

Transplant Hepatology Board Review Course

Practice Module Supplement

QUESTIONS

1

A 25-year-old woman with long-standing asthma was incidentally found to have a liver lesion on images from her chest CT. A dedicated CT of the abdomen with intravenous contrast shows the lesion as a 7-cm central arterially enhancing mass (see Figure) with isoenhancement on venous phase and no definite washout on delayed images. No definitive central scar is noted. The liver otherwise appears morphologically normal. Her laboratory results are as follows:

Total bilirubin	0.8	[0.3-1.0 mg/dL]
ALT	15	[10-40 U/L]
AST	14	[10-40 U/L]
Albumin	3.8	[3.5-5.5 g/dL]
Leukocyte count	4500	[4000-11,000/ μ L]
Hematocrit	36.8	[37%-47%]
Platelet count	240,000	[150,000-400,000/ μ L]



What is the next best step in her management?

- A. No further work-up needed
 - B. Repeat imaging in 12 months
 - C. Biopsy the lesion
 - D. Perform surgical resection
 - E. Start transplant evaluation
-

2

Which of these patients presenting with acute liver failure has the best prognosis for transplant-free survival?

- A. Hepatitis B virus infection
 - B. Ischemic hepatitis
 - C. Wilson's disease
 - D. *Amanita phalloides* toxicity
-

3

A 55-year-old woman with a history of melanoma involving the thigh is treated with adjuvant ipilimumab after resection of the involved area. She does not take any other medications and denies herbal use or regular alcohol use. One month after initiation of therapy, the patient has the following laboratory results:

AST	420	[10-40 U/L]
ALT	900	[10-40 U/L]
Total bilirubin	3.1	[0.3-1.0 mg/dL]
Alkaline phosphatase	120	[30-120 U/L]
INR	1.2	[<1.1]
Hepatitis B surface antigen	Negative	
Hepatitis C antibody	Negative	
Hepatitis A IgM	Negative	
Antinuclear antibodies	1:1280	[1:40 or less]
IgG	3000	[800-1500 mg/dL]

A CT scan of the abdomen shows a normal-appearing liver, no evidence of ductal dilatation, and patent portal vein.

What is the next best step in her management?

- A. Perform a liver biopsy
 - B. Continue ipilimumab, start steroids
 - C. Continue ipilimumab, monitor liver function tests closely
 - D. Start defibrotide
-

4

Which of the following best describes the mechanism of action of tacrolimus?

- A. Blocks T cell replication through inhibition of mTOR
 - B. Prevents replication of activated T cells by inhibiting purine synthesis
 - C. Depletes lymphocytes through complement-mediated cell lysis
 - D. Inhibits activation of T cells by blocking signal 1
 - E. Inhibits formation of arachidonic acid, a precursor in the inflammatory cascade
-

5

A 37-year-old, G2P1-positive woman presents at 32 weeks of gestation with 3 weeks of intense, diffuse itching including the palms and soles of her feet. Her itching keeps her up at night and she has diffuse excoriations over her trunk and extremities from scratching. She has scleral icterus and mild jaundice. She is alert and oriented to person, place, and time and has no asterixis.

Laboratory results:

Hemoglobin	11.2	[12-16 g/dL]
Platelet count	210,000	[150,000-400,000/ μ L]
Glucose	72	[70-99 mg/dL]
Creatinine	0.8	[0.7-1.5 mg/dL]
Urinalysis	Normal	
AST	892	[10-40 U/L]
ALT	789	[10-40 U/L]
Total bilirubin	4.1	[0.3-1.0 mg/dL]
GGT	43	[8-40 U/L]
INR	1.0	[<1.1]
Bile acid level	32	[less than 11.3 μ mol]
Hepatitis A IgM	Negative	
Hepatitis B surface antigen	Negative	
Hepatitis B surface antibody	Positive	
Hepatitis B core IgM	Negative	
Hepatitis C antibody	Negative	

A liver ultrasound is normal.

Which of the following is the next best step in her management?

- A. Deliver baby early at 34 weeks
 - B. Test for long-chain 3-hydroxyacyl-CoA dehydrogenase (LCHAD)
 - C. Perform a liver biopsy
 - D. Start ursodeoxycholic acid
 - E. Transfuse platelets with delivery
-

6

Liver transplant recipients are at increased relative risk of de novo development of which of the following malignancies?

