Supplementary Table 3. Grading of the responses from the ChatGPT Language Model for the questions related to cirrhosis management quality measure

<table>
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<tr>
<th>Questions</th>
<th>Responses 1</th>
<th>Responses 2</th>
<th>Reviewer Grade</th>
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<tbody>
<tr>
<td>1. When should patients with ascites who are admitted to the hospital for evaluation and management of symptoms related to ascites or encephalopathy receive a diagnostic paracentesis?</td>
<td>A diagnostic paracentesis is typically performed in patients with ascites who are experiencing symptoms related to the accumulation of fluid in the abdomen, such as abdominal pain, difficulty breathing, or feeling full or bloated. The procedure may also be performed in patients who have developed hepatic encephalopathy, a condition in which the accumulation of toxins in the blood can cause changes in mental status, including confusion, altered levels of consciousness, and coma. A diagnostic paracentesis may be performed as part of the initial evaluation of these patients when they are admitted to the hospital to help determine the cause of the ascites or encephalopathy and guide further treatment. It is important to note that the timing and indications for a diagnostic paracentesis may vary depending on the specific patient and the clinical circumstances.</td>
<td>Similar</td>
<td>1/2</td>
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<td>2. Patients who are admitted with or develop GI bleeding should receive antibiotics within how many hours? What is the minimum duration for the course of antibiotics?</td>
<td>The timing and duration of antibiotic treatment for gastrointestinal (GI) bleeding depend on the underlying cause of the bleeding and the patient’s individual circumstances. In general, antibiotics should be administered as soon as possible after the diagnosis of GI bleeding is made. There is no specific time frame for initiating antibiotic treatment, as the decision to use antibiotics should be based on the patient’s clinical presentation and the suspected or confirmed cause of the bleeding. As for the duration of antibiotic treatment, it is typically at least 3-5 days, but may be longer depending on the severity of the infection and the patient’s response to treatment. It is important to continue antibiotics for the full course of treatment as prescribed by a healthcare provider, even if the patient’s symptoms improve, to ensure that the infection is fully cleared.</td>
<td>It is generally recommended that patients who are admitted with or develop gastrointestinal (GI) bleeding should receive antibiotics within 24 hours. The minimum duration for the course of antibiotics will depend on the specific type of infection present and the patient’s response to treatment. In general, antibiotics should be given for at least 3-5 days, and sometimes longer if the infection is severe or if the patient is not responding well to treatment. It is important to follow the recommendations of the healthcare provider in charge of the patient’s care, as the specific treatment plan may vary depending on the individual case.</td>
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<td>3. What is the minimum amount of ascites removed from paracentesis in patients with cirrhosis for intravenous albumin to be indicated?</td>
<td>Intravenous albumin is usually indicated in patients with cirrhosis and ascites who have had at least 5 liters of ascites removed through paracentesis. This is based on the finding that patients with large-volume ascites (&gt; 5 liters) who have had at least this amount of fluid removed are at increased risk of developing hypovolemia, or low blood volume. In these patients, intravenous albumin can be used to help restore and maintain normal blood volume. However, the decision to use intravenous albumin should be made on a case-by-case basis, taking into account the patient’s overall clinical condition and any other relevant factors.</td>
<td>It is generally recommended that patients with cirrhosis and ascites who have had more than 5 liters of ascites removed during paracentesis within the previous 3 months, or more than 6 liters removed within the previous 6 months, receive intravenous albumin to help prevent further fluid accumulation and reduce the risk of complications such as hepatorenal syndrome. However, the decision to administer intravenous albumin should be made on a case-by-case basis, taking into account the patient’s overall clinical condition and the presence of other risk factors for fluid accumulation. It is important to note that intravenous albumin should not be used as a substitute for proper management of the underlying liver disease, and that other measures such as salt and water restriction, diuretic therapy, and antibiotic prophylaxis may also be necessary to prevent recurrent ascites.</td>
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### Supplementary Table 3. Continued

