

# Intrahepatic Cholangiocarcinoma Presenting as LI-RADS 5 "HCC"

Raja K. Dhanekula<sup>1</sup>, Donald G. Mitchell<sup>3</sup>, John L. Farber<sup>4</sup>, Ashwin Sama<sup>2</sup>, Jesse M. Civan<sup>1</sup>

<sup>1</sup>Division of Gastroenterology and Hepatology, <sup>2</sup>Department of Medical Oncology, <sup>3</sup>Department of Radiology, <sup>4</sup>Department of Pathology, Thomas Jefferson University Hospital

## Background

- Hepatocellular Carcinoma (HCC), if within Milan Criteria, is an indication for liver transplantation.
- In contrast, intrahepatic cholangiocarcinoma (IHCC) is a contra-indication to liver transplantation due to high rates of recurrence.
- LI-RADS 5 classification (synonymous with OPTN-5) carries a near 100% positive predictive value for HCC, allowing prioritization of patients for liver transplantation without histological confirmation.

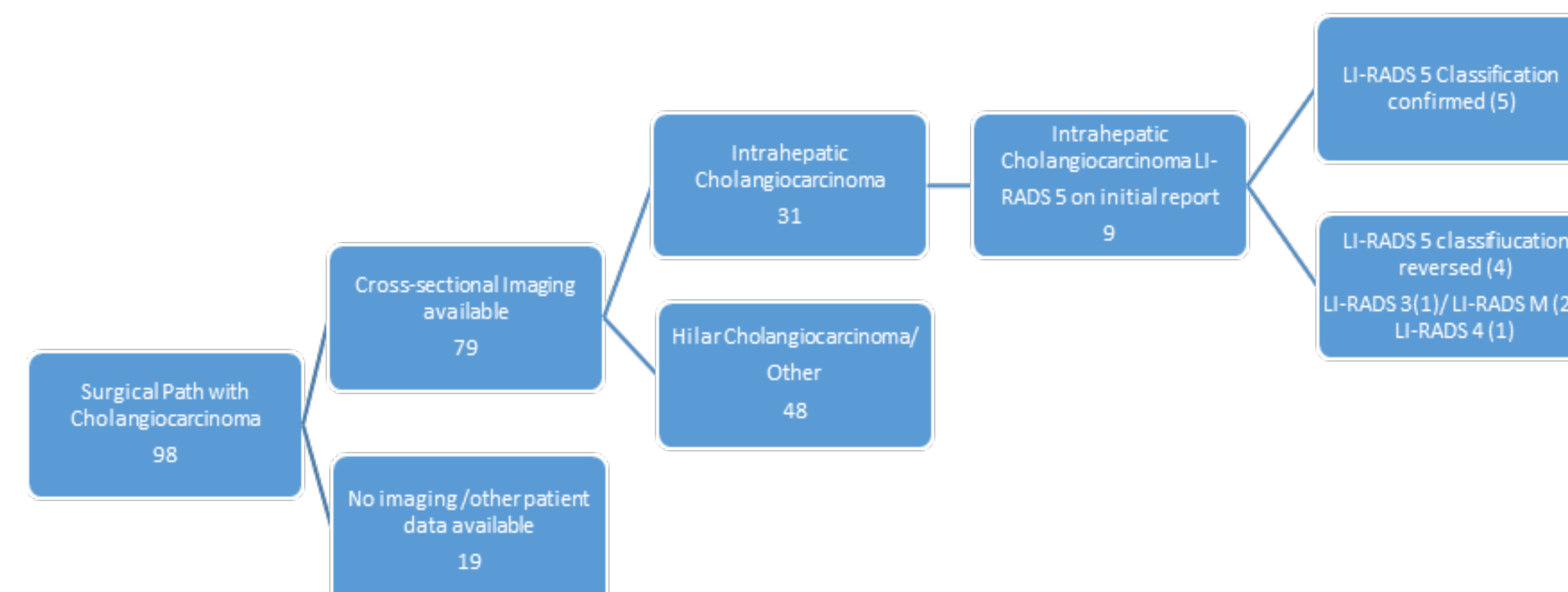
LI-RADS Category	Concept and Definition
LR-1 Definitely Benign	<b>Concept:</b> 100% certainty observation is benign. <b>Definition:</b> Observation with imaging features diagnostic of a benign entity, or definite disappearance at follow up in absence of treatment.
LR-2 Probably Benign	<b>Concept:</b> High probability observation is benign. <b>Definition:</b> Observation with imaging features suggestive but not diagnostic of a benign entity.
LR-3 Intermediate probability for HCC	<b>Concept:</b> Both HCC and benign entity have moderate probability. <b>Definition:</b> Observation that does not meet criteria for other LI-RADS categories.
LR-4 Probably HCC	<b>Concept:</b> High probability observation is HCC but there is not 100% certainty. <b>Definition:</b> Observation with imaging features suggestive but not diagnostic of HCC.
LR-5 Definitely HCC	<b>Concept:</b> 100% certainty observation is HCC. <b>Definition:</b> Observation with imaging features diagnostic of HCC or proven to be HCC at histology.