- A. Prostate
 - B. Sarcoma
 - C. Leukemia
 - D. Melanoma
 - E. Breast
-

7

A 38-year-old woman status post liver transplantation presents with complaints of fever, malaise, dry cough, and maculopapular rash. She underwent a deceased donor liver transplant 8 weeks ago for acute liver failure due to autoimmune hepatitis. Donor and recipient both had positive serologies for cytomegalovirus, and she has been taking valganciclovir and trimethoprim-sulfamethoxazole for prophylaxis. She was diagnosed with acute cellular rejection at 6 weeks post-transplant that was managed with high dose corticosteroids. Her liver biochemistries initially improved, but she has now developed an increase in her ALT and AST levels and has leukopenia.

Which of the following infections best explains her clinical presentation?

- A. Herpes simplex virus reactivation
 - B. Human herpesvirus 6 reactivation
 - C. De novo adenovirus infection
 - D. Transplant-acquired Parvovirus B19 infection
 - E. *Pneumocystis jirovecii* pneumonia
-

8

A 62-year-old man status post liver transplantation presents with complaints of progressive dyspnea and non-productive cough. He underwent deceased donor liver transplantation 2 years ago for hepatitis C cirrhosis and hepatocellular carcinoma. His post-transplant course has been complicated by an episode of rejection after withdrawal of mycophenolate mofetil (MMF) and then cytomegalovirus (CMV) infection after treatment of rejection. Blood and sputum cultures are negative and CT thorax demonstrates a pulmonary nodule. Broncho-alveolar lavage is positive for *Cryptococcus neoformans*.

Which of the following is the most appropriate initial management of this invasive fungal infection?

- A. CT-guided biopsy of the lung nodule to exclude underlying malignancy
 - B. Withdrawal of MMF and decrease calcineurin inhibitor by 50%
 - C. Surgical consultation for resection of pulmonary cryptococcoma
 - D. Lumbar puncture with measurement of opening pressure
 - E. Resume CMV prophylaxis with valganciclovir
-

9

A 49-year-old woman undergoes deceased donor liver transplantation for decompensated cirrhosis. Biopsy of the donor at time of procurement revealed 30% microvesicular steatosis. On postoperative day 3, the recipient remains intubated in the SICU, hypothermic, and on vasopressors. She is noted to have elevated total bilirubin, aminotransferases, and INR. Ultrasonography of the liver with Doppler reveals slightly increased resistive indices in the hepatic artery with patent portal vein.

Current laboratory results are as follows:

AST	2405	[10-40 U/L]
ALT	2176	[10-40 U/L]
Total bilirubin	14.1	[0.3-1.0 mg/dL]
INR	3.7	[<1.1]

What is the next best step in management of this patient?

- A. High dose methylprednisolone
 - B. Hepatic artery arteriogram
 - C. Endoscopic retrograde cholangiopancreatography
 - D. Re-list for liver transplantation
-

10

A 34-year-old woman undergoes a hematopoietic stem cell transplant for acute myeloid leukemia. She receives myeloablative-conditioning therapy with busulfan and cyclophosphamide. On day 15 post-transplant she develops jaundice, right upper quadrant pain, and ascites. Transjugular liver biopsy shows normal hepatic vein venogram and hepatic venous pressure gradient of 18 mmHg. Histology reveals congestion in zone 3 with associated hemorrhage and collagen deposition within the central veins.

What is the best treatment for this patient?

- A. Intravenous heparin
 - B. Thrombolysis
 - C. Defibrotide
 - D. Transjugular intrahepatic portosystemic shunt (TIPS)
 - E. Liver transplantation
-

11

Which of the following cytokines is most likely to be associated with allograft tolerance?

- A. IL-1 β
 - B. IL-6
 - C. IL-10
 - D. IL-12
 - E. IL-17
-

12

A 62-year-old woman who had an uncomplicated kidney transplant for IgA nephropathy 2 years ago presents with abnormal liver enzymes. Laboratory results are as follows:

AST	99	[10-40 U/L]
ALT	122	[10-40 U/L]
Total bilirubin	0.9	[0.3-1.0 mg/dL]
Alkaline phosphatase	107	[30-120 U/L]
Albumin	4.1	[3.5-55 g/dL]
Total protein	6.9	[5.5-9.0 g/dL]
Hepatitis A total antibody	Negative	
Hepatitis B surface antigen	Negative	
Hepatitis C antibody	Negative	
Hepatitis E IgM	Positive	
Hepatitis E RNA	Positive	
CMV PCR	Negative	
Epstein-Barr Virus PCR	Negative	
Antinuclear antibodies	Negative	[1:40 or less]
Hemochromatosis DNA analysis	Negative	
Alpha-1 antitrypsin	167	[150-350 mg/dL]

A liver biopsy is performed and shows a peri-portal lymphoplasmacytic infiltrate, mild steatosis (<10%) without steatohepatitis, and stage 2 fibrosis. Her liver enzymes fail to improve with dose reduction of her tacrolimus and mycophenolate mofetil.

