^5).
- Wilson disease and **1 or more** of the following(108)(135)(136):
  - Acute liver failure[AA]
  - Acute decompensated liver disease unresponsive to medical therapy (eg, chelation, zinc)[BB]
  - Progressive chronic liver failure (eg, jaundice, ascites, hepatic encephalopathy, varices)[CC]
- Acute severe autoimmune hepatitis and **1 or more** of the following(119):
  - Severe coagulopathy (INR 1.5 or greater) with severe hepatic encephalopathy (grade III or IV)
  - Worsening liver function tests despite corticosteroid therapy
  - New or worsening hepatic encephalopathy despite corticosteroid therapy
- Anhepatic state[DD](108)
- Hepatic adenoma or multiple adenomas and **ALL** of the following(125):
  - One or more adenoma not appropriate for resection or medical management(125)(139)
  - Liver transplant necessary, as indicated by **1 or more** of the following:
    - Biopsy-proven malignant transformation of one or more adenomas(125)(139)
    - Glycogen storage disease-associated adenoma[EE](125)(139)
    - High risk for malignancy or malignant transformation (eg, increasing size, positive beta-catenin nuclear staining)(125)(139)
    - Hemorrhagic complication in one or more adenoma(125)
- Hereditary hemorrhagic telangiectasia and **ALL** of the following(125):
  - Intrahepatic arteriovenous malformations on imaging(125)
  - High-output heart failure on echocardiogram(125)

- Acute hepatic porphyria with recurrent intractable symptoms despite pharmacotherapy (eg, prophylactic hemin or givosiran therapy)(140)
- Other hepatic disorder associated with increased mortality that can be addressed with liver transplant (eg, primary biliary cholangitis, hemochromatosis, alpha-1 antitrypsin deficiency)(131)(141)

− Repeat transplant (ie, replacement of previously placed transplant) needed, as indicated by **1 or more** of the following:

- Primary nonfunctional graft, as indicated by **ALL** of the following[FF](142):
  - Recent transplant (onset within 7 days of transplant)
  - Need for mechanical ventilation or continuous renal replacement therapy
  - AST 3000 units/L (50.1 mckat/L) or greater
  - Biochemical evidence of nonfunction, as indicated by **1 or more** of the following:
    - INR 2.5 or greater
    - Arterial pH of 7.30 or less
    - Venous pH of 7.25 or less
    - Lactate of 4 mmol/L (36 mg/dL) or greater
- Acute or chronic rejection of transplanted liver resulting in insufficient hepatic function(142)
- Hepatic artery thrombosis in transplanted liver(108)(142)
- Redevelopment of need for liver transplant (eg, recurrence of hepatic dysfunction)
- Post-transplant biliary stricture refractory to endoscopic or percutaneous therapy(142)

- No contraindications to liver transplant present

− Renal transplant in adult needed, as indicated by **ALL** of the following(104):

− End-stage renal disease, as indicated by **1 or more** of the following:

- Need for renal replacement therapy due to irreversible renal disease (ie, end-stage renal disease)(108)
- Impending end-stage renal disease (ie, diagnosed with irreversible renal disease or pathology whose natural history is progression to a need for renal replacement therapy)(108)

− No contraindications to renal transplant present, as indicated by **ALL** of the following(143):

- No multiple myeloma or monoclonal immunoglobulin deposition disease (light or heavy chain deposition) unless in stable remission
- No inability to comply with ongoing medical care
- No uncontrolled HIV infection, as indicated by **1 or more** of the following:
  - No HIV infection
  - No uncontrolled HIV infection, as indicated by **ALL** of the following:
    - CD4 T-cell count has been greater than 200/mm^3 (0.2 x10^9/L) for at least 3 months.
    - Viral load is undetectable.
    - No opportunistic infection within last 6 months
    - No history of progressive multifocal leukoencephalopathy (PMLD)
    - No history of central nervous system lymphoma
    - No cognitive impairment attributable to HIV infection
    - Patient is adherent to antiretroviral drug regimen.
- No stroke within last 6 months or transient ischemic attack within last 3 months
- No active gastrointestinal disease, including symptomatic peptic ulcers, diverticulitis, inflammatory bowel disease, or gallbladder disease
- No acute pancreatitis within last 3 months
- No acute hepatitis (eg, elevated INR or transaminitis)
- No active malignancies[GG]
- No surgical contraindications to renal transplant (eg, urologic or vascular problems)

− Pediatric dual liver-renal transplant, as indicated by **ALL** of the following:

− Pediatric liver transplant, as indicated by **ALL** of the following:

− Transplant needed for **1 or more** of the following:

− Acute liver failure (also known as fulminant liver failure), as indicated by **ALL** of the following(108)(144)(145):

- Acute liver disease (ie, 8 weeks' duration or less)[HH]
- Severe manifestations of liver disease, as indicated by **1 or more** of the following(108):
  - Acute need for mechanical ventilation
  - Acute need for renal replacement therapy
  - INR of 2.0 or more
  - INR of 1.5 to 1.9 with any degree of hepatic encephalopathy[II]

− Severe chronic liver disease, as indicated by **1 or more** of the following(112)(115):

- MELD or Pediatric Model for End-Stage Liver Disease score of 15 or higher[JJ][KK][LL][MM]

− Complication of liver disease, as indicated by **1 or more** of the following:

- Severe growth failure (eg, z score is less than 2 standard deviations below mean for age and sex)(115)

- Parenteral nutrition necessary to maintain growth or euglycemia(115)
- Ascites or hepatic hydrothorax that persists or recurs despite diuresis and low-sodium diet
- Hepatic encephalopathy that persists despite treatment (eg, lactulose, rifaximin)(115)
- Recurrent spontaneous bacterial peritonitis(115)
- Recurrent severe cholangitis (eg, 2 or more episodes within 6 months requiring IV antibiotics for 2 weeks via central access)(115)
- History of life-threatening infection (eg, bacteremia, hypotension) with need for ICU stay(115)
- Variceal bleeding that persists despite treatment (eg, beta-blocker therapy, band ligation)(115)