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<td>4. In hospitalized patients with cirrhosis and ascites, what is the threshold ascitic fluid polymorphonuclear count to start empiric antibiotics and albumin? What is the dose of albumin given in this scenario?</td>
<td>In hospitalized patients with cirrhosis and ascites, empiric antibiotic treatment is generally recommended for those with an ascitic fluid polymorphonuclear (PMN) count of at least 250 cells/mm³. This is based on the finding that patients with an ascitic fluid PMN count of 250 cells/mm³ or higher are at increased risk of developing spontaneous bacterial peritonitis (SBP), a serious complication of cirrhosis that requires prompt treatment with antibiotics. If intravenous albumin is used in conjunction with antibiotics for the treatment of SBP, the usual dose is 1.5 g/kg body weight per day, given in divided doses. For example, a 70 kg patient would receive 105 g of albumin per day. It is important to note that the use of intravenous albumin in the treatment of SBP is controversial, and some studies have suggested that it may not provide any additional benefit beyond that of antibiotic treatment alone. The decision to use intravenous albumin should be made on a case-by-case basis, taking into account the patient’s overall clinical condition and any other relevant factors.</td>
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<td>5. Should patients with ascites and/or hepatic hydrothorax be given both sodium restriction and diuretics?</td>
<td>Patients with ascites and/or hepatic hydrothorax may benefit from both sodium restriction and diuretics. Sodium restriction can help to reduce the amount of fluid accumulation in the body, while diuretics can help to increase the amount of urine produced and promote the elimination of excess fluid. However, the specific treatment plan will depend on the underlying cause of the fluid accumulation, as well as the patient’s overall health status and other medical conditions. It is important for patients with ascites and/or hepatic hydrothorax to work closely with their healthcare team to determine the most appropriate treatment approach.</td>
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<td>6. Should patients who undergo paracentesis receive fresh frozen plasma or platelets?</td>
<td>Paracentesis is a procedure in which a needle is used to remove fluid from the abdomen. The decision to administer fresh frozen plasma or platelets to a patient who has undergone paracentesis will depend on the specific circumstances of the case and the patient’s overall health and medical history. In general, fresh frozen plasma (FFP) may be administered to patients who have lost a significant amount of blood or have a deficiency of clotting factors. Platelets may be given to patients who have a low platelet count or who are at risk of bleeding. It is important to note that FFP and platelets are blood products that are derived from donated blood. As such, they carry a risk of allergic reactions and other adverse effects. Therefore, these products should be administered only when the potential benefits outweigh the potential risks. If you have undergone paracentesis and have concerns about whether you should receive FFP or platelets, it is best to consult with your healthcare provider. They will be able to assess your specific needs and determine the most appropriate course of treatment.</td>
<td>Similar</td>
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8. Should patients with decompensated cirrhosis and no documented history of previous GI bleeding receive upper endoscopy to screen for varices? If yes, the upper endoscopy be performed within how many months of diagnosis?

Yes, patients with decompensated cirrhosis and no documented history of previous GI bleeding should receive upper endoscopy to screen for varices. This is because patients with decompensated cirrhosis are at high risk for developing varices, which are dilated blood vessels in the lining of the esophagus or stomach that can rupture and cause serious bleeding. Upper endoscopy allows for the visualization and assessment of these blood vessels, and can help to identify those at high risk for bleeding. The upper endoscopy should be performed within 3-6 months of the diagnosis of decompensated cirrhosis. This is because the risk of variceal bleeding increases with the severity of liver disease, and patients with decompensated cirrhosis are at particularly high risk. Early identification and management of varices can help to prevent serious bleeding events and improve outcomes for these patients.

9. What treatment or medication should be given to patients with cirrhosis, no documented history of previous GI bleeding, and medium/large varices on endoscopy? Within how many months the treatment should be given?

If a patient with cirrhosis has medium or large varices on endoscopy, it is generally recommended to start prophylactic treatment to prevent the varices from bleeding. This is typically done with a combination of medications called beta blockers and band ligation. Beta blockers work by reducing the pressure in the veins in the esophagus, which helps to prevent the varices from bleeding. Band ligation involves placing a rubber band around the base of the varix, which cuts off the blood supply to the vein and causes it to shrink. This treatment should be initiated as soon as possible, ideally within a few weeks of the endoscopy. If the patient has a history of bleeding from varices, or if the varices are very large or have already bled, more aggressive treatment may be necessary. This may include medications to reduce portal pressure, such as non-selective beta blockers or nitrates, or procedures to destroy the varices, such as sclerotherapy or transjugular intrahepatic portosystemic shunt (TIPS).
10. Should patients with cirrhosis who present with upper GI bleeding receive upper endoscopy? If yes, within how many hours of presentation should the upper endoscopy be done?

Yes, patients with cirrhosis who present with upper gastrointestinal (GI) bleeding should generally receive upper endoscopy. Upper endoscopy is a procedure that allows a doctor to examine the inside of the upper digestive tract, including the esophagus, stomach, and duodenum. It can be used to identify the source of bleeding and determine the best treatment approach.

