A Case of Hepatocellular Carcinoma Treated with Interventional Radiology

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Agenda

- Our patient
- American College of Radiology guidelines
- Transarterial chemoembolization (TACE)
- Radiofrequency ablation (RFA)
- Efficacy of RFA and TACE
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Our Patient: History

- Senior male with liver cirrhosis due to hemochromatosis and heavy alcohol use
- Hepatocellular carcinoma (HCC) discovered with ultrasound and confirmed with biopsy at outside hospital
- Cirrhosis well compensated—patient active and working
Our Patient: HCC on CT

HCC enhances in the arterial phase before washing out in the portal phase
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Our Patient: HCC Qualities

• Single tumor
• Measured about 2 cm in diameter at original presentation at outside hospital
• Measures a little over 3 cm in diameter after referral for treatment at our hospital
Treatment: Solitary Tumor <3 cm

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<tr>
<th>Treatment/Procedure</th>
<th>Rating</th>
<th>Comments</th>
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<tbody>
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<td>Systemic chemotherapy</td>
<td>3</td>
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<tr>
<td>Resection</td>
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<td>Transplantation</td>
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<td>Chemical ablation</td>
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<td>Thermal ablation</td>
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<td>Transarterial embolization (TAE)</td>
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Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

Liver transplantation is rated highest by ACR, followed by resection and thermal ablation.

## Treatment: Solitary Tumor 5 cm

<table>
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<th>Variant 2: Hepatocellular carcinoma: Solitary tumor 5 cm.</th>
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**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

With a larger tumor, **TACE with thermal ablation** is favored over **thermal ablation alone**.

Our Patient: Treatment

- Transplant possible but patient must abstain from alcohol and wait for available liver—HCC may progress in the meantime
- Resection unsuitable due to cirrhosis and location of tumor deep in right lobe—remaining function would be insufficient
- TACE with RFA (a type of thermal ablation) is chosen by patient and team as bridging therapy to potential transplant
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TACE: Overview

- Catheterize branch of hepatic artery feeding tumor via femoral artery
- Deposit drug-eluting microspheres to deliver chemotherapy and embolize
- Postembolization syndrome seen in ~90%
- Major complications seen in ~5%

Data from Clark TW.
Our Patient: TACE Approach

Catheter inserted via femoral artery advancing toward branch of hepatic artery feeding tumor

Images from BIDMC PACS
Our Patient: TACE Positioning

Catheter advanced into branch of hepatic artery feeding tumor to deposit microspheres

Images from BIDMC PACS
Companion Patient: TACE

Tumor enhances before but not after successful embolization of feeding arteries

Images from Vogl TJ et al.
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Radiofrequency Ablation: Overview

- Insert **probe** into liver percutaneously
- Destroy **tumor**, margin, and insertion path with heat produced by A/C current
- Major complications seen in ~3%
Our Patient: RF Ablation

Probe inserted into tumor under ultrasound guidance following preliminary CT showing tumor with central air from successful TACE
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Our Patient: One Month Post

Follow-up MRI shows no contrast enhancement at site of tumor or path of insertion of RFA probe—this indicates successful treatment.
Our Patient: Three Months Post

No enhancement of treatment site in the arterial phase and no enhancement in the portal phase.

Images from BIDMC PACS
Site of treatment remains stable with no enhancement and hence no evidence of HCC
Our Patient: Outcome

- Patient tolerated treatment with no side effects or complications
- Imaging shows no evidence of missed, recurrent, or new HCC at one year
- Patient is in good health—status on transplant list consequently made inactive only to be made active if patient falls ill
TACE: Known Efficacy

• Overall survival at 2 years is higher after TACE (63%) than after conservative treatment (27%) for unresectable HCC (N=112)

• Overall survival after TACE is 26% at 5 years (N=8510)

• Transplant dropout rate potentially lower with TACE (3-9%) than without (25-38%)

Data from Llovet JM et al., Vogl TJ et al., Pompili M et al., Lau WY et al.
RFA: Known Efficacy

• Transplant dropout rate is lower with RFA (6-14%) than without (25-38%)
• Overall survival after RFA is statistically equal to overall survival after resection for tumors less than 3 cm (58-74% at 5 years)
• RFA is consequently challenging resection as treatment for tumors less than 3 cm

Data from Lau WY et al.
TACE with RFA: Known Efficacy

- Overall survival at 5 years is higher after TACE with RFA (44%) than after TACE alone (20%) for recurrent HCC (N=103)
- Recurrence rate is lower after TACE with RFA (21%) than after both TACE alone (57%) and RFA alone (43%) (N=103)
- Quality of life scores are higher after TACE with RFA than after TACE alone (N=83)

Data from Yang W et al., Wang YB et al.
Summary

• Our patient has responded well to treatment
• ACR recommends TACE with RFA for solitary HCC tumors of 5 cm if transplant and resection are not possible
• TACE delivers chemotherapy and blocks blood supply to tumor
• RFA destroys tumor with heat
• TACE and RFA are promising treatments
Acknowledgements

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References