- Biliary atresia(147)
- Hepatocellular carcinoma with no evidence of tumor outside the liver(115)(148)(149)
- Cholangiocarcinoma and **ALL** of the following(70)(108)(126):
  - Tumor less than or equal to 3 cm in diameter
  - Unresectable due to location (eg, perihilar, vital vessel involvement), extent (eg, multifocal, bilobar disease), or severe underlying hepatic disease (eg, cirrhosis, primary sclerosing cholangitis)(150)
  - No metastatic or nodal disease
  - Neoadjuvant chemoradiation planned prior to transplant(126)
- Hepatoblastoma without metastases that is not amenable to hepatic resection(108)(115)(127)
- Epithelioid hemangioendothelioma unresponsive to therapy that is not amenable to hepatic resection(115)
- Neuroendocrine tumor and **ALL** of the following(115)(127):
  - Primary tumor and extrahepatic disease resected with curative intent 6 months or more prior to transplant(115)
  - Stable disease for 6 months or more prior to transplant(115)
  - Tumor not amenable to resection(115)
  - No evidence of extrahepatic metastases(115)
- Polycystic liver disease and **ALL** of the following(111):
  - Surgical therapy (removal of cysts, fenestration) not effective or not possible(77)
  - Severe disease, as indicated by **1 or more** of the following:
    - Hepatic decompensation (eg, ascites, hepatic encephalopathy)(111)
    - Concurrent hemodialysis or GFR less than 20 mL/min/1.73m^2 (0.33 mL/sec/1.73m^2) eGFR - Pediatric Calculator(111)
    - Prior kidney transplant(111)
    - Moderate to severe protein-calorie malnutrition(111)
    - Severe sarcopenia(111)
- Primary sclerosing cholangitis and **ALL** of the following(150)(151):
  - Cirrhosis on imaging or liver biopsy(150)
  - Transplant necessary due to **1 or more** of the following:
    - Biliary tract stricture not responsive to intervention(111)(150)
    - Intractable pruritus(150)
    - Two or more episodes of cholangitis within 1 year(111)(150)
- Familial amyloidosis(108)
- Urea cycle disorder(108)(152)
- Organic acidemia(108)(153)
- Hepatopulmonary syndrome[Y] and **ALL** of the following(108):
  - Sequelae of portal hypertension (eg, ascites, varices, splenomegaly, thrombocytopenia)
  - PaO_2 less than 60 mm Hg (8.0 kPa) (on room air) not otherwise explained by underlying pulmonary disease
  - Right to left cardiac shunt demonstrated by contrast echocardiogram ("bubble study") or nuclear perfusion lung scan
- Portopulmonary hypertension and **ALL** of the following(108)(134):
  - Portal hypertension
  - Pulmonary hypertension on right heart catheterization with **ALL** of the following(154)(155):
    - Mean pulmonary artery pressure greater than 35 mm Hg at rest
    - Pulmonary vascular resistance 3 Wood units (240 dynes*sec/cm^5) or greater
  - Other causes of pulmonary hypertension not a significant contributor to pulmonary hypertension (eg, heart failure, valvular heart disease, parenchymal pulmonary disease)
  - Satisfactory response to pulmonary hypertension treatment (eg, vasodilators, endothelial receptor blocker), as evidenced by **1 or more** of the following[Z](119)(133)(134):
    - Post-treatment mean pulmonary artery pressure less than 35 mm Hg and pulmonary vascular resistance less than 5 Wood units (400 dynes*sec/cm^5)
    - Post-treatment mean pulmonary artery pressure more than 35 mm Hg and less than 45 mm Hg, and pulmonary vascular resistance less than 3 Wood units (240 dynes*sec/cm^5)

- Wilson disease and **1 or more** of the following(108)(135):
  - Acute liver failure[AA]
  - Acute decompensated liver disease unresponsive to medical therapy (eg, chelation, zinc)[BB]
  - Progressive chronic liver failure (eg, jaundice, ascites, hepatic encephalopathy, varices)[CC]
- Acute severe autoimmune hepatitis and **1 or more** of the following(119):
  - Severe coagulopathy (INR 1.5 or greater) with severe hepatic encephalopathy (grade III or IV)
  - Worsening liver function tests despite corticosteroid therapy
  - New or worsening hepatic encephalopathy despite corticosteroid therapy
- Anhepatic state[DD](108)
- Acute hepatic porphyria with recurrent intractable symptoms despite pharmacotherapy (eg, prophylactic hemin or givosiran therapy)(140)
- Other hepatic disorder associated with increased mortality that can be addressed with liver transplant (eg, glycogen storage disease, familial intrahepatic cholestasis, severe trauma, alpha-1 antitrypsin deficiency)[LL](156)(157)(158)

− Repeat transplant (ie, replacement of previously placed transplant) needed, as indicated by **1 or more** of the following:

- Primary nonfunctional graft, as indicated by **ALL** of the following[FF](142):
  - Recent transplant (onset within 7 days of transplant)
  - Need for mechanical ventilation or continuous renal replacement therapy
  - AST 3000 units/L (50.1 mckat/L) or greater
  - Biochemical evidence of nonfunction, as indicated by **1 or more** of the following:
    - INR 2.5 or greater
    - Arterial pH of 7.30 or less
    - Venous pH of 7.25 or less
    - Lactate of 4 mmol/L (36 mg/dL) or greater
- Acute or chronic rejection of transplanted liver resulting in insufficient hepatic function(142)
- Hepatic artery thrombosis in transplanted liver(108)(142)(157)
- Redevelopment of need for liver transplant (eg, recurrence of hepatic dysfunction)
- Post-transplant biliary stricture refractory to endoscopic or percutaneous therapy(142)

- No contraindications to liver transplant present

− Pediatric renal transplant, as indicated by **ALL** of the following:

− Renal transplant appropriate, as indicated by **1 or more** of the following(143):

- Need for renal replacement therapy due to irreversible renal disease (ie, end-stage renal disease)
- Impending end-stage renal disease (ie, diagnosed with irreversible renal disease or pathology whose natural history is progression to a need for renal replacement therapy)

− Repeat transplant (ie, replacement of previously placed transplant) needed, as indicated by **1 or more** of the following:

- Acute or chronic rejection of transplanted kidney resulting in insufficient renal function
- Redevelopment of need for renal transplant, as indicated by **1 or more** of the following:
  - Need for chronic renal replacement therapy due to irreversible renal disease (ie, end-stage renal disease)
  - Impending end-stage renal disease (ie, diagnosed with irreversible renal disease or pathology whose natural history is progression to a need for renal replacement therapy)

− No contraindications present, as indicated by **ALL** of the following(143):

- No multiple myeloma or monoclonal immunoglobulin deposition disease (light or heavy chain deposition) unless in stable remission
- No amyloidosis with extensive extrarenal involvement (eg, cardiac amyloidosis)
- No decompensated cirrhosis unless candidate for combined liver-renal transplant
- No severe irreversible obstructive or restrictive lung disease (eg, oxygen-dependent irreversible disease)
- No severe uncorrectable symptomatic heart disease (eg, New York Heart Association functional class IV heart failure, coronary artery disease, valvular disease) unless candidate for combined heart-kidney transplant or evaluated by a transplant cardiologist
- No progressive central neurodegenerative disease (eg, Alzheimer, Parkinson, or Huntington diseases)
- No unstable psychiatric disorder that affects decision-making
- No ongoing substance use disorder that affects decision-making
- No inability to comply with ongoing medical care
- No uncontrolled HIV infection, as indicated by **1 or more** of the following:
  - No HIV infection
  - HIV infection under control, as indicated by **ALL** of the following:
    - CD4 T-cell count has been greater than 200/mm^3 (0.2 x10^9/L) for at least 3 months.
    - Viral load is undetectable.

- No opportunistic infection within last 6 months
- No history of PMLD
- No history of central nervous system lymphoma
- No cognitive impairment attributable to HIV infection
- Patient is adherent to antiretroviral drug regimen.

- No active bacterial, viral, parasitic, or fungal infection other than hepatitis C
- No stroke within last 6 months or transient ischemic attack within last 3 months
- No active gastrointestinal disease, including symptomatic peptic ulcers, diverticulitis, inflammatory bowel disease, or gallbladder disease
- No acute pancreatitis within last 3 months
- No acute hepatitis (eg, elevated INR or transaminitis)
- No active malignancies[GG]
- No surgical contraindications (eg, urologic or vascular problems)

Alternatives to Procedure

- Alternatives may include(1)(2):
  - Nonoperative observation(11)(49)(72)(84)(89)(90)
  - Medical management of disease (eg, ulcer, abscess, injury, pain)(4)(7)(11)(14)(47)(48)(52)(55)(56)(62)(80)(83)(86)
  - For primary or metastatic malignancy: radiation, chemotherapy, immunotherapy, ablation, chemo-embolization or radio-embolization, or palliative care(4)(13)(21)(62)(68)(70)(74)(82)(159)
  - For select patients with gastric cancer: partial gastrectomy(21)
  - For select patients with hepatocellular carcinoma: liver transplant(68)(73)(160)
  - For bariatric surgery or revision: multidisciplinary nonsurgical weight loss program, including low-calorie or very low-calorie diet, supervised exercise, behavior modification, endoscopic gastroplasty, or anti-obesity pharmacotherapy (eg, phentermine/topiramate, naltrexone/bupropion, liraglutide, semaglutide)(38)(161)(162)(163)
  - For chronic intestinal failure: home parenteral nutrition, intestinal rehabilitation (eg, dietary modification, oral hydration, supplemental nutritional supplements, and antisecretory agents), bowel lengthening procedures(97)

Operative Status Criteria

Search by CPT® code for specific procedure Benchmark Length of Stay (BLOS).

