# Laser-induced thermotherapy as minimally invasive treatment for hepatocellular carcinoma

**Hamzah Adwan1**,Nour-Eldin Abdelrehim Nour-Eldin1, Ümniye Balaban2, Thomas J. Vogl1

1 Department of Diagnostic and Interventional Radiology, University Hospital, Goethe University, Frankfurt, Germany   
2 Department of Biostatistics and Mathematical Modeling, University Hospital, Goethe University, Frankfurt, Germany

# Abstract:

Hepatocellular carcinoma (HCC) is the most common primary tumor of liver, and one the most common malignancies worldwide. There are many treatment options for HCC depending on the tumor stage such as liver transplantation, surgical resection, and locoregional treatments. These locoregional treatments are various and include transarterial chemoebolisation (TACE) as well as thermal ablation such as radiofrequency ablation (RFA), microwave ablation (MWA), and laser-induced thermotherapy (LITT).  
LITT has unfortunately been less investigated compared to other thermoablative therapies. This makes the study unique, and interesting especially due to the many examined parameters.

The aim of this study was to retrospectively evaluate the MR-guided LITT in the treatment of HCC, according to treatment response, survival rates, and complications.

This study enrolled 53 patients (12 women and 41 men; mean age: 67.5 ± 8 years) with 75 HCC lesions. All sessions were performed in analgosedation, and as an outpatient procedure. The included cases were investigated based size of tumors, ablation time, technical success, size of the post-ablation area, complete ablation, complications, local tumor progression (LTP), intrahepatic distant recurrence (IDR), overall survival (OS), and disease-free survival (DFS). Therapy response was assessed using contrast-enhanced MRI.

A total of 76 LITT sessions were performed. The mean preablation axial diameter of tumor was 2.4 ± 0.9 cm. Technical success was achieved in all sessions. The mean diameter of ablation area was 5.3± 1.8 cm. The mean ablation time was 16.7±7.4 min. Complete ablation was achieved in 98.7% (74/75) of the treated tumors. The rates of LTP and IDR were 3.8% and 64.2%, respectively.

The 1-, 3-, and 5-year OS rates were 96.2%, 54.7%, and 30.2%, respectively. The 1-, 2-, and 3-year DFS rates were 54.7%, 30.2%, and 17%, respectively.

There were no treatment-related deaths or major complications among the patients. The rate of minor complications was at 7.9% (6/76).

LITT is safe and effective as local treatment for HCC, which can be performed in short time, and as an outpatient procedure without the requirement of general anesthesia. HCC patients treated by LITT, had a high OS time and low rate of LTP.

**Biography:**

Hamzah Adwan is a medical doctor who graduated in 2021 from Goethe-University Frankfurt am Main, Germany, and is currently doing his residency in Radiology.

He has been doing research since 2018 at the Department of Radiology at Goethe-University Frankfurt am Main in the field of Interventional Oncology under the supervision of Professor Thomas J. Vogl.

He has presented his work at a number of conferences and society meetings such as

the CIRSE, IMSCB, ECR, Deutscher Röntgenkongress, and IROS.

In addition, he has won a number of awards and recognitions including second prize

winner of the oral presentation at the clinical sciences section at IMSCB 2020, and Scholarship holder of ‚Die hellsten Köpfe für die Radiologie‘ (brightest minds of

Radiology) at Deutscher Röntgenkongress 2019&2020. He was selected as

ambassador of IMSSB 2021. More recently, his abstract to the IROS 2022 in Salzburg/Austria was selected to be one of the ten best abstracts presented at the congress.