In general, it is recommended that upper endoscopy be performed as soon as possible in patients with upper GI bleeding, as prompt diagnosis and treatment can be important for reducing the risk of complications. However, the specific timing will depend on the patient’s clinical condition and the availability of endoscopy services. It is generally recommended that upper endoscopy be performed within 24 hours of presentation in patients with upper GI bleeding. However, in cases where the patient is stable and there is a delay in obtaining endoscopy, supportive care can be provided while waiting for the procedure.

11. When should patients with cirrhosis who are found to have bleeding esophageal varices during endoscopy receive EVL or sclerotherapy?

Patients with cirrhosis who are found to have bleeding esophageal varices during endoscopy should receive either EVL (endoscopic variceal ligation) or sclerotherapy as soon as possible. This is because bleeding esophageal varices can be life-threatening and require immediate treatment to stop the bleeding and prevent further complications. In some cases, patients may be given a prophylactic treatment of EVL or sclerotherapy to prevent bleeding from occurring in the future. The decision to use EVL or sclerotherapy will depend on the severity of the bleeding, the patient’s overall health, and any other underlying medical conditions.

12. What combination of treatment should be given to patients with cirrhosis who survive an episode of acute variceal hemorrhage?

The combination of treatment for patients with cirrhosis who survive an episode of acute variceal hemorrhage should include:

- Endoscopic therapy to stop the bleeding and prevent further bleeding, such as band ligation or sclerotherapy.
- Prophylactic measures to prevent future episodes of variceal hemorrhage, such as beta blockers or nitrates.
- Management of underlying cirrhosis, such as lifestyle changes (such as avoiding alcohol) and medications to reduce portal hypertension and improve liver function.
- Treatment of any underlying causes of cirrhosis, such as viral hepatitis or autoimmune liver diseases.
- Close monitoring and follow-up to ensure that the patient’s condition is stable and to identify any potential complications or new episodes of bleeding.

Reviewer Grade
1. Comprehensive
2. Correct but inadequate
3. Mixed with correct and incorrect/obtained data
4. Completely incorrect

Similarity:
3

1/2
13. Should Patients with previous overt hepatic encephalopathy be counseled regarding the risks associated with driving? Why?

Yes, patients with previous overt hepatic encephalopathy should be counseled regarding the risks associated with driving. Hepatic encephalopathy is a condition that causes changes in mental function and behavior due to liver failure or other liver-related issues. These changes can affect a person's ability to safely operate a vehicle.

Driving requires cognitive and motor skills that may be impaired in individuals with hepatic encephalopathy. This can increase the risk of accidents and injuries for both the patient and other road users. In addition, hepatic encephalopathy can cause fatigue and drowsiness, which can also affect a person's ability to safely operate a vehicle.

Counseling patients about the risks associated with driving can help them make informed decisions about their ability to drive safely. It is important for patients to understand the potential consequences of driving while impaired and to seek alternative transportation options if necessary.

Reviewer Grade
1. Comprehensive
2. Correct but inadequate
3. Mixed with correct and incorrect/ outdated data
4. Completely incorrect

14. Should the physician perform a search for evidence of precipitating factors documented in the chart for patients with hepatic encephalopathy? Why?

Yes, it is important for the physician to perform a search for evidence of precipitating factors in patients with hepatic encephalopathy. Hepatic encephalopathy is a condition that occurs when there is a disturbance in the normal functioning of the brain due to liver disease. Precipitating factors are events or conditions that can trigger or worsen hepatic encephalopathy. Examples of precipitating factors include gastrointestinal bleeding, infections, dehydration, electrolyte imbalances, and certain medications. Identifying and addressing these factors can help to improve the patient's symptoms and prevent further deterioration of their condition.

Reviewer Grade
1. Comprehensive
2. Correct but inadequate
3. Mixed with correct and incorrect/ outdated data
4. Completely incorrect

15. What medication should be given to patients who are hospitalized and have an acute episode of overt hepatic encephalopathy? What are the main goals of treatment?

Acute episodes of overt hepatic encephalopathy are a medical emergency that require immediate treatment. The main goals of treatment are to remove the precipitating factors, such as constipation or infection, and to improve the function of the liver.

Treatment may include medications such as lactulose, a laxative that helps to reduce the levels of toxic substances in the blood by promoting the removal of waste products through the intestines, and antibiotics to treat any infections. Other medications that may be used to treat hepatic encephalopathy include neomycin, rifaximin, and metronidazole.