Note: The definition of an ambulatory procedure depends on payer-provider contractual agreement or regulatory language (eg, CMS' Two-Midnight Rule). An ambulatory procedure may include one postoperative overnight stay in a facility; therefore, a Benchmark Length of Stay (BLOS) of ambulatory refers to patients discharged the day of or the day after the procedure. Depending on various patient and procedural factors, some patients undergoing a procedure with an ambulatory BLOS require inpatient care (eg, medical necessity for hospital-based care across 2 or more postoperative midnights). The Ambulatory Surgery Exception Criteria GRG can help with this determination.

- Ambulatory: Benchmark Length of Stay (BLOS) = A
- Inpatient, as indicated by **1 or more** of the following:
  - Benchmark Length of Stay (BLOS) = 2 or more days postoperative (eg, medical necessity for hospital-based care across 2 or more postoperative midnights)
  - Procedure is usually performed on ambulatory basis, but inpatient stay is needed. See Ambulatory Surgery Exception Criteria GRG.
  - Medicare patient, and specific procedure is on CMS Inpatient Only List

Hospitalization

General Recovery Course

Stage	Level of Care	Clinical Status	Interventions
1	• OR to ICU or intermediate care[NN] • Social Determinants of Health Assessment • Discharge planning. See Discharge Planning Tool SR.	• **Clinical Indications met[OO]** • **Procedure completed**	• Inpatient interventions as needed • Possible prophylactic antiemetic for postoperative nausea and vomiting[PP] • Multimodal analgesia

2	• Floor • Social Determinants of Health Assessment	• **No ICU or intermediate care needs**	• Inpatient interventions continue • Multimodal analgesia • Transition to oral routes
3	• **Activity level acceptable** • Social Determinants of Health Assessment • Floor to discharge • Complete discharge planning	• **Hemodynamic stability** • **Operative site and other wounds acceptable** • **Pain and nausea absent or adequately managed** • **Temperature status acceptable** • **No infection, or status acceptable** • **No blood loss, or problem resolved** • **Abdominal status acceptable** • **Hepatic and biliary abnormalities absent or acceptable** • **Inflammation absent or stable (eg, colitis)** • **No transplant done, or status acceptable** • **General Discharge Criteria met**	• **Intake acceptable** • **No inpatient interventions needed**

(1)(2)(3)(7)(8)(13)(46)(52)(62)(165)(166)(167)(168)(169)(170)(171)(172)

Recovery Milestones are indicated in **bold**.

Benchmark Length of Stay (BLOS): Access diagnosis and procedure code-specific BLOS via Search functions.

Discharge Criteria

- Continued inpatient stay is needed until **1 or more** of the following are present:
  - Acceptable patient status for next level of care is achieved.
  - **ALL** of the following are present:
    - Hemodynamic stability, as indicated by **1 or more** of the following:
      - Hemodynamic abnormalities at baseline or acceptable for next level of care
      - Patient hemodynamically stable, as indicated by **ALL** of the following(173)(174):
        - Tachycardia absent
        - Hypotension absent
        - No evidence of inadequate perfusion (eg, no myocardial ischemia)
        - No other hemodynamic abnormalities (eg, no Orthostatic hypotension)
    - Operative site and other wounds acceptable, as indicated by **1 or more** of the following(175):
      - Wounds absent
      - Wound site clean and intact, with minimal to no drainage and without signs of infection
      - Current wound care performable at next level of care
    - Pain and nausea absent or adequately managed, as indicated by **1 or more** of the following(176)(177)(178)(179)(180):
      - No pain or nausea
      - Minimal discomfort on oral medications
      - Pain and nausea managed on regimen performable at next level of care
    - Temperature status acceptable, as indicated by **1 or more** of the following(181)(182)(183):
      - Temperature less than 100.5 degrees F (38.1 degrees C) (oral) and greater than 96.8 degrees F (36 degrees C) (rectal)
      - Temperature as expected for disease process and appropriate for management at next level of care
    - No infection, or status acceptable, as indicated by **1 or more** of the following(182)(183)(184)(185)(186):
      - No infection present
      - Infection status acceptable for next level of care, as indicated by **ALL** of the following(187):
        - WBC count normal, stable, or declining with treatment
        - Adequate treatment performable at next level of care
        - Organism and sensitivities identified, or adequate clinical response to empiric therapy
        - Repeat cultures negative or not needed
    - No blood loss, or problem resolved, as indicated by **1 or more** of the following(188)(189)(190)(191):
      - No blood loss problem

- Repeat evaluation shows blood loss resolved sufficiently (eg, hemoglobin at acceptable level and stable)

Abdominal status acceptable, as indicated by **ALL** of the following(192):

- Bowel sounds present
- No ileus, signs of obstruction, or peritonitis
- Abdominal distention absent or manageable at next level of care

Hepatic and biliary abnormalities absent or acceptable, as indicated by **1 or more** of the following(193)(194)(195):

- No abnormalities present
- Hepatic and biliary status acceptable for next level of care, as indicated by **ALL** of the following:
    - Liver function tests normal, stable, or improving
    - Ascites absent, diminishing, or stable, with adequate respiratory function for next level of care
    - Renal function acceptable
    - Bilirubin stable or diminishing
    - Encephalopathy absent or controlled adequately for next level of care
    - No biliary obstruction, or current drainage and treatment plan appropriate for next level of care

- Inflammation absent or stable (eg, colitis)

No transplant done, or status acceptable, as indicated by **1 or more** of the following(116)(196)(197)(198)(199)(200)(201)(202)(203)(204)(205):

- No transplant
- Status acceptable, as indicated by **ALL** of the following:
    - Infection and rejection absent or under appropriate treatment
    - Immunosuppression regimen appropriate for next level of care
    - Infection prophylaxis regimen established
    - No graft vs host disease evident

Activity level acceptable, as indicated by **1 or more** of the following:

- Patient ambulatory and can perform ADL as appropriate for age and development
- Activity at baseline
- Activity level acceptable for next level of care

Intake acceptable, as indicated by **1 or more** of the following(206):

- Oral hydration, medications, and diet
- Enteral hydration, medications, and diet
- Administration routes performable at next level of care

No inpatient interventions needed; examples include:

- Wound care needed not feasible at next level of care
- Gastrointestinal decompression, such as nasogastric or other tube suction, with continuing ileus or other acute intra-abdominal process
- Drain care: drains in place, with high-volume output requiring continuing observation and care that cannot be managed at next level of care
- Repeat urgent or emergent surgery for bleeding, obstruction, abscess, leak, fistula, or other lesions
- Urgent CT scan, ultrasound, angiogram, or endoscopic procedure to evaluate acute abdominal process

General Discharge Criteria GRG met or Pediatric General Discharge Criteria GRG met (if either is relevant or necessary for patient's condition)

Case Management

See Surgical Admission Case Management GRG GRG for further information.

Discharge Destination

- Post-hospital levels of admission may include:
    - Home.
    - Home healthcare. See Surgical Admission Home Care GRG HC or Geriatric Admission Home Care GRG HC for further information.
    - Recovery facility care. See Surgical Admission Recovery Facility Care GRG RFC or Geriatric Admission Recovery Facility Care GRG RFC for further information.
    - Inpatient rehabilitation facility. See Inpatient Rehabilitation Facility (IRF) Admission Recovery Facility Care GRG RFC for further information.

Evidence Summary

Criteria

The evidence for the clinical indications found in this guideline includes 93 published peer reviewed articles, 30 specialty society or other evidence-based guidelines, 1 Cochrane systematic review, and 25 book sections.