- The "LI-RADS M" classification indicates the presence of malignancy not meeting diagnostic criteria for HCC. In theory, IHCC lesions should be identified as LI-RADS M and not LI-RADS 5.

## Methods

- Single center retrospective chart review.
- Cases of biopsy-proven cholangiocarcinoma were identified by query of our pathology database from June 2011 through September 2015.
- Patient charts were retrospectively reviewed to identify cases of IHCC which, prior to histological diagnosis of cholangiocarcinoma, were incorrectly diagnosed as HCC on the basis of LI-RADS 5 findings.
- Relevant imaging studies were independently reviewed by an expert abdominal radiologist to confirm that LI-RADS 5 designation was correct.

## Results



- Of 98 cases of biopsy proven cholangiocarcinoma, 31 were IHCC. Of these, 9 cases (29%) were radiographically diagnosed as HCC.
- Five cases (16% of IHCC cases) were confirmed on independent review as LI-RADS 5. Two cases were reclassified as LI-RADS M, one case as LI-RADS 3, and one case as LI-RADS 4.
- Of the five confirmed "LI-RADS 5 IHCC" cases, histology was based on resection of the tumor in three cases and on core biopsies in two cases.

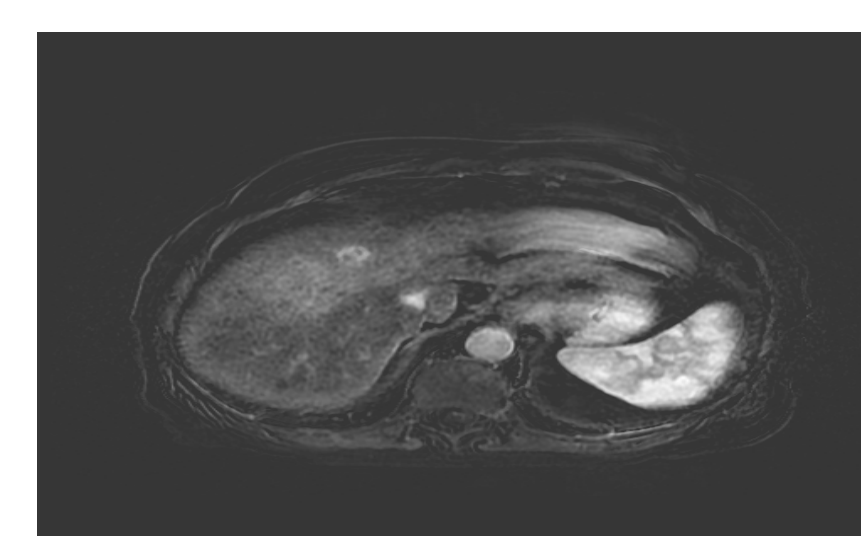
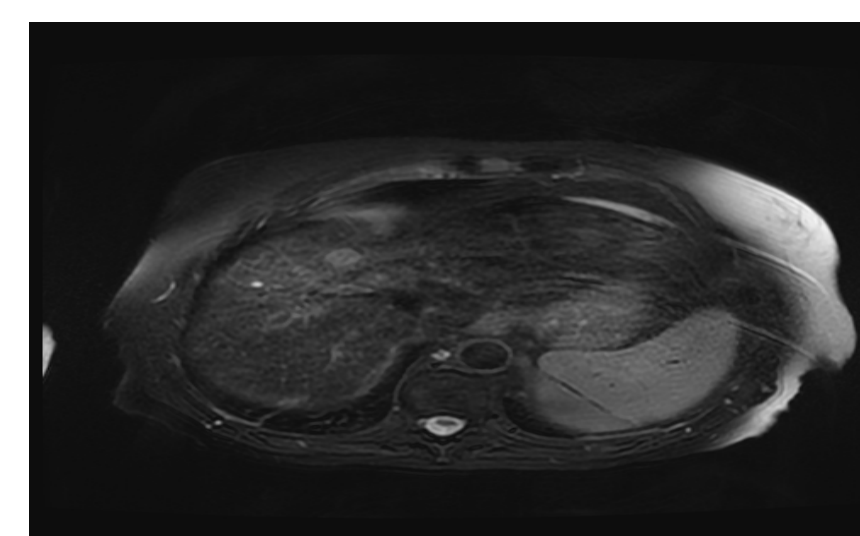
## Discussion

- Although LI-RADS 5 classification is thought to carry a near 100% positive predictive value for the diagnosis of HCC, 16% of IHCC cases in our series met LI-RADS 5 criteria.
- The true proportion of lesions classified as LI-RADS 5 but in fact representing cholangiocarcinoma is unknown, as many patients never have histological confirmation of a radiographic HCC diagnosis. Even patients going to liver transplant often undergo tumor-directed therapy which may preclude confirming diagnosis on explant because of complete necrosis of tumor.
- Our study did not address the potential role of diagnostic tests, such as CA 19-9 levels, which might be helpful to identify such cases.