What is the next best treatment for this patient?

- A. Pegylated interferon alpha
 - B. Ribavirin
 - C. Sofosbuvir
 - D. Tenofovir
-

13

Which of the following is a feature of hepatorenal syndrome?

- A. 2+ protein on urinalysis
 - B. Red cell casts on urine microscopy
 - C. Nephromegaly on ultrasound
 - D. Low urine sodium
 - E. Low serum complements (C3/C4)
-

14

Which of the following hemodynamic measurements is most consistent with portal hypertension due to portal vein thrombosis?

	Weged Hepatic Vein Pressure	Free Hepatic Vein Pressure	Hepatic Venous Pressure Gradient
A.	Increased	Increased	Increased
B.	Normal	Normal	Normal
C.	Increased	Normal	Normal
D.	Increased	Increased	Normal
E.	Increased	Normal	Increased

15

Which of the following factors is most commonly associated with post-liver transplant renal disease?

- A. Increased age
 - B. Hepatitis C status
 - C. Pretransplant renal dysfunction
 - D. Male sex
 - E. Tacrolimus immunosuppression
-

16

A 32-year-old female with a history of cryptogenic cirrhosis is status post liver transplantation from a 19-year-old male donor. There was no history or clinical/laboratory evidence to suggest immunodeficiency in the recipient. Post-transplant immunosuppression consists of tacrolimus, prednisone, and mycophenolate mofetil.

In the third week after transplantation, the patient developed a fever, a maculopapular rash over the abdomen, face, and both upper extremities, and non-bloody diarrhea. Routine laboratory analysis revealed progressive leukopenia and thrombocytopenia. Liver enzymes normalized quickly after transplantation and remained normal throughout the postoperative course. Despite G-CSF initiation, white blood cell counts continued to decline, and the patient required continued platelet and red cell transfusions. All cultures were negative for infectious etiologies. Skin and colonic biopsies were obtained. Histologic and serologic analysis for recipient cytomegalovirus disease were unrevealing and no evidence of drug reaction was noted. Despite discontinuation of mycophenolate mofetil and addition of high dose corticosteroids and anti-thymocyte globulin, the patient developed sepsis and died.

Which of the following risk factors is most strongly associated with this presentation?

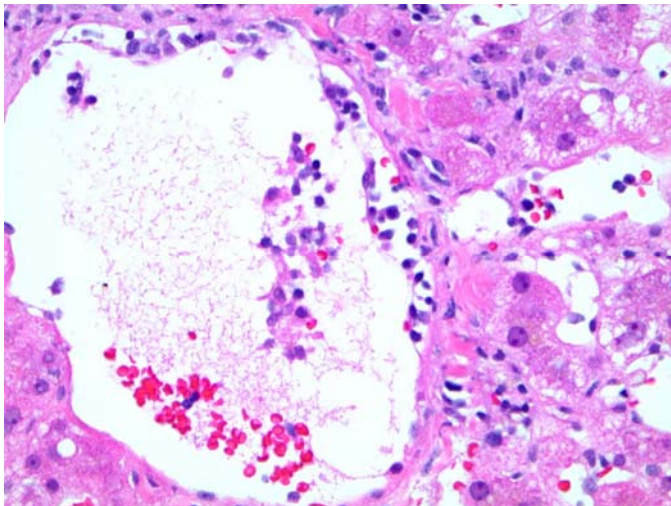
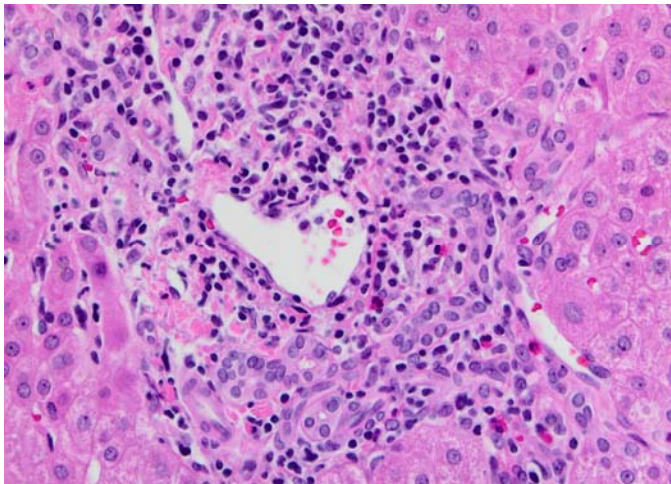
- A. Number of HLA class 1 (A/B) mismatches
 - B. The use of mycophenolate mofetil
 - C. Difference between ages of donor and recipient
 - D. Number of HLA class 2 (DR/DQ) mismatches
 - E. Difference in sex between donor and recipient
-