Rationale

Use of this MCG care guideline helps the clinician identify, for a given procedure, which patient-specific factors and clinical conditions are appropriate for that procedure. The evidence-based clinical criteria assist the clinician in the decision to appropriately perform a procedure, evaluating whether the potential benefits of a procedure outweigh the potential risks. For Medicare enrollees, surgical MCG care guidelines also identify which procedures CMS has designated as inpatient only.

Use of these evidence-based clinical criteria to support decision making around the need for a given procedure is of benefit to the patient, as all procedures come with inherent risk that must be balanced by anticipated clinical benefit. Utilizing evidence-based clinical criteria enables a more accurate and patient-specific decision-making process. In addition, the use of evidence-based guidelines can help reduce unwarranted variation in care, such as divergent clinical thresholds to perform a procedure for clinically similar patients that vary across geographic regions, between facilities, and among individual clinicians.

Related CMS Coverage Guidance

This guideline supplements but does not replace, modify, or supersede existing Medicare regulations or applicable National Coverage Determinations (NCDs) or Local Coverage Determinations (LCDs).

Code of Federal Regulations (CFR): 42 CFR 412.3(207); 42 CFR 419.22(208); 42 CFR 422.101(209)

Internet-Only Manual (IOM) Citations: CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 1 - Inpatient Hospital Services Covered Under Part A(210); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 6 - Hospital Services Covered Under Part B(211); CMS IOM Publication 100-02, Medicare Benefit Policy Manual, Chapter 15 - Covered Medical and Other Health Services(212); CMS IOM Publication 100-08, Medicare Program Integrity Manual, Chapter 6, Section 6.5 - Medical Review of Inpatient Hospital Claims for Part A Payment(213)

Medicare Coverage Determinations: Medicare Coverage Database(214)

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Footnotes

[A] Primary repair is recommended for congenital Morgagni and Bochdalek diaphragmatic hernias even in the absence of symptoms due to the high risk of strangulation.(10) Acquired diaphragmatic hernias usually occur following traumatic injury and may present with either immediate or delayed complications of abdominal organ incarceration, or compression of the lungs or heart.(20) A clinical guideline recommends surgical repair for traumatic diaphragmatic hernias.(20) [A in Context Link 1]

[B] Biliopancreatic diversion is a complex operation entailing the removal of about 70% of the stomach using a double anastomosis to bypass most of the small intestine. Single-anastomosis duodeno-ileal bypass with sleeve gastrectomy is a modification of the original biliopancreatic diversion that uses only a single anastomosis for the bypass, which reduces perioperative risk.(25)(26) [B in Context Link 1]

[C] Although effective, due to a higher risk of nutritional deficiencies and higher complication rates, it is recommended that biliopancreatic diversion (with or without duodenal switch) for primary bariatric surgery be considered only in patients with a BMI of 60 or greater.(30) [C in Context Link 1]

[D] Multiple specialty society guidelines recommend against requiring a mandated weight loss goal as a prerequisite for bariatric surgery as it has not been found to be associated with improved surgical outcomes or postoperative weight loss.(27)(31) [D in Context Link 1]

[E] Sometimes a pregnancy test is performed the day of surgery. [E in Context Link 1]

[F] Cohort studies and database analyses show that the use of biliopancreatic diversion as a revisional bariatric procedure is usually reserved for patients who remain at a very high BMI after their primary bariatric procedure, due to a greater risk of postoperative nutritional deficiencies and higher complication rates.(26)(33)(35)(36) Analysis of the 2020 Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program database reported a mean BMI of 45.9 for 596 patients undergoing revision of either sleeve gastrectomy or gastric bypass to biliopancreatic diversion.(36) [F in Context Link 1]

[G] A World Health Organization evidence review concluded that lower BMI thresholds should be used for Asian adults based on epidemiologic studies showing a higher risk of type 2 diabetes and cardiovascular disease at a lower BMI.(37) These findings have been demonstrated in adults from different Asian regions and have led to recommendations from US, international, and Asian regional specialty society guidelines that lower BMI thresholds for bariatric surgery should be used for Asian adults.(27)(30)(31)(38)(39)(40) [G in Context Link 1, 2, 3]

[H] Consensus guidelines do not define threshold criteria to define the degree of insufficient weight loss or the amount of excessive weight regained following primary bariatric surgery that would justify reoperative bariatric surgery.(16)(27)(42) However, 50% excess weight loss has been used historically as a threshold defining a successful response to bariatric surgery.(43) Loss of less than 50% of excess weight or regaining more than 20% to 25% of excess weight, 1 year or longer after the primary bariatric procedure, has been used as criteria for reoperation in some studies.(26)(33) Excess weight is the difference between the patient's weight before the previous procedure and the target weight that corresponds to a BMI of 25. Another way to calculate the target weight is to multiply the square of the patient's height in meters by 25.(33) [H in Context Link 1, 2]

[I] Reoperative bariatric surgery may be characterized as a conversion (new or different type of procedure), correction (intended to resolve a complication or anatomic defect), or reversal (restoration of normal anatomy).(27) [I in Context Link 1]

[J] Resistant hypertension is defined as a blood pressure above goal despite treatment with 3 antihypertensive medications with complementary mechanisms, including a diuretic at maximally tolerated doses, or blood pressure at goal but requiring 4 or more medications for control.(41) [J in Context Link 1]

[K] Most superficial perianal abscesses can be incised and drained under local anesthesia in the office setting.(47)(60) [K in Context Link 1]

[L] Breast reconstruction may be performed as an autologous flap reconstruction, via placement of an implant, or as a combination procedure and may be performed either at the time of mastectomy or as a delayed interval procedure.(65) Most specialty society guidelines recommend an interval (as opposed to immediate) procedure for patients undergoing postmastectomy radiation.(65) [L in Context Link 1]

[M] Resection for select patients with limited multifocal disease or with a resectable area of major vascular invasion is controversial but may be considered.(68) Some patients with unresectable masses may be better surgical candidates following systemic therapy or, alternatively, may be candidates for liver transplant.(68) [M in Context Link 1]

[N] Most patients with splenic injury can be treated with nonoperative management. Indications for surgical intervention include hemodynamic instability unresponsive to resuscitation, splenic bleeding unresponsive to catheter-directed embolization, stable but moderate to severe lesion where embolization is not available, or if associated traumatic injury that requires surgical exploration is present.(89)(90) [N in Context Link 1]

[O] In adults, common etiologies of short gut syndrome include mesenteric ischemia, Crohn disease, trauma, and surgical resection. In infants and children, common etiologies include necrotizing enterocolitis, gastroschisis, volvulus, and intestinal atresia.(95)(96)(98) [O in Context Link 1]

[P] Hepatic congestion from primary heart failure can cause hepatic congestion and inflammation, ultimately leading to hepatic fibrosis and cirrhosis. Cardiac causes include restrictive or dilated cardiomyopathy, hypertrophic cardiomyopathy, and congenital heart disease.(105) [P in Context Link 1]

[Q] The standard medical definition of acute liver failure is the onset of acute liver disease of less than 26 weeks' duration with an INR greater than 1.5 attributable to liver disease plus any degree of hepatic encephalopathy.(107) However, for purposes of liver transplant, the Organ Procurement and Transplantation Network defines acute liver failure (also known as fulminant liver failure) as the onset of hepatic encephalopathy within 56 days (8 weeks) of the first signs or symptoms of liver disease.(108) [Q in Context Link 1]

[R] Hepatic encephalopathy is graded by West Haven criteria for patients age 3 years or older.(110) A calculator for West Haven criteria is available at www.mdcalc.com/hepatic-encephalopathy-grades-stages. [R in Context Link 1, 2]