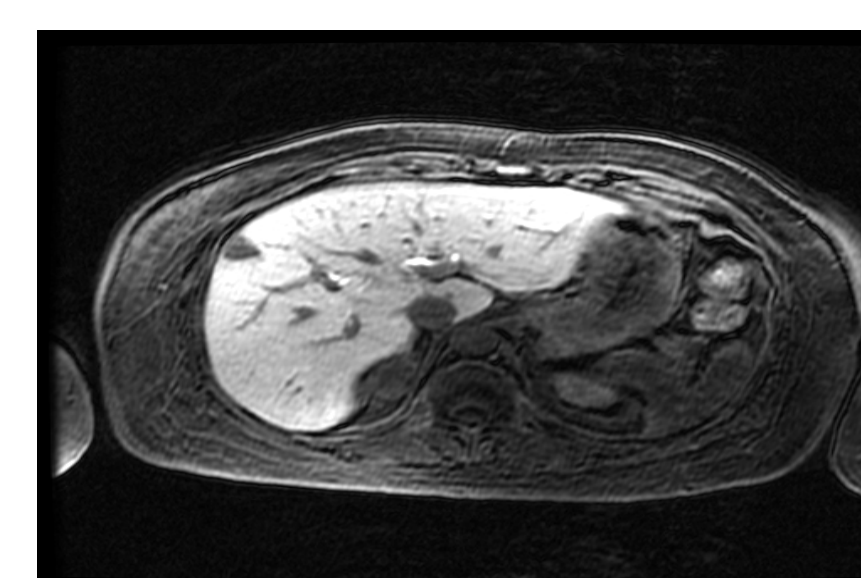
## Cases: Representative Images



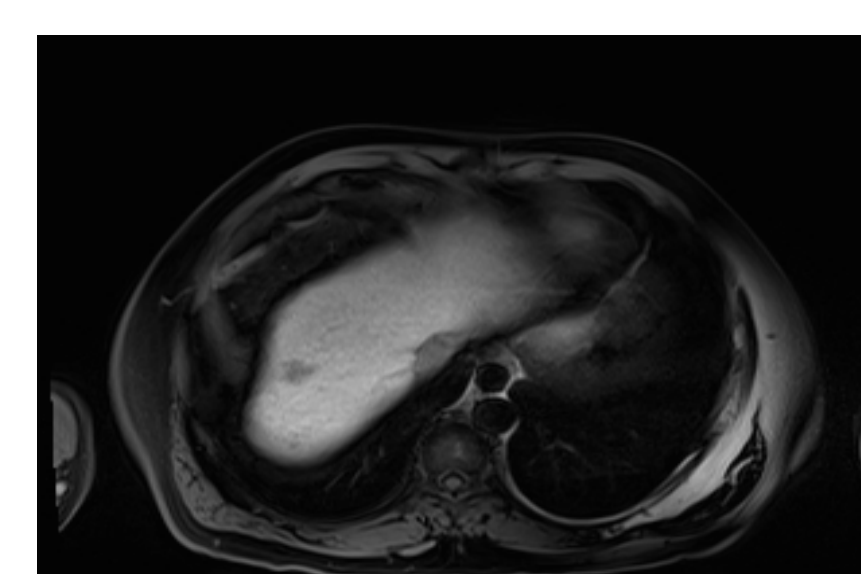
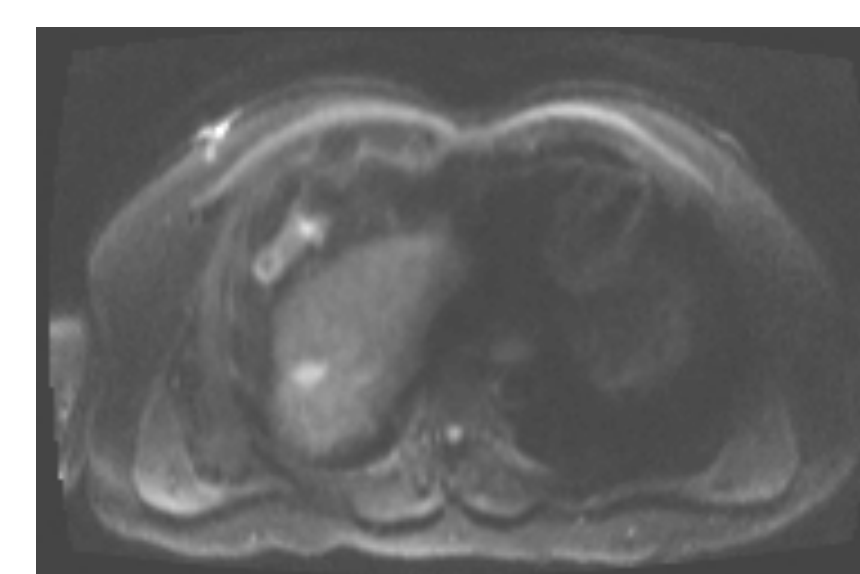
"This mass is indeed hypervascular, with strong arterial phase enhancement, and has subtle washout. This and the high T2 signal are not typical of cholangiocarcinoma"