17

A 42-year-old male underwent orthotopic liver transplant for alcohol-induced liver disease. He is maintained on tacrolimus and mycophenolic acid immunosuppression. Routine laboratory studies at 4 months post-transplant revealed the following:

AST	112	[10-40 U/L]
ALT	147	[10-40 U/L]
Total bilirubin	1.2	[0.3-1.0 mg/dL]
Alkaline phosphatase	162	[30-120 U/L]
GGT	141	[8-40 U/L]
Tacrolimus trough	6.7	[5-15 ng/mL]

Representative images from a liver biopsy are shown:



Images courtesy of Maura O'Neil, MD

What is the next best step in his management?

- A. Hepatic artery angiogram
 - B. Endoscopic retrograde cholangiopancreatography
 - C. Valganciclovir
 - D. Methylprednisolone
 - E. Alcohol abstinence and counseling
-

18

A 61-year-old patient underwent a liver transplant for NASH-related cirrhosis complicated by hepatocellular carcinoma. The patient's medication regimen consists of tacrolimus, everolimus, acyclovir, trimethoprim/sulfamethoxazole and amlodipine. Three months after transplantation, the patient presents to the emergency department with acute abdominal pain associated with intractable nausea and vomiting. CT scan shows an incarcerated umbilical hernia with bowel obstruction, and the patient is taken to the operating room for hernia repair.

Which of the following medications should be held after the hernia repair due to effects on wound healing?

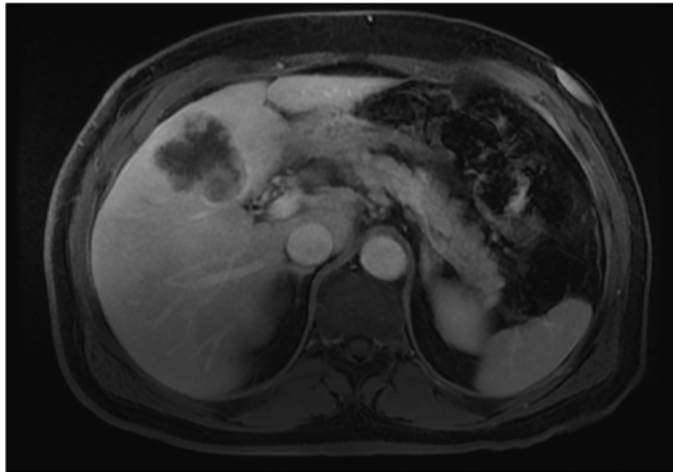
- A. Tacrolimus
 - B. Everolimus
 - C. Acyclovir
 - D. Trimethoprim/Sulfamethoxazole
 - E. Amlodipine
-

19

A 66-year-old man with a history of hypertension, diabetes, and hyperlipidemia presented to the emergency department for epigastric abdominal pain radiating to the right flank for the past week. He has unintentionally lost 20 lb in the past 3 months. His laboratory results are as follows:

Albumin	3.0	[3.5-55 g/dL]
Total bilirubin	1.3	[0.3-1.0 mg/dL]
Alkaline phosphatase	385	[30-120 U/L]
AST	46	[10-40 U/L]
ALT	127	[10-40 U/L]

An ultrasound of the liver showed a large heterogeneous and lobulated complex mass measuring 8.1 x 4.8 x 7.1 cm. The liver was mildly coarsened and echogenic, and there was mild intrahepatic biliary ductal dilatation. An MRI of the upper abdomen (see image) shows an enhancing mass in the left lobe of the liver with thick irregular rim enhancement with gradual centripetal enhancement. The common hepatic artery, right and left hepatic arteries, main portal vein, and right and left portal veins are not involved by the mass. There was no evidence of intra- or extra-hepatic biliary dilatation. Serum alpha-fetoprotein was 1 ng/mL [less than 10 ng/mL], carbohydrate antigen (CA) 19-9 was 47 U/mL [0-37 U/mL], and carcinoembryonic antigen (CEA) was 26.5 ng/mL [less than 2.5 ng/mL].



Which of the following modalities is the treatment of choice for this patient?