It is important to note that the specific treatment plan will depend on the underlying cause of the hepatic encephalopathy and the overall health of the patient. It is important to work closely with a healthcare team to determine the most appropriate treatment approach.
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<td><strong>16.</strong> What prophylactic medication should be given to patients who are discharged after an acute episode of hepatic encephalopathy?</td>
<td>Prophylactic medication is often prescribed to patients who have had an acute episode of hepatic encephalopathy in order to prevent future episodes from occurring. The most commonly used prophylactic medications for hepatic encephalopathy are lactulose and rifaximin. Lactulose is a laxative that helps to decrease the levels of toxins in the blood by increasing the frequency of bowel movements and reducing the absorption of toxins in the intestine. Rifaximin is an antibiotic that targets bacteria in the intestine and helps to reduce the production of ammonia, a common cause of hepatic encephalopathy. It is important to follow the recommendations of a healthcare provider regarding the use of prophylactic medication and to take the medication as directed in order to reduce the risk of future episodes of hepatic encephalopathy.</td>
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<td><strong>17.</strong> For patients with cirrhosis who do not have absolute contraindications to liver transplantation, what is the cut-off for MELD-score to indicate an evaluation for liver transplantation?</td>
<td>The Model for End-Stage Liver Disease (MELD) score is a numerical scale that is used to assess the severity of liver disease and predict the risk of mortality in patients with cirrhosis. The MELD score is calculated using three laboratory values: serum creatinine, bilirubin, and INR (international normalized ratio). The score ranges from 6 to 40, with a higher score indicating more severe liver disease. For patients with cirrhosis who do not have absolute contraindications to liver transplantation, the cut-off for MELD score to indicate an evaluation for liver transplantation varies depending on the transplant center and the availability of donor organs. In general, patients with a MELD score of 20 or higher are considered to be candidates for liver transplantation. However, some transplant centers may consider patients with a MELD score lower than 20 if they have other factors that suggest a high risk of mortality without a transplant. It is important to note that the MELD score is just one factor that is considered in the evaluation for liver transplantation, and other factors such as the patient’s overall health, age, and cause of liver disease are also taken into account.</td>
<td>Similar 3</td>
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<td><strong>18.</strong> Should Patients with cirrhosis, who do not have absolute contraindications to liver transplantation, have hepatocellular carcinoma (HCC) meeting the transplant criteria, be considered for liver transplantation regardless of Model for End-Stage Liver Disease (MELD) score?</td>
<td>Yes, patients with cirrhosis and HCC who do not have absolute contraindications to liver transplantation should be considered for liver transplantation regardless of MELD score if they meet the transplant criteria for HCC. MELD scores are used to prioritize liver transplantation for patients with end-stage liver disease, but they do not take into account specific conditions such as HCC. Therefore, patients with HCC who meet the transplant criteria should not be denied a transplant solely based on their MELD score.</td>
<td>Similar 1/2</td>
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19. What is the time interval for hepatocellular carcinoma (HCC) screening using abdominal imaging with or without serum alpha-fetoprotein in patients with cirrhosis?

The recommended time interval for hepatocellular carcinoma (HCC) screening using abdominal imaging with or without serum alpha-fetoprotein (AFP) in patients with cirrhosis depends on the specific guidelines being followed and the individual patient’s risk factors for HCC.

The American Association for the Study of Liver Diseases (AASLD) recommends that patients with cirrhosis undergo HCC surveillance with abdominal ultrasound every 6 months, along with serum AFP testing every 6 months. However, if a patient has a high risk of developing HCC (e.g., due to a history of heavy alcohol consumption or hepatitis B infection), the AASLD recommends more frequent imaging (e.g., every 3-4 months) and serum AFP testing.

The European Association for the Study of the Liver (EASL) recommends similar HCC surveillance intervals for patients with cirrhosis. However, the EASL also suggests that patients with a low risk of developing HCC (e.g., due to non-alcoholic fatty liver disease or hepatitis C infection) may be able to undergo HCC surveillance every 12-24 months.

It is important to note that these are general guidelines and the appropriate HCC surveillance interval for a particular patient may vary based on their individual circumstances. It is always best to discuss the appropriate HCC screening intervals with a healthcare provider.

20. Should patients with cirrhosis have hepatitis B immune status and/or vaccination be documented in the chart?

Yes, it is important for patients with cirrhosis to have their hepatitis B immune status and vaccination documented in the chart. Hepatitis B is a viral infection that can cause liver inflammation and damage, and it is one of the leading causes of cirrhosis and liver cancer. In patients with cirrhosis, it is especially important to prevent hepatitis B infection, as it can lead to further deterioration of the liver and increase the risk of death.