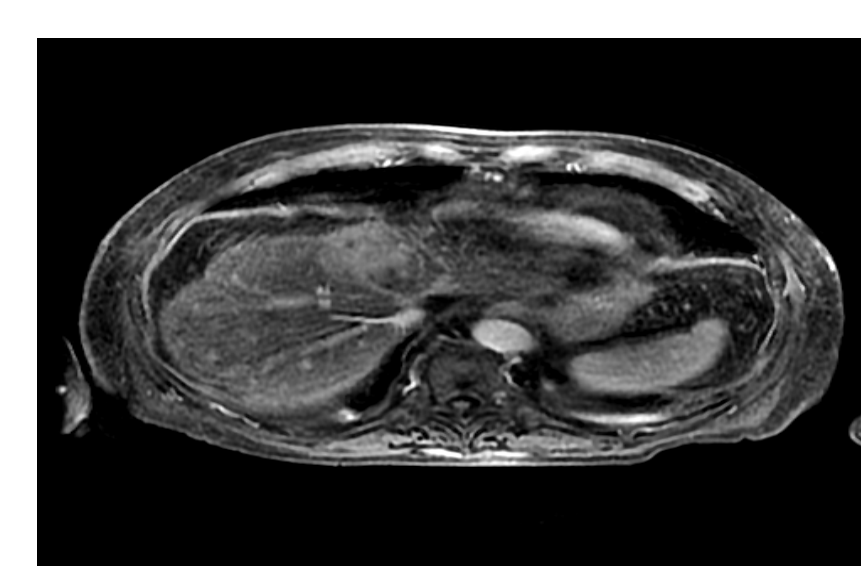
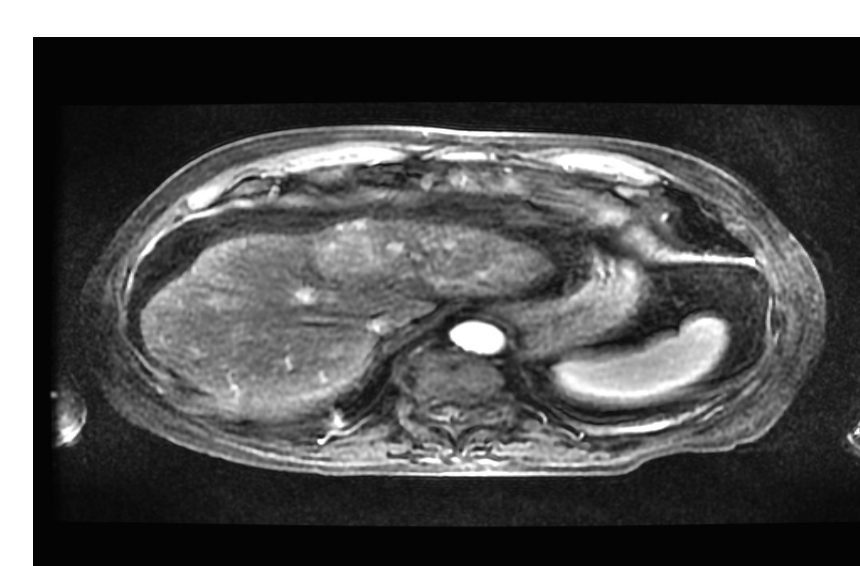
"This is indeed hyperenhancing, and has washout, There is a moderately T2 hyperintense lesion within segment IV A which demonstrates early arterial enhancement and washout"



"This mass is indeed hypervascular, with strong arterial phase enhancement, and has subtle washout. This and the high T2 signal are not typical of cholangiocarcinoma"



"Hyperenhancing lesion in the segment 7 with washout on the venous phase, consistent with LI-RADS 5 HCC"



"This tumor is highly atypical for ICC, given that it is hypervascular with extensive tumor thrombus. Tumor thrombus is extremely rare in IHCC, although common in HCC. Tumor categorized as LR-5V on review."