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When Is Transplant Not An Option For HCC

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Disclosures

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Advisory Board: AbbVie, Clinical Area – HCV
Advisory Board: Gilead, Clinical Area – HCV
Learners should be able to:

• Interpret LI-RaDS criteria for medical imaging reporting on suspicious liver masses
• Verbalize the use of Milan Criteria in determining transplant eligibility
• Describe downstaging
• Identify at least 3 options for HCC treatment
Hepatocellular carcinoma (HCC) is an aggressive tumor that often occurs in the setting of chronic liver diseases, obesity, and cirrhosis.

(Blonski, 2010)
HCC

- HCC is the fifth most common cancer in the United States.
- HCC is the third most common cause for cancer death in the world.

(Marrero, et al)
HCC was particularly lethal, with a 5-year survival of less than 5%.

(Marrero, et al.)
Hepatocellular Carcinoma

Image credit: https://gut.bmj.com/content/63/5/844
Causes of HCC

- Cirrhosis
- Chronic Hepatitis B Infection
- Chronic Hepatitis C Infection
- Miscellaneous (Obesity, NASH, Alcoholic Cirrhosis, Diabetes)

(Marrero, et al.)
HCC and Cirrhosis

- HCC is the major cause of liver-related death in patients with compensated cirrhosis
- Male > Female prevalence
- Pre-existing cirrhosis is found in more than 80% of individuals diagnosed with HCC
- Size and number of lesions are tied to treatment options and survival

(Marrero Et Al.)
Chronic Hepatitis B & HCC

- HBV viral load >2000 IU/mL is associated with high risk for malignant transformation
- HCC can be found in HBV patients without cirrhosis.
- Chronic HBV (without cirrhosis) accounts for at 50-80% of HCC worldwide.

(Bionski, et al.)
• HCV infection is a major cause of HCC in Western Countries.

• HCC can develop in HCV-infected patients without cirrhosis.
Liver Imaging Reporting and Data System
LI-RADS

• Quality assurance tool created and trademarked by the American College of Radiology in 2011
• Standardizes reporting and data collection of CT and MRI imaging for patients at risk for HCC, or primary liver cancers

(Tsoufas et al, 2021)
LI-RADS Interpretation

Observation in high risk patient

- Definitely Benign
- Probably Benign
- Not definitely or probably benign
- Treated mass
- Tumor in vein
- Probably malignant, but not specific for HCC

LI-RADS | Description | Management
--- | --- | ---
Negative | no observations detected | return to surveillance in 6 months
LR-NC | not categorizable due to image degradation or omission | repeat or alternative imaging in < 3 mo
LR-1 | definitely benign observation | return to surveillance in 6 mo
LR-2 | probably benign | consider repeat diagnostic imaging in 6 mo.
LR-3 | intermediate probability of malignancy | repeat or alternative imaging in 3-6 mo
LR-4 | probably HCC | multidisciplinary discussion for further work-up
LR-5 | definitely HCC | multidisciplinary discussion for management consensus
LR-M | probably/definite malignancy not HCC specific | multidisciplinary discussion, consider biopsy
LR-TIV | definite tumor in vein | multidisciplinary discussion, may include biopsy

Arterial phase hypo- or iso-enhancement | Arterial phase non-rim hyperenhancement
--- | ---
<20 | <10 | 10-19 | ≥20
none | LR3 | LR3 | LR3 | LR5
one | LR3 | LR4 | LR4 | LR5
≥two | LR4 | LR4 | LR4 | LR5

Enhancing capsule
Non-peripheral washout
Threshold growth
CT Image of LI-Rad 5
Staging and Treatment of HCC

(Marrero, et al, 2018)
Milan Criteria For Liver Transplant

• Introduced by Mazzaferro in 1996

• Assess suitability of patients for liver transplant with cirrhosis and hepatocellular carcinoma, recommended by AASLD guidelines.

(Tsoulfas et al, 2021)
Adults with HCC are eligible for transplant if:

1. Single tumor diameter < 5 cm
2. Not more than 3 foci of tumor, each one <3 cm
3. No angioinvasion
4. No extrahepatic involvement

- Using this criteria, it has been found that patients have an excellent 5-year survival rate of 70% or greater, with a 15% chance for recurrence.

(Tsoufas et al, 2021)
# Milan Criteria Calculator

<table>
<thead>
<tr>
<th>Criteria</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single tumor with diameter ≤5 cm</td>
<td>0</td>
<td>+1</td>
</tr>
<tr>
<td>Up to 3 tumors each with diameter ≤3 cm</td>
<td>0</td>
<td>+1</td>
</tr>
<tr>
<td>Extra-hepatic involvement</td>
<td>+1</td>
<td>0</td>
</tr>
<tr>
<td>Major vessel involvement</td>
<td>+1</td>
<td>0</td>
</tr>
</tbody>
</table>

0 points: Transplantation may be considered  
1 to 3 points: Transplantation may be pointless
Tumor Downstaging

- Tumor down-staging is defined as reduction in the size of the tumor using local regional therapies (LRT) specifically to meet acceptable criteria for liver transplant.

- Tumor down-staging serves as a tool to select a sub-group of patients with HCC initially exceeding transplant criteria but will likely do well after liver transplant.

(Yao et al)
Radiofrequency Ablation

- Microwave ablation (MWA) destroys liver tumors using heat generated by microwave energy.
- With microwave ablation, the surgeon inserts a small laparoscopic port or open incision to access the tumor.
- CT or US guidance is used to pinpoint the exact location of the tumor.
- Microwave probe is inserted. It produces intense heat that destroys the tumor tissue.
- It is preferred treatment when diseased tissue is small or cannot be surgically removed.

(Marrero, et al, 2018)
Transcatheter Arterial Chemoembolization (TACE)

- Minimally invasive procedure
- Performed in Interventional Radiology
- Purpose: restrict tumor blood supply

Small embolic particles coated with chemotherapy are injected selectively through a catheter into an artery directly supplying blood to the tumor.

(Marrero, et al, 2018)
Radioembolization (Y-90)

- Minimally invasive procedure
- Combines embolization and radiation therapy
- Tiny glass or resin beads filled with radioactive isotope yttrium (Y-90) are placed inside the blood vessels that feed the tumor
  - This constricts blood flow while delivering high dose of radiation to the tumor
- Outcome: Shrinkage or eradication of tumor

(Marrero, et al, 2018)
Cyberknife

- External beam radiation mounted on a robot
- Able to move and bend around patient; approaches tumor from thousands of unique angles
- Delivers high doses of radiation with high precision
- Concentrates radiation at the tumor while minimizing doses of radiation to surrounding healthy tissue

(Marrero, et al, 2018)
Case Study #1
L.S. 77 y/o AA Female

New Patient 1/14/2021
Treatment Naïve

- Genotype 1a
- HCV RNA 36,200,000
- AFP 91.1
- ALT 158
- AST 50
- APRI = 1.832
- Fib 4 = 3.37
- Albumin 1.9
- INR 1.6
- Total bilirubin 1.2
- MELD 16
- Platelets 91
- F4-Decompensated
Case Study # 1

L.S. 77 Y/O AA Female

- Abdominal Ultrasound 1/12/2021 (No focal hepatic mass seen)
- MRI Abdomen W/WO-(LI-RAD 5) 3/5/2021
- TACE Procedure
References


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