The hepatitis B vaccine is a safe and effective way to prevent hepatitis B infection. The vaccine is recommended for all adults who are at risk of hepatitis B, including patients with cirrhosis. It is important for patients with cirrhosis to have their hepatitis B immune status documented in the chart, as this will help to determine whether they need to be vaccinated or not. If a patient has already been vaccinated, it is important to document this in the chart as well, as this will help to ensure that they receive booster doses as needed.
### Supplementary Table 3. Continued

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<td><strong>21. What treatment should be considered for patients with untreated hepatitis C cirrhosis?</strong></td>
<td>Treatment for patients with untreated hepatitis C cirrhosis typically involves the use of antiviral medications to help clear the hepatitis C virus from the body. The goal of treatment is to halt or slow the progression of liver damage and prevent complications such as liver failure or liver cancer. There are several antiviral medications that are effective in treating hepatitis C, including interferon-based therapies (such as pegylated interferon), direct-acting antivirals (DAAs), and combination therapies that use a combination of interferon and DAAs. The specific treatment regimen recommended for a patient with untreated hepatitis C cirrhosis will depend on several factors, including the type of hepatitis C virus they have, the severity of their liver damage, and any other medical conditions they may have. It is important for patients to work closely with their healthcare team to determine the most appropriate treatment plan for their specific needs.</td>
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<td><strong>22. What treatment should be considered for Patients with untreated hepatitis B cirrhosis?</strong></td>
<td>It is generally recommended that patients with untreated hepatitis B cirrhosis receive antiviral therapy to slow the progression of liver damage and reduce the risk of developing liver cancer. The most commonly used antiviral medications for hepatitis B are nucleos(t)ide analogues, which work by inhibiting the hepatitis B virus's ability to replicate. These medications can be taken orally and are generally well-tolerated, although they may cause side effects such as headache, fatigue, and nausea. It is important for patients to take these medications exactly as prescribed and to continue treatment for the recommended duration in order to achieve the maximum benefit. In addition to antiviral therapy, patients with hepatitis B cirrhosis may also need to receive other treatments such as liver transplantation or other supportive care measures.</td>
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<td><strong>23. Patients with cirrhosis should receive counseling or be referred to a substance abuse treatment program within how many months of positive screening?</strong></td>
<td>It is generally recommended that patients with cirrhosis who screen positive for substance abuse receive counseling or be referred to a substance abuse treatment program as soon as possible. There is no specific timeframe within which this should occur, as the need for treatment may vary depending on the individual's specific circumstances and the severity of their substance abuse. In general, however, it is important for patients with cirrhosis to receive appropriate treatment as soon as possible to help prevent further liver damage and improve their overall health.</td>
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<td><strong>24. Should Patients with cirrhosis who are undergoing abdominal surgery have documentation of the risk–benefit of undergoing the surgical procedure in the medical record?</strong></td>
<td>Yes, it is important to document the risk–benefit of undergoing surgery in the medical record for patients with cirrhosis or any other underlying medical condition. This documentation can help to inform the decision-making process and ensure that the patient is aware of the potential risks and benefits of the procedure. It is also important to carefully consider the potential effects of the surgery on the patient’s underlying condition and to have a plan in place to manage any potential complications that may arise.</td>
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### Questions

**25. Recently discharged patients with cirrhosis should have a clinic visit with a health care provider within how many weeks of discharge?**

**Responses 1**

Recently discharged patients with cirrhosis should have a clinic visit with a health care provider within 1-2 weeks of discharge. This is to ensure that the patient’s condition is stable and to address any issues or concerns that may have arisen since the patient was discharged from the hospital. It is important for patients with cirrhosis to have close follow-up with their health care provider to monitor the progression of their disease and to manage any complications that may arise.

**Responses 2**

Similar

**Reviewer Grade**

2. Correct but inadequate

**26. Patients with cirrhosis should be assessed for frailty using what method?**

**Responses 1**

There are several ways to assess frailty in patients with cirrhosis. One commonly used method is the Fried frailty criteria, which includes five criteria: weight loss, weakness, low physical activity, slow walking speed, and exhaustion.

Another method is the Clinical Frailty Scale (CFS), which categorizes patients into one of nine levels of frailty, ranging from very fit to very frail. The CFS takes into account factors such as mobility, cognition, nutrition, and co-morbidities.

Both the Fried frailty criteria and the CFS are simple and easy to use, and can provide useful information about a patient’s frailty status and prognosis. It is important to note that frailty can be reversible, and interventions such as physical therapy and rehabilitation can improve a patient’s frailty status.

**Responses 2**

Similar

**Reviewer Grade**

2. Correct but inadequate