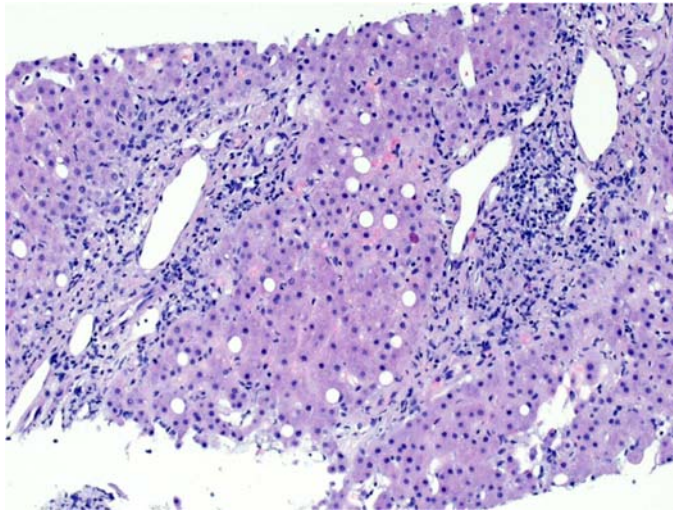
- A. Surgical resection
 - B. Stereotactic body radiation therapy
 - C. Microwave ablation
 - D. Liver transplantation
 - E. Nivolumab
-

20

A 36-year-old white female was noted to have elevated liver tests while undergoing a hysterectomy. Further evaluation included magnetic resonance cholangiopancreatography (MRCP) and a liver biopsy that led to the diagnosis of primary sclerosing cholangitis. A subsequent colonoscopy revealed ulcerative colitis, which was symptomatically difficult to control despite steroids, mesalamine, azathioprine, infliximab, and vedolizumab but finally improved on ustekinumab. Her liver tests remained stable for several years, but she subsequently developed an acute rise in liver tests as follows:

	<u>2013</u>	<u>2017</u>	
Total Protein	7.4	8.2	[5.5-9.0 g/dL]
Albumin	3.9	3.4	[3.5-5.5 g/dL]
Total bilirubin	0.5	0.7	[0.3-1.0 mg/dL]
Alkaline phosphatase	221	631	[30-120 U/L]
AST	48	633	[10-40 U/L]
ALT	114	733	[10-40 U/L]

A repeat MRCP showed intrahepatic ductal dilatation with scattered areas of narrowing and irregularity in a similar distribution to prior study and associated atrophic left lobe of the liver. Viral serologies and autoimmune markers were drawn. A representative image of her liver biopsy is shown.



Which of the following is the most appropriate diagnosis?

- A. Cytomegalovirus hepatitis
 - B. Ustekinumab-induced hepatitis
 - C. Nonalcoholic steatohepatitis
 - D. Autoimmune hepatitis overlap with primary sclerosing cholangitis
-

21

Which of the following clinical scenarios may warrant an automatic MELD exception?

- A. Ascites refractory or resistant to diuretics with accompanying hyponatremia
 - B. Chronic gastrointestinal blood loss requiring repeated transfusions
 - C. Budd-Chiari syndrome with acute liver failure
 - D. Primary hyperoxaluria with renal failure
 - E. Chronic rejection refractory to adjustments in immunosuppression
-

22

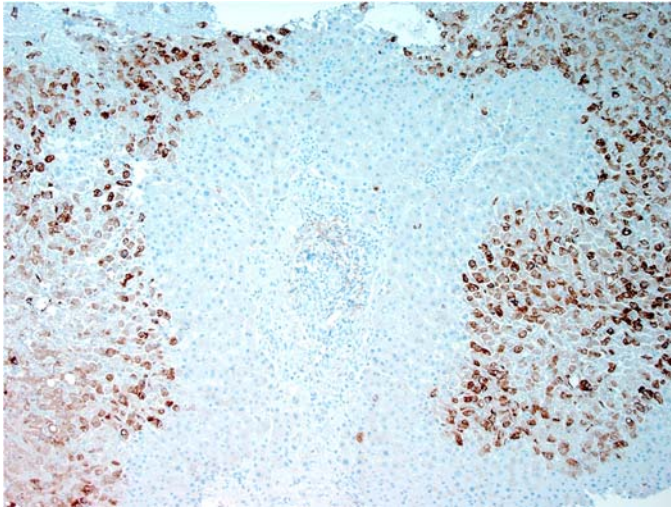
A 44-year-old woman who had a liver transplant 16 years ago was seen for her annual transplant follow up. She reported a new palpable lymph node in the posterior left neck, which has not resolved with 10 days of empiric antibiotic therapy. On examination, she has a 1.5-cm lymph node in the left lateral neck. A needle biopsy showed large atypical lymphoid cells in a background of small lymphocytes and rare histiocytes and eosinophils. Epstein Barr virus (EBV) DNA in the blood was negative. An excision biopsy showed post-transplant lymphoproliferative disorder (PTLD), Hodgkin lymphoma type, with areas of lymphocyte depletion, EBV positive. Liver chemistry tests were normal.