[S] The Model for End-Stage Liver Disease (MELD) score is used for patients age 12 years or older and may be calculated at the Organ Procurement and Transplantation Network website at https://optn.transplant.hrsa.gov/resources/allocation-calculators/meld-calculator/.(108) In cases in which the calculated MELD score or Pediatric Model for End-Stage Liver Disease (PELD) score does not reflect the urgent need for a liver transplant, an appeal may be made to the Regional Review Board for a score exception.(108)(111)(115) Examples of conditions eligible for MELD or PELD score exclusions include hepatopulmonary syndrome, primary hyperoxaluria,

metabolic disorders (eg, organic acidemia, urea cycle disorder), hepatocellular carcinoma, and cystic fibrosis with FEV_1 less than 40% predicted.(108)(111)(115) [S in Context Link 1]

[T] A specialty society guideline notes that the European Association for the Study of the Liver-Chronic Liver Failure Consortium (EASL-CLIF-C) score may be used to help prioritize patients for liver transplant.(118) A calculator is available at https://efclif.com/research-infrastructure/score-calculators/clif-c-of-aclf-ad/#calculator. [T in Context Link 1]

[U] A specialty society guideline recommends that patients with an acute-on-chronic liver failure grade of 3 be considered for liver transplant.(119) A calculator is available at www.aclf.in/?page=doctor_aarc_grade_cal. [U in Context Link 1]

[V] Patients who have organ failure that has stabilized or improved may be better candidates for transplant.(120) [V in Context Link 1]

[W] Grade III encephalopathy is characterized by confusion, incoherent speech, and sleepiness but is arousable to voice. Grade IV is a comatose patient, unresponsive to pain, with decerebrate or decorticate posturing.(110) [W in Context Link 1]

[X] Severe acute respiratory distress syndrome (PaO_2 to FiO_2 ratio less than 150 mm Hg (SpO_2 to FiO_2 ratio less than 150)) is predictive of worse post-transplant outcomes and may be considered a barrier to transplant.(120) SpO_2 to FiO_2 ratios generally correlate well with PaO_2 to FiO_2 ratios after mathematical correction when SpO_2 levels are 97% or less.(121) However, this ratio should be used with caution due to limitations in accuracy of pulse oximetry, especially in patients who are poorly perfused or have acidosis.(121)(122) Pulse oximetry (SpO_2) may underestimate arterial saturation (SaO_2), especially in people with dark skin pigmentation, thick skin, cold body temperature, or who are wearing colored nail polish.(121) Where appropriate, pulse oximetry should be measured after warming fingers or removing nail polish.(123) [X in Context Link 1]

[Y] Hepatopulmonary syndrome is characterized by hypoxemia due to intrapulmonary vascular dilation in the setting of portal hypertension or cirrhosis.(114)(132)(133) [Y in Context Link 1, 2, 3]

[Z] Portopulmonary hypertension with a mean pulmonary artery pressure of greater than 45 mm Hg following treatment is associated with a high mortality rate post liver transplant and is considered a contraindication to transplant.(119)(134) [Z in Context Link 1, 2]

[AA] A clinical guideline recommends liver transplant as lifesaving therapy for all patients with Wilson disease and acute liver failure.(135) Patients with acute liver failure due to Wilson disease may present with hemolysis, hepatic encephalopathy, and (in contrast to other causes of acute liver failure) relatively small elevations of serum aminotransferases.(135) [AA in Context Link 1, 2]

[BB] Some patients with acute liver injury due to Wilson disease will respond to aggressive medical therapy while others may progress to acute liver failure.(135) A New Wilson Index score of 11 or greater (available at www.pediatriconcall.com/calculators/hepatology/wilsons-disease-scoring-system) is predictive of high mortality without liver transplant; however, it may be less reliable in children than in adults.(135) [BB in Context Link 1, 2]

[CC] Patient may have chronic liver disease due to failure of medical management or due to disease progression in a previously undiagnosed and untreated patient.(135) [CC in Context Link 1, 2]

[DD] Total hepatectomy with a temporary portacaval shunt may be required in severe hepatic trauma or primary liver allograft nonfunction immediately after transplant.(137)(138) [DD in Context Link 1, 2]

[EE] Glycogen storage disease increases the risk for malignant transformation.(139) [EE in Context Link 1]

[FF] Primary nonfunction (PNF) differs from hyperacute rejection in that PNF occurs immediately following transplant and is not antibody-mediated, whereas hyperacute rejection occurs after an initial period of stability (24 to 48 hours) and is due to antibody-mediated rejection with detectable donor-specific antibodies.(142) Donor risk factors for PNF include prolonged organ ischemia, hepatic steatosis, older age, and deceased cardiac donors; recipient risk factors include older age and higher Model for End-Stage Liver Disease scores.(142) [FF in Context Link 1, 2]

[GG] Treated and cured cancers, including any carcinoma in situ, nonmetastatic basal cell and squamous cell carcinoma of the skin, melanoma in situ, prostate cancer with Gleason score 6 or less, small (3 cm or less) renal tumors, superficial bladder cancer, and follicular or papillary thyroid cancer less than 2 cm with low-grade histology, are not contraindications to transplant. Patients with hematologic or solid tumor malignancies in remission and patients with myelodysplasias, chronic leukemia, or low-grade lymphomas may be transplant candidates after evaluation by a transplant hematologist.(143) [GG in Context Link 1, 2]

[HH] The standard medical definition of acute liver failure in children is acute liver disease of less than 8 weeks' duration plus either an INR greater than 2 or an INR greater than 1.5 with any degree of hepatic encephalopathy.(146) However, for purposes of liver transplant, the Organ Procurement and Transplantation Network defines acute liver failure (also known as fulminant liver failure) as the onset of hepatic encephalopathy within 8 weeks of the first signs or symptoms of liver disease.(108) [HH in Context Link 1]

[II] Hepatic encephalopathy is graded by West Haven criteria for patients age 3 years or older or by the Whitington Scale for patients younger than 3 years.(110)(146) A calculator for West Haven criteria is available at www.mdcalc.com/hepatic-encephalopathy-grades-stages. Whitington Scale criteria for early encephalopathy (stage I and II) include inconsolable crying, sleep reversal, and inattention to

task; moderate encephalopathy (stage III) is characterized by stupor, combativeness, and somnolence with hyperreflexia; and late encephalopathy (stage IV) is characterized by coma (either arousable to painful stimuli (IVa) or with no response to pain (IVb)) with absent reflexes and decerebrate or decorticate posturing.(146) [II in Context Link 1]

[JJ] The Model for End-Stage Liver Disease score is used for liver allocation for patients 12 years or older; an individual's score can be calculated at the Organ Procurement and Transplantation Network website at http://optn.transplant.hrsa.gov/converge/resources/MeldPeldCalculator.asp?index=98.(108) [JJ in Context Link 1]

[KK] The Pediatric Model for End-Stage Liver Disease score, a model similar to the Model for End-Stage Liver Disease, has been developed for children 11 years of age or younger. An individual's score can be calculated at the Organ Procurement and Transplantation Network website at http://optn.transplant.hrsa.gov/converge/resources/MeldPeldCalculator.asp?index=99.(108) [KK in Context Link 1]

[LL] In cases in which the calculated Model for End-Stage Liver Disease (MELD) or Pediatric Model for End-Stage Liver Disease (PELD) score does not reflect the urgent need for a liver transplant, an appeal may be made to the Regional Review Board for a score exception.(108)(115) Examples of conditions eligible for MELD or PELD score exclusions include hepatopulmonary syndrome, primary hyperoxaluria, metabolic disorders, hepatocellular carcinoma, and cystic fibrosis with FEV_1 less than 40% predicted.(108) [LL in Context Link 1, 2]

