RADY Case Presentation

Diwash Thapa MS4
2022
Focused patient history

One liner: 57 yo male with a PMHx of HCV (cured with Mavyret 2019) prior transcatheter arterial chemoembolization (TACE) for hepatocellular carcinoma (HCC) LR-5 lesions X 2

Chief complaint: Increased size of viable disease in the liver and an adrenal nodule.

HPI: First presented in the context of biopsy-proven compensated cirrhosis (BCLC B). Tumor board discussion staged him as BCLC B and the distribution of lesions made it amenable for TACE.

Lesions were viable and equivocal but remained stable in size on follow up surveillance MRI. Lost to follow up for ~ 3 months. Presents with new imaging from OSH.

Vitals: BP 170/87 | Pulse 70 | Temp 36.9 °C (98.4 °F) (Temporal) | Wt 82 kg (180 lb 12.8 oz) | SpO2 99% | BMI 27.09 kg/m²
List of imaging studies and biopsies

• MRI abdomen and pelvis w/ and w/o contrast
• MRI abdomen and pelvis w/ and w/o contrast
• Bland embolization DSA and CBCT

• CT guided adrenal and liver biopsies
Contrast Enhanced T1W MRI abdomen and pelvis

Arterial Phase

Portal Venous Phase

Delayed Phase

Segment 5 lesion: LR-5

Segment 7 lesion: LR-5
## ACR Appropriateness Criteria

Incidental liver lesion, greater than 1 cm on US, noncontrast or single-phase CT, or noncontrast MRI. Known chronic liver disease.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriateness Category</th>
<th>Relative Radiation Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>US abdomen with IV contrast</td>
<td>Usually Appropriate</td>
<td></td>
</tr>
<tr>
<td>MRI abdomen without and with IV contrast</td>
<td>Usually Appropriate</td>
<td></td>
</tr>
<tr>
<td>CT abdomen with IV contrast multiphase</td>
<td>Usually Appropriate</td>
<td></td>
</tr>
<tr>
<td>Image-guided biopsy liver</td>
<td>May Be Appropriate</td>
<td>Varies</td>
</tr>
<tr>
<td>Liver spleen scan</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>RBC scan abdomen and pelvis</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>CT abdomen without and with IV contrast</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>DOTATATE PET/CT skull base to mid-thigh</td>
<td>Usually Not Appropriate</td>
<td></td>
</tr>
<tr>
<td>FDG-PET/CT skull base to mid-thigh</td>
<td>Usually Not Appropriate</td>
<td></td>
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<tr>
<td>Octreotide scan with SPECT or SPECT/CT chest and abdomen</td>
<td>Usually Not Appropriate</td>
<td></td>
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</table>
LI-RADS®
Liver Imaging Reporting and Data System

- **Ultrasound LI-RADS®**
  - For surveillance of HCC
  - In cirrhotic and other high-risk patients
  - Using unenhanced ultrasound

- **CEUS LI-RADS®**
  - For diagnosis of HCC
  - In cirrhotic and other high-risk patients
  - Using contrast-enhanced ultrasound (CEUS)

- **CT/MRI Diagnostic LI-RADS®**
  - For diagnosis and staging of HCC
  - In cirrhotic and other high-risk patients, including liver transplant candidates with HCC
  - Using CT, MRI with extracellular agents (ECA), or MRI with hepatobiliary agents (HBA)

- **CT/MRI Treatment Response LI-RADS®**
  - For assessing response of HCC to locoregional treatment
  - In cirrhotic and other high-risk patients, including liver transplant candidates with HCC
  - Using CT, MRI with extracellular agents (ECA), or MRI with hepatobiliary agents (HBA)
LI-RADS®

LI-RADS categories reflect the incremental probability of a lesion being malignant and HCC based on imaging characteristics.
LI-RADS®

The decision tree of assigning LR categories involves counting the number major imaging features which include specific features (right) followed by using the diagnostic table to assign a LR #:

**CT/MRI Diagnostic Table**

<table>
<thead>
<tr>
<th>Arterial phase hyperenhancement (APHE)</th>
<th>No APHE</th>
<th>APHE (not rim)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation size (mm)</td>
<td>&lt; 20</td>
<td>≥ 20</td>
</tr>
<tr>
<td>Count major features:</td>
<td>None</td>
<td>LR-3</td>
</tr>
<tr>
<td>- &quot;Washout&quot; (not peripheral)</td>
<td>LR-3</td>
<td>LR-3</td>
</tr>
<tr>
<td>- Enhancing &quot;capsule&quot;</td>
<td>LR-3</td>
<td>LR-3</td>
</tr>
<tr>
<td>- Threshold growth</td>
<td></td>
<td>≥ 20</td>
</tr>
<tr>
<td>≥ Two</td>
<td>LR-4</td>
<td>LR-5</td>
</tr>
<tr>
<td></td>
<td>LR-4</td>
<td>LR-5</td>
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<td></td>
<td>LR-4</td>
<td>LR-5</td>
</tr>
<tr>
<td></td>
<td>LR-4</td>
<td>LR-5</td>
</tr>
</tbody>
</table>

*Observations in this cell are categorized LR-4, except:*
- LR-5g, if ≥ 50% diameter increase in < 6 months (equivalent to OPTN 5A-g)
- LR-5us, if "washout" and visibility at screening ultrasound (per AASLD HCC criteria)
Our pt LI-RADS® Category 5 -> Tumor board

- **Multiphase CT or MRI**
  - No observation
  - Categorize each untreated observation detected

- **LR-NC**
  - Repeat or alternative diagnostic imaging in ≤ 3 months

- **LR-1**
  - Return to surveillance in 8 months

- **LR-2**
  - Return to surveillance in 8 months
  - Consider repeat diagnostic imaging in 3-6 months

- **LR-3**
  - Repeat or alternative diagnostic imaging in 3-6 months

- **LR-4**
  - Multi-disciplinary discussion for tailored workup
  - May include biopsy

- **LR-5**
  - HCC confirmed
  - Multi-disciplinary discussion for consensus management

- **LR-M**
  - Multi-disciplinary discussion for tailored workup
  - Often includes biopsy

- **LR-TIV**
  - Multi-disciplinary discussion for tailored workup
  - May include biopsy

- **Pathology diagnosis**
Tumor board discussions are guided by disease staging according to the Barcelona Clinic Liver Cancer (BCLC) system (see next slide). Our patient had one lesion >3 cm and was fully active with no performance restrictions placing them under BCLC-B.

TACE was recommended because the distribution of the HCC lesions was in a distinct arterial supply.
**Fig. 1. BCLC staging and treatment strategy in 2022.** The BCLC system establishes a prognosis in accordance with the 5 stages that are linked to first-line treatment recommendation. The expected outcome is expressed as median survival of each tumour stage according to the available scientific evidence. Individualised clinical decision-making, according to the available data on November 15, 2021, is defined by teams responsible for integrating all available data with the individual patient’s medical profile. Note that liver function should be evaluated beyond the conventional Child-Pugh staging, AFP, alpha fetoprotein; ALBI, albumin-bilirubin; BCLC, Barcelona Clinic Liver Cancer; BSC, best supportive care; ECOG-PS, Eastern Cooperative Oncology Group-performance status; LT, liver transplantation; MELD, model of end-stage liver disease; TACE, transarterial chemoembolisation.
Follow up Contrast Enhanced T1W MRI abdomen and pelvis

Increased size of right adrenal nodule

Post-TACE, unfortunately, residual APHEs concerning for viability were seen in segment 5 and 7 (arrows) lesions. Additionally, the right adrenal nodule nearly doubled in size.
CT guided adrenal nodule biopsy displayed grade 2 neuroendocrine tumor (NET).

CT guided liver biopsy also showed grade 2 neuroendocrine tumor (NET). Bland embolization is the treatment of choice for metastatic NET to the liver [3].
CT angiography using power contrast injection shows tumor blush/hyper attenuation in segment 8

Feeder artery of an unexpected seg 8 lesion led to additional embolization

Static column of embolic indicating procedural endpoint

DSA during bland embolization of R hepatic artery
Patient is also undergoing subcutaneous lanreotide treatment monthly. If this fails to control his adrenal met, he will need adrenalectomy.
UNC Top Three

• The hallmark feature of hepatocellular (HCC) on imaging is arterial phase hyperenhancement with rapid portal venous washout.

• LI-RADS is validated for cirrhosis, chronic hepatitis B viral infection, and current or prior HCC only!

• Other hypervascular liver malignancies can mimic imaging features of HCC, about 5% of the time.