What is the next step in the management of this patient?

- A. Intravenous steroid bolus
 - B. Reduction of tacrolimus dose
 - C. Chemotherapy and radiation therapy
 - D. Rituximab
 - E. Ganciclovir and intravenous immunoglobulin
-

23

A 40-year-old female with primary sclerosing cholangitis received an ABO-compatible living donor liver transplant from her husband. She received thymoglobulin for induction. On postoperative day (POD) 7, her liver enzymes increased, and a liver biopsy showed acute cellular rejection. She was treated with intravenous steroid boluses and additional doses of thymoglobulin with initial improvement of the liver tests up to POD 10. However, the liver tests began rising again on POD 11. By this time, a C4d stain of the liver biopsy became available, as shown in the image.



C4d stain

What would be the appropriate next step in the management of her graft dysfunction?

- A. Start plasmapheresis and rituximab
 - B. Start belatacept
 - C. Repeat solumedrol boluses followed by taper
 - D. Add an mTOR inhibitor to the immunosuppression regimen
 - E. Give additional thymoglobulin doses
-

24

A 50-year-old white male presents to your clinic with elevated liver enzymes. He does not smoke cigarettes or drink alcohol. He has no family history of liver disease or liver cancer. His laboratory results are as follows:

Leukocyte count	6000	[4000-11,000/ μ L]
Hematocrit	42	[42-50%]
Platelet count	190,000	[150,000-400,000/ μ L]
ALT	55	[10-40 U/L]
AST	50	[10-40 U/L]
Alkaline phosphatase	112	[30-120 U/L]
Albumin	4.0	[3.5-5.5 g/dL]
Total protein	7.0	[5.5-9.0 g/dL]
Hepatitis A IgG	Negative	
Hepatitis B surface antigen	Negative	
Hepatitis C antibody	Negative	
Iron saturation	45	[20%-50%]
Ferritin	1200	[20-235 ng/mL]
HFE	C282Y/C282Y	

Ultrasound of the abdomen is normal.

Which of the following should you do next?

- A. No further testing needed
- B. Phlebotomy
- C. Liver biopsy
- D. Ask patient for family history of hemochromatosis
- E. Repeat iron profile in 3 months

25

A 22-year-old female is 26 weeks pregnant and is referred by her obstetrician for a history of hepatitis B virus infection. During a prenatal visit, her liver enzymes were normal, but her hepatitis B surface antigen and hepatitis B e antigen were both positive, and her hepatitis B DNA was 1,000,000 IU/mL.

In addition to hepatitis B immune globulin and vaccination of the infant at birth, which of the following strategies is recommended to best reduce the risk of mother-to-child transmission?

- A. Vaccinate the mother for hepatitis B now
 - B. Treat the mother with interferon now
 - C. Treat the mother with tenofovir now
 - D. Monitor the mother and recheck hepatitis B viral load just before delivery
 - E. Treat the baby with tenofovir after delivery
-

26

A 58-year-old man with obesity, diabetes, and hypertension is admitted to the hospital with 3 weeks of jaundice, abdominal bloating, fatigue, and malaise. He reports drinking 2 to 3 beers daily after work and 12 to 18 beers on the weekend but admits to more drinking since he lost his job 9 months ago. His last alcohol use was 2 weeks ago. On admission, he has a temperature of 99.1°F, blood pressure 98/62 mmHg, heart rate 96 bpm, respiratory rate 20 br/min, and oxygen saturation of 94% on room air. His examination is significant for jaundice, lower extremity edema, a distended abdomen, and asterixis. Laboratory results show a leukocyte count of 18,000/ μL [4000-11,000/ μL] and creatinine level of 1.5 mg/dL [0.7-1.5 mg/dL]. MELD-Na is 29 and Discriminant Function is 41.

Which of the following is the most appropriate initial treatment for this patient?