[MM] Pediatric patients who have chronic liver disease and ongoing gastrointestinal bleeding requiring 20 mL/kg or more of red blood cell transfusions within 24 hours or who have a need for mechanical ventilation or continuous renal replacement may be registered as a status 1B for transplant, indicating an urgent need for liver transplant.(108) [MM in Context Link 1]

[NN] See Intensive, Intermediate, and Telemetry Care Guidelines ISC. [NN in Context Link 1]

[OO] See Clinical Indications for Procedure in this guideline. [OO in Context Link 1]

[PP] Effective antiemetic agents include 5-hydroxytryptamine receptor antagonists, dexamethasone, anticholinergic agents, or neurokinin 1 receptor antagonists. Patients at risk for postoperative nausea and vomiting may be given antiemetics preoperatively as prophylaxis.(164) [PP in Context Link 1]

Definitions

Abdominal status acceptable

- Abdominal status acceptable, as indicated by **ALL** of the following(1):
  - Bowel sounds present
  - No ileus, signs of obstruction, or peritonitis
  - Abdominal distention absent or manageable at next level of care

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Activity level acceptable

- Activity level acceptable, as indicated by **1 or more** of the following:
  - Patient ambulatory and can perform ADL as appropriate for age and development
  - Activity at baseline
  - Activity level acceptable for next level of care

General Discharge Criteria met

- General Discharge Criteria met or Pediatric General Discharge Criteria met (if either is relevant or necessary for patient's condition)

Hemodynamic stability

- Hemodynamic stability, as indicated by **1 or more** of the following:
  - Hemodynamic abnormalities at baseline or acceptable for next level of care
  - Patient hemodynamically stable, as indicated by **ALL** of the following(1)(2):
    - Tachycardia absent
    - Hypotension absent
    - No evidence of inadequate perfusion (eg, no myocardial ischemia)
    - No other hemodynamic abnormalities (eg, no Orthostatic hypotension)

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1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
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Hepatic and biliary abnormalities absent or acceptable

- Hepatic and biliary abnormalities absent or acceptable, as indicated by **1 or more** of the following(1)(2)(3):
  - No abnormalities present
  - Hepatic and biliary status acceptable for next level of care, as indicated by **ALL** of the following:
    - Liver function tests normal, stable, or improving
    - Ascites absent, diminishing, or stable, with adequate respiratory function for next level of care
    - Renal function acceptable
    - Bilirubin stable or diminishing
    - Encephalopathy absent or controlled adequately for next level of care
    - No biliary obstruction, or current drainage and treatment plan appropriate for next level of care

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Hypotension absent

- Hypotension absent,[A] as indicated by **1 or more** of the following:
  - Hypotension absent in adult patient, as indicated by **1 or more** of the following:
    - Systolic blood pressure greater than or equal to 90 mm Hg[A](1)
    - Mean arterial pressure[B] greater than or equal to 70 mm Hg MAP Calculator[A](1)(2)
    - Blood pressure at patient's baseline (eg, healthy adult with low systolic blood pressure), at intentional therapeutic goal (eg, patient with heart failure), or acceptable for next level of care (eg, blood pressure stable and no significant signs or symptoms due to low blood pressure)
  - Hypotension absent in pediatric patient, as indicated by **1 or more** of the following:
    - Systolic blood pressure greater than or equal to 110 mm Hg in child 13 to 17 years of age[A](3)
    - Systolic blood pressure greater than or equal to 100 mm Hg in child 6 to 12 years of age[A](3)
    - Systolic blood pressure greater than or equal to 95 mm Hg in child 3 to 5 years of age[A](3)
    - Systolic blood pressure greater than or equal to 90 mm Hg in child 1 or 2 years of age[A](3)
    - Systolic blood pressure greater than or equal to 80 mm Hg in infant 6 to 11 months of age[A](3)
    - Systolic blood pressure greater than or equal to 70 mm Hg in infant 3 to 5 months of age[A](3)
    - Systolic blood pressure greater than or equal to 65 mm Hg in infant 1 or 2 months of age[A](3)
    - Blood pressure at patient's baseline (eg, healthy child with low systolic blood pressure), at intentional therapeutic goal, or acceptable for next level of care (eg, blood pressure stable and no significant signs or symptoms due to low blood pressure)

References

1. Schriger DL. Approach to the patient with abnormal vital signs. In: Goldman L, Cooney KA, editors. Goldman-Cecil Medicine. 27th ed. Elsevier; 2024:32-35.
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Footnotes

A. Criteria based upon clinician-acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.
B. The mean arterial pressure (MAP) takes into account both SBP and DBP readings.

Immunosuppressed

- Immunosuppressed refers to a degree of immunocompromise that is clinically significant (eg, affects choice of antimicrobial agent due to possibility of atypical organism, necessitates additional isolation, or leads to clinically relevant increase in likelihood of severe infection)[A]; examples include(1)(2)(3)(4):
  - Neutropenia (absolute neutrophil count less than 500/mm^3 (0.5 x10^9/L), or expected to decrease to this level within the next 48 hours)
  - Drug-induced immunosuppression (ie, current usage); examples include:
    - Systemic corticosteroids[B](6)(7)(8)(9)
    - Immunosuppressive agent (eg, tacrolimus, azathioprine, methotrexate, cyclosporin)
    - Immunomodulatory therapy (eg, tumor necrosis factor inhibitor, interleukin inhibitor, monoclonal antibodies)
  - Poorly controlled diabetes mellitus (eg, HbA1c of 8.5% (69 mmol/mol) or higher)[C][D](10)(11)(12)(13)
  - Chronic kidney disease (ie, estimated GFR less than 60 mL/min/1.73m^2 (1.0 mL/sec/1.73m^2)) or end-stage renal disease (hemodialysis or peritoneal dialysis)[E](15)(16)(17)(18)(19)(20)
  - Cirrhosis[F](21)(22)(23)(24)(25)
  - Bone marrow suppression or dysfunction (eg, chemotherapy, radiation therapy, bone marrow fibrosis or infiltration with malignant cells)
  - Humoral (antibody, B-lymphocyte) immune dysfunction or deficiency (eg, common variable immune deficiency, specific antibody deficiency, chronic lymphocytic leukemia)(26)(27)
  - Cell-mediated (eg, T-lymphocyte, natural killer cell) immune dysfunction or deficiency (eg, severe combined immune deficiency, DiGeorge syndrome, Wiskott-Aldrich syndrome)
  - Phagocytic cell (neutrophil, macrophage) dysfunction (eg, chronic granulomatous disease, leukocyte adhesion deficiency)
  - Acquired immunodeficiencies (eg, HIV/AIDS, hematopoietic and lymphoid malignancies)
  - History of solid organ or hematopoietic stem cell transplant[G]
  - Asplenia (surgical or congenital) or functional hyposplenia (eg, sickle cell disease)[H](28)
  - Complement deficiency (eg, hereditary, due to protein loss (nephrotic syndrome))

References

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Footnotes

A. Examples are given for some of the mechanisms of immunocompromise; however, the list is not all-encompassing. The intent is to illustrate the degree of immunocompromise that may be clinically significant. The presence of a listed potentially immunocompromising factor does not always indicate clinically significant immunosuppression. For example, some findings, such as neutropenia, are usually indicative of significant immunocompromise, whereas others (eg, presence of diabetes, renal failure, or asplenia) may not necessarily indicate clinically important immunocompromise. The judgment as to the presence of clinically significant immunocompromise in a particular patient is also influenced by several variables, such as the nature of the suspected infection and the specific details of the patient's presentation, condition, and comorbidities. Patients may have more than one potential source of immunocompromise, increasing the likelihood of significant dysfunction (eg, poorly controlled diabetes and chronic kidney disease).

B. The minimum dose of systemic corticosteroid use associated with an increased risk of serious infection is not defined, but there is increasing risk with higher doses and longer duration of treatment.(5) Observational studies of patients with rheumatologic disease indicated, after statistical adjustment, that infection risk was increased with prolonged use of as little as 5 mg of prednisone-equivalent per day dosing, and also found that higher doses and longer duration increased risk.(6)(7)(8) An evidence-based specialty society guideline defines clinically important immunocompromise in adult pneumonia patients as those patients with an impaired immune response who are judged to be at elevated risk of infection by atypical or opportunistic organisms, so that there is a need to alter empirical antimicrobial therapy.(9) This same guideline states that corticosteroid use would lead to such an immune system impairment at doses of 20 mg of prednisone-equivalent per day or more for 14 days or more, or a course of treatment with a cumulative dose of 600 mg or more of prednisone-equivalent.(9)

C. It is generally agreed that the presence of diabetes is associated with an increased risk of infection, including infection leading to hospitalization.(2)(10)(11)(12)(13) At least some of this risk is attributed to the deleterious effects of diabetes on the immune system.(2)(10)(11)(12)(13) It has been found that the impact of diabetes can be higher in certain types of infections (eg, higher impact in cellulitis, osteomyelitis) and with a longer total duration of the diagnosis.(10)(11)(13)

D. There is no universally agreed upon HbA1c level that indicates "poor control." It has been found that the higher the HbA1c, the larger the impact on the immune system.(10)(11)(12)(13) Goal HbA1c can vary to some degree depending on the patient. Otherwise healthy adults and adolescents may have a target HbA1c of less than 7% (53 mmol/mol), whereas those who have complex comorbidities, impairment in cognition or activities of daily living, or a history of severe hypoglycemia may have a target of less than 8% (64 mmol/mol).(14) However, these targets are put forth with reduction of microvascular and macrovascular effects of diabetes in mind, not immune system effects.(14) In this way, there is no simple cutoff between adequate and poor control. Cohort studies, after statistical adjustment, have found that HbA1c levels above 8.0% to 8.5% (64 to 69 mmol/mol) are independently associated with hospitalization due to infection.(10)(11)(12)(13)

E. Patients with chronic kidney disease or end-stage renal disease have impaired immune system function, measured, for example, by higher rates of infection requiring hospitalization.(15)(16)(17) The degree of renal impairment correlates with the severity of

immunocompromise.(15)(16)(17) The degree of proteinuria (eg, urine albumin to creatinine ratio) is also independently correlated with the severity of immune system dysfunction. These 2 factors are additive, in that patients with both reduced GFR and significant proteinuria are the most severely affected.(15)(16)(17) Patients with end-stage renal disease, in general, have more profound immune system dysfunction, with inadequate dialysis even more detrimental.(18)(19)(20)

F. Patients with cirrhosis of the liver are functionally immunocompromised due to a variety of mechanisms. This immunocompromise correlates with the severity of the cirrhosis and is called cirrhosis-associated immune dysfunction (CAID). Immune dysfunction is also worsened during periods of acute exacerbation of chronic liver disease.(21)(22)(23)(24)(25) CAID is particularly associated with bacterial infections, affecting both the frequency and severity of infection.(23)(24)(25)
G. Susceptibility to infection varies with the immunosuppressive agents used.(4)
H. Patients with asplenia or hyposplenia are at higher risk of infection with encapsulated organisms, such as *Streptococcus pneumoniae*, meningococcal infection, encapsulated strains of *Haemophilus influenzae*, and certain tick-borne diseases.(2)(28)

Intake acceptable

- Intake acceptable, as indicated by **1 or more** of the following(1):
  - Oral hydration, medications, and diet
  - Enteral hydration, medications, and diet
  - Administration routes performable at next level of care

References

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Multimodal analgesia

- Multimodal analgesia involves the utilization of 2 or more analgesic agents with different mechanisms of action in order to provide additive or synergistic pain control, while minimizing side effects and reliance on opioids.(1)(2)(3)

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No blood loss, or problem resolved

- No blood loss, or problem resolved, as indicated by **1 or more** of the following(1)(2)(3)(4):
  - No blood loss problem
  - Repeat evaluation shows blood loss resolved sufficiently (eg, hemoglobin at acceptable level and stable)

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No contraindications to liver transplant present

- No contraindications to liver transplant present, as indicated by **ALL** of the following(1)(2)(3)(4)(5)(6)(7)(8):
  - No sustained increases of intracranial pressure greater than 50 mm Hg
  - Cerebral perfusion pressure not less than 40 mm Hg for more than 2 hours
  - No irreversible brain damage
  - No advanced HIV disease[A](6)
  - No uncontrolled systemic infection (eg, cholangitis, bacterial peritonitis)

- No active alcohol or illicit substance use[B]
- No advanced cardiac or pulmonary disease (eg, untreated coronary artery stenosis of 70% or greater, severe valvular disease, severe chronic lung disease) if considered only for liver transplant
- No severe portopulmonary hypertension (mean pulmonary artery pressure of greater than 45 mm Hg) following pulmonary vasodilator or vasomodulator treatment(8)(14)
- No unaddressed barriers to ability to comply with immunosuppression protocol and follow-up requirements (eg, adequate social support)
- No history of persistent nonadherence
- No anatomic abnormalities precluding liver transplant
- No active extrahepatic malignancy[C](8)
- No hemangiosarcoma
- No Niemann-Pick disease type C

References

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Footnotes

A. HIV-positive liver transplant candidates should have CD4 counts greater than 100/mm^3 (0.1 x10^9/L) and plasma HIV RNA levels that are expected to be undetectable at the time of liver transplant.(6)

B. The duration of the period of sobriety required prior to liver transplant is controversial with no universally accepted time period. An arbitrarily picked duration of 6 months is the most commonly employed duration.(9) Because studies have shown that mortality is high in patients with severe alcoholic hepatitis who do not undergo transplant, and that patients undergoing earlier liver transplant for severe alcoholic hepatitis have similar survival and alcohol relapse rates as those who have completed a 6-month waiting period, shorter durations of abstinence may be appropriate.(9)(10)(11)(12) Specialty society guidelines recommend against basing the liver transplant candidacy on a fixed abstinence interval.(8)(13) Use of controlled substances as directed by a clinician (eg, medical marijuana, prescription opiates) should not be labeled as a substance use disorder.

C. Liver transplant candidates with a history of extrahepatic malignancy should have received definitive treatment with an adequate tumor-free survival period. The determination of what constitutes an adequate tumor-free survival period varies depending on the type of malignancy and efficacy of the treatment received.(6)(8)

No infection, or status acceptable

- No infection, or status acceptable, as indicated by **1 or more** of the following(1)(2)(3)(4)(5):
  - No infection present
  - Infection status acceptable for next level of care, as indicated by **ALL** of the following(6):
    - WBC count normal, stable, or declining with treatment
    - Adequate treatment performable at next level of care
    - Organism and sensitivities identified, or adequate clinical response to empiric therapy
    - Repeat cultures negative or not needed

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No inpatient interventions needed

- No inpatient interventions needed; examples include:
  - Wound care needed not feasible at next level of care
  - Gastrointestinal decompression, such as nasogastric or other tube suction, with continuing ileus or other acute intra-abdominal process
  - Drain care: drains in place, with high-volume output requiring continuing observation and care that cannot be managed at next level of care
  - Repeat urgent or emergent surgery for bleeding, obstruction, abscess, leak, fistula, or other lesions
  - Urgent CT scan, ultrasound, angiogram, or endoscopic procedure to evaluate acute abdominal process

No transplant done, or status acceptable

- No transplant done, or status acceptable, as indicated by **1 or more** of the following(1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11):
  - No transplant
  - Status acceptable, as indicated by **ALL** of the following:
    - Infection and rejection absent or under appropriate treatment
    - Immunosuppression regimen appropriate for next level of care
    - Infection prophylaxis regimen established
    - No graft vs host disease evident