- A. Initiate therapy with glucocorticoids now
 - B. Order a low sodium diet and intravenous furosemide
 - C. Complete an infectious evaluation, initiate lactulose, and screen for nutritional deficiencies
 - D. Initiate parenteral nutrition support until his encephalopathy and ascites are controlled
 - E. Order oxazepam for management of alcohol withdrawal
-

27

A 64-year-old man with hepatitis C is referred for antiviral treatment. During his evaluation, 2 liver lesions were found on ultrasound. A CT scan showed a 1.3-cm right lobe lesion and a 1.8-cm left lobe lesion, both with contrast enhancement on late arterial phase, washout on portal venous phase, and peripheral rim enhancement. Trace ascites is also noted. His laboratory tests showed the following:

Leukocyte count	2500	<i>[4000-11,000/μL]</i>
Hemoglobin	11	<i>[14-18 g/dL]</i>
Platelet count	60,000	<i>[150,000-400,000/μL]</i>
INR	1.1	<i>[<1.1]</i>
Sodium	134	<i>[136-145 mEq/L]</i>
Creatinine	1.1	<i>[0.7-1.5 mg/dL]</i>
Total bilirubin	1.4	<i>[0.3-1.0 mg/dL]</i>
AST	61	<i>[10-40 U/L]</i>
ALT	50	<i>[10-40 U/L]</i>
Alpha-fetoprotein	38	<i>[less than 10 ng/mL]</i>
MELD	10	

What is the best definitive treatment for this patient?

- A. Surgical resection with extended left lobe hepatectomy
- B. List for liver transplantation with MELD 10 because he does not qualify for a standard MELD exception
- C. List for liver transplantation with MELD 10 and await growth of one of the lesions to 2 cm to obtain a standard MELD exception
- D. List for liver transplantation with a MELD exception for HCC
- E. Start systemic chemotherapy with sorafenib

28

The risk of which of the following is reduced by the use of rituximab prophylaxis for ABO-incompatible liver transplantation?

- A. Acute cellular rejection
 - B. Antibody-mediated rejection
 - C. Bacterial infection
 - D. Fungal infection
 - E. Cytomegalovirus disease
-

29

A 52-year-old male with alcoholic cirrhosis complicated by ascites, muscle wasting, and variceal bleeding is referred for fluid management by urology as part of a preoperative evaluation for a large hydrocele. Diuretics were stopped due to hyponatremia and his ascites has been managed with large volume paracentesis every 2 to 3 weeks. On examination, he has muscle wasting and tense ascites.

Laboratory results are as follows:

Sodium	126	<i>[136-145 mEq/L]</i>
Creatinine	1.2	<i>[0.7-1.5 mg/dL]</i>
AST	60	<i>[10-40 U/L]</i>
ALT	52	<i>[10-40 U/L]</i>
Total bilirubin	2.3	<i>[0.3-1.0 mg/dL]</i>
Albumin	2.8	<i>[3.5-55 g/dL]</i>
INR	2.3	<i>[<1.1]</i>
MELD-Na	28	

What is the best next management step to control his ascites?

- A. Recommend a low salt diet
 - B. Restart diuretics
 - C. Continue serial large volume paracentesis
 - D. Begin midodrine and octreotide
 - E. Refer for a transjugular intrahepatic portosystemic shunt
-

30

Which of the following features on liver biopsy supports a histologic diagnosis of nonalcoholic steatohepatitis?

- A. Interface hepatitis
 - B. Plasma cells
 - C. Ballooned hepatocytes
 - D. Perisinusoidal fibrosis
 - E. Periportal fibrosis
-

31

Which of the following characteristics is most commonly seen on liver biopsy in a patient with cystic fibrosis?

- A. Hepatic steatosis
 - B. Interface hepatitis with plasma cells and emperipolesis
 - C. Microabscesses
 - D. Hepatic sinusoidal dilation
 - E. Cholestasis and neocholangiogenesis
-

32

Which of the following may be associated with the use of a donor liver with moderate steatosis?

- A. Hepatic artery thrombosis
 - B. Primary non-function
 - C. Increased risk of acute cellular rejection
 - D. Increased risk of chronic rejection
-

33

A 64-year-old man with chronic hepatitis C genotype 1a comes to your office for antiviral treatment. He has cirrhosis without a history of decompensation. He was treated with pegylated interferon and ribavirin in 1992 but relapsed one month after completing treatment. He was retreated in 2013 with pegylated interferon, ribavirin, and telaprevir, but this was discontinued 4 months into treatment due to severe anemia requiring blood transfusion. He would like to be retreated.

Which of the following regimens would you recommend?

- A. Sofosbuvir/velpatasvir daily for 12 weeks
 - B. Sofosbuvir/ledipasvir daily for 24 weeks
 - C. Elbasvir/grazoprevir daily for 12 weeks
 - D. Glecaprevir/pibrentasvir daily for 8 weeks
-

34

A journal article presented an adjusted model of the estimated risk of biliary complications after undergoing living donor liver transplantation (LDLT) versus deceased donor liver transplantation (DDLT). In the study results, LDLT was associated with a biliary complication odds ratio of 1.18 (95% confidence interval, 1.08-1.31, $P < 0.001$) compared with DDLT. What is the estimated difference in risk of suffering a biliary complication in LDLT versus DDLT?