References

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Operative site and other wounds acceptable

- Operative site and other wounds acceptable, as indicated by **1 or more** of the following(1):
  - Wounds absent
  - Wound site clean and intact, with minimal to no drainage and without signs of infection
  - Current wound care performable at next level of care

References

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Orthostatic hypotension

- Orthostatic hypotension,[A][B] as indicated by **1 or more** of the following(1)(2)(3):
  - Fall in SBP of 20 mm Hg or more 1 to 3 minutes after patient sits or stands from recumbent position
  - Fall in DBP of 10 mm Hg or more 1 to 3 minutes after patient sits or stands from recumbent position

References

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Footnotes

A. Concomitant measurements of the heart rate are important to measure to help diagnose subtypes of orthostatic hypotension (eg, the lack of a compensatory increase in heart rate is typical of autonomic failure and an exaggerated tachycardia may be reflective of volume depletion). However, the heart rate is not a component of the definition of orthostatic hypotension, which relies upon blood pressure alone.(1)(2)(3)
B. Criteria based upon clinician acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

Pain and nausea absent or adequately managed

- Pain and nausea absent or adequately managed, as indicated by **1 or more** of the following(1)(2)(3)(4)(5):
  - No pain or nausea
  - Minimal discomfort on oral medications
  - Pain and nausea managed on regimen performable at next level of care

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5. Fourth consensus guidelines for the management of postoperative nausea and vomiting: erratum. Anesthesia and Analgesia 2020;131(5):e241. DOI: 10.1213/ANE.0000000000005245.

Peritoneal signs

- Peritoneal signs, as indicated by **1 or more** of the following(1)(2):
  - Rebound tenderness
  - Rigid abdomen
  - Involuntary guarding

References

1. Bush LM, Levison ME. Peritonitis and intraperitoneal abscesses. In: Bennett JE, Dolin R, Blaser MJ, editors. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 9th ed. Philadelphia, PA: Elsevier; 2020:1009-1036.e5.
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Renal function acceptable

- Renal function acceptable, as indicated by **1 or more** of the following(1)(2)(3):
  - Renal function normal (GFR of 90 mL/min/1.73m^2 (1.50 mL/sec/1.73m^2) or more) eGFR - Adult Calculator eGFR - Pediatric Calculator
  - Renal function that is **ALL** of the following:
    - Impaired (estimated GFR less than 90 mL/min/1.73m^2 (1.50 mL/sec/1.73m^2)) but stable or improving eGFR - Adult Calculator eGFR - Pediatric Calculator
    - Appropriate for management at next level of care
  - Renal function at baseline and appropriate for management at next level of care
  - Dialysis needed and performable at next level of care

References

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Social Determinants of Health Assessment

- Risk of poor health outcomes may be increased by the presence of **1 or more** of the following social determinants of health(1)(2)(3):
  - Housing insecurity, as indicated by **1 or more** of the following:
    - Individual or caregiver's current living situation is **1 or more** of the following(4):
      - Does not have own housing (eg, staying in a hotel, shelter, or with others)
      - Has own housing (eg, house, apartment), but at risk of losing it in the future (ie, behind on rent or mortgage)
      - Has own housing (eg, house, apartment), but has lived in 3 or more places in past year
    - Current housing has **1 or more** of the following:
      - Electrical appliances (eg, stove, refrigerator) not working or unavailable
      - Insufficient heating or cooling
      - Insufficient ventilation
      - Lead paint or pipes
      - Mold
      - Pests (eg, bugs) or rodents
      - Smoke detectors not working or unavailable
  - Food insecurity, as indicated by **1 or more** of the following(5):
    - In the past year, individual or caregiver ran out of food and did not have money to buy more food.
    - In the past year, individual or caregiver worried that they would run out of food before they received money to buy more food.
  - Insufficient transportation, as indicated by **1 or more** of the following(6):
    - In the past year, individual or caregiver missed medical appointments or could not get medications due to lack of transportation.
    - In the past year, individual or caregiver missed nonmedical activities, work, or could not get things needed for daily living due to lack of transportation.
  - Insufficient utilities, as indicated by **1 or more** of the following(7):
    - Utilities (eg, electricity, water, gas, or oil) are currently shut off or unavailable.

- In the past year, electric, water, gas, or oil company threatened to shut off services.
- Personal safety risk, as indicated by **2 or more** of the following(5):
  - Individual is sometimes or frequently physically hurt by another person (including family member).
  - Individual is sometimes or frequently insulted or talked down to by another person (including family member).
  - Individual is sometimes or frequently threatened with physical harm by another person (including family member).
  - Individual is sometimes or frequently screamed or cursed at by another person (including family member).
- Insufficient dependent care, as indicated by **1 or more** of the following:
  - In the past year, individual or caregiver was unable to work due to lack of dependent care.
  - In the past year, individual or caregiver was unable to work more (additional) hours due to lack of dependent care.
  - In the past year, individual or caregiver missed medical appointments or could not get medications due to lack of dependent care.
  - In the past year, individual or caregiver missed nonmedical activities (eg, school, church, social activity) due to lack of dependent care.
- Depression risk, as indicated by **ALL** of the following(8):
  - In the past 2 weeks, individual had little interest or pleasure in normal activities on at least several days.
  - In the past 2 weeks, individual felt down, depressed, or hopeless on at least several days.

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Tachycardia absent

- Tachycardia[A][B] absent, as indicated by **1 or more** of the following:
  - Heart rate less than or equal to 100 beats per minute in adult[A][B](1)
  - Heart rate less than or equal to 85 beats per minute in child 13 to 17 years of age[A][B](2)
  - Heart rate less than or equal to 95 beats per minute in child 6 to 12 years of age[A][B](2)
  - Heart rate less than or equal to 110 beats per minute in child 1 to 5 years of age[A][B](2)
  - Heart rate less than or equal to 120 beats per minute in infant 3 to 11 months of age[A][B](2)
  - Heart rate less than or equal to 150 beats per minute in infant 1 or 2 months of age[A][B](2)

References

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Footnotes

A. Criteria based upon clinician acquired numeric values (eg, vital signs, oxygen saturation) should be used if they are accurate reflections of the patient's condition. Transitory findings (eg, abnormal only upon initial emergency department intake or only one time out of multiple readings) that rapidly improve with no or minimal treatment usually do not reflect disease severity or risk for deterioration. This does not imply that an initial or one-time reading cannot ever be applicable. The goal is to separate erroneous or incidental findings from those that truly represent the patient's clinical picture.

B. Interpretation of heart rate requires clinical judgment and consideration of several patient-specific factors, such as the patient's baseline heart rate, medications, and clinical impact. For example, an elderly patient on a beta-blocker medication with a baseline

resting heart rate of 60 beats per minute may be clinically tachycardic at a heart rate of 94 beats per minute. Likewise, a patient who is upset, in pain, or nervous in the emergency department with a heart rate of 106 beats per minute may meet the technical definition of tachycardia, but this tachycardia (absent associated findings such as chest pain or hypotension) may not be clinically important. The numeric values included in this definition are provided to allow for consistency in terms of a technical definition of the term tachycardia. Whether a heart rate above or below the technical threshold is clinically meaningful is a matter of persistence, context, and clinical judgment.

Temperature status acceptable

- Temperature status acceptable, as indicated by **1 or more** of the following(1)(2)(3):
  - Temperature less than 100.5 degrees F (38.1 degrees C) (oral) and greater than 96.8 degrees F (36 degrees C) (rectal)
  - Temperature as expected for disease process and appropriate for management at next level of care

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MCG Health
General Recovery Care 30th Edition
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Last Update: 1/25/2026 12:53:16 AM
Build Number: 30.0.2026012500524.025256