- A. 8%
 - B. 18%
 - C. 23%
 - D. 31%
 - E. 39%
-

35

A 52-year-old man with decompensated alcoholic cirrhosis is referred to you for liver transplant evaluation. His cirrhosis is complicated by large volume ascites on diuretics, hepatic encephalopathy treated with lactulose, and non-bleeding esophageal varices that have been band ligated. His MELD-Na is 25 and blood group is A. He is listed in a UNOS region where the median MELD score at transplant for blood group A is 31. He and his family are concerned that he will never receive a transplant.

Which of the following is most likely to result in this patient receiving a liver transplant?

- A. Development of a 1.8-cm HCC
 - B. Hepatopulmonary syndrome with room air PaO₂ < 65 mmHg
 - C. Agreeing to accept an anti-HBc positive donor liver
 - D. Relocating to a region with a lower median MELD score at transplant
-

36

A 57-year-old man with cirrhosis from hepatitis B and hepatocellular carcinoma presents for evaluation for liver transplantation. His alpha-fetoprotein level is 322 [*less than 10 ng/mL*]. His initial CT scan shows 3 liver lesions with imaging characteristics consistent with hepatocellular carcinoma (LIRADS 5). The maximum diameter of the first lesion is 2 cm and of the second lesion is 2 cm.

What is the maximum size of the third lesion that will allow him to be eligible for a standard MELD exception through the national hepatocellular downstaging policy?

- A. 3 cm
 - B. 4 cm
 - C. 6.5 cm
 - D. 8 cm
-

37

Under Organ Procurement and Transplantation Network (OPTN) policy and the National Organ Transplantation Act (NOTA), which of the following characteristics can make a patient ineligible for transplantation?

- A. Race
 - B. Citizenship
 - C. Celebrity status
 - D. Ability to pay
 - E. ICU status
-

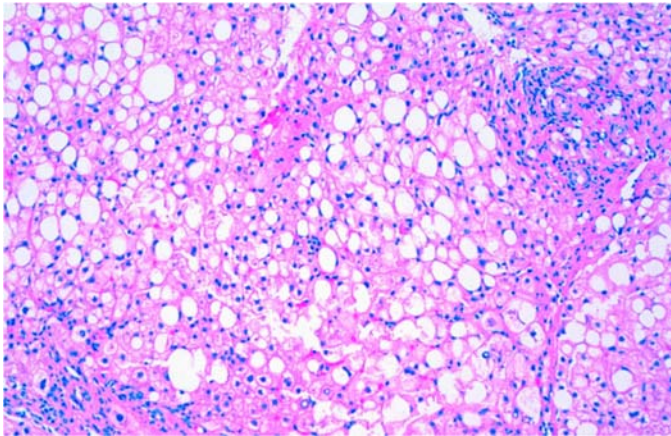
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In the Adult-to-Adult Living Donor Liver Transplantation Cohort Study (A2ALL), which type of graft was associated with the best outcome for the recipient?

- A. Right hepatic lobe
 - B. Left hepatic lobe
 - C. Left lateral segment
 - D. Equally good outcomes with right and left hepatic lobe
-

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A 50-year-old Hispanic woman presents to the outpatient clinic for evaluation of abnormal liver enzymes. She has a past medical history of rheumatoid arthritis and hyperlipidemia and a prior history of breast ductal carcinoma in situ. Her current medications are etanercept, simvastatin, and tamoxifen. She recently completed a 3-day course of nitrofurantoin for a urinary tract infection. She does not drink alcohol. Blood work from her primary care provider shows an AST level of 70 [10-40 U/L] and ALT level of 100 [10-40 U/L]. Bilirubin and alkaline phosphatase levels are normal. Workup for underlying liver disease reveals antinuclear antibodies at 1:640 [1:40 or less], anti-smooth muscle antibodies at 1:80 [1:80 or less], ferritin level of 300 [20-235 ng/mL], and iron saturation of 40% [20%-50%]. The patient undergoes a liver biopsy. A representative H&E stain is shown below.



Which of the following medications is most likely to cause this pattern of injury?

- A. Simvastatin
- B. Tamoxifen
- C. Etanercept
- D. Nitrofurantoin

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Which marker is most predictive of liver transplant-free survival in primary biliary cholangitis?

- A. ALT
 - B. INR
 - C. Total bilirubin
 - D. Pruritis
 - E. Variceal bleeding
-