No-Touch Radio Frequency Ablation for a Subcapsular Hepatocellular Carcinoma: A Case Report and Review of Literature

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Abstract

Radiofrequency Ablation of subcapsular lesions poses a challenge due to the risks of tumour seeding along the track, hemorrhage and lower efficacy. “No touch ablation” is a relatively novel technique used in the ablation of subcapsular HCC with good results. This technique avoids direct puncture of the tumour by inserting more than one electrodes adjacent to and outside the tumor and activating them sequentially to perform ablation. The risk of track site seeding and haemorrhage is significantly reduced. We describe a case of a subcapsular HCC in a 65-year-old female patient which was successfully treated with this novel technique.

Keywords
► radio frequency ablation
► no-touch ablation technique
► hepatocellular carcinoma

Introduction

Radio frequency ablation (RFA) is a safe and effective technique for the treatment of early-stage hepatocellular carcinoma (HCC) of < 3 cm in size. 1 In patients of chronic liver disease with Child–Pugh stage A, survival after ablation is almost similar to that of open surgical resection. 2 However, for subcapsular lesions, RFA poses the risks of tumor seeding along the track and hemorrhage. 3 To overcome these, it is advisable to pass the probe through the normal non-tumor liver. However, it may not always be possible to approach the subcapsular exophytic tumors through the normal liver parenchyma. 4 Further, the ablation of subcapsular tumors is more frequently incomplete due to the difficulty in obtaining safe ablation margins. Some interventional radiologists consider such tumors as a contraindication for standard monopolar RFA.

“No touch ablation” is a relatively novel technique used in successful ablation of subcapsular HCC. This technique avoids direct puncture of the tumor by inserting more than one electrode adjacent to and outside the tumor and activating them sequentially or simultaneously to perform ablation. 5 In addition, it provides better ablation margins. We describe one such case who was a 65-year-old female with subcapsular HCC and was successfully treated with no-touch RFA technique.

Case Presentation

A 65-year-old female patient of hepatitis B-related cirrhosis presented to the emergency with a history of two bouts of hematemesis. She was hemodynamically stable. Laboratory parameters showed a hemoglobin of 9.6 g/dL, urea of 21 mg/dL, total bilirubin of 0.7 mg/dL, albumin of 4.1 g/dL, and international normalized ratio of 1.1. Serum alfa fetoprotein was 8.2 ng/mL that was within normal limits. Her performance status was 0 and Child–Pugh stage was A. Endoscopy showed bleeding esophageal varices that were
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The treatment of unresectable small subcapsular liver tumors has always been challenging for an interventional radiologist. The interventional treatment options include transtumoral RFA or microwave ablation, creation of artificial ascites additionally, no-touch multibipolar RFA, and transarterial chemoembolization (TACE) or a combination therapy using RFA and TACE. Transtumoral RFA is associated with high complication rate including tumor rupture and seeding as well as hemorrhage. In addition, direct puncture of the tumor has higher risk of track seeding with tumor cells and track recurrence. The rate of needle track seeding after RFA
No-Touch RFA with multiple bipolar probes is emerging as a very good treatment option for subcapsular liver tumors up to 5 cm in diameter.5 Here, more than one probes are placed adjacent to the peripheral margins of the tumor without directly puncturing it. The number of probes required depends on the size of the tumor. In this technique, the spread of RF energy during ablation is centripetal rather than centrifugal that decreases the risk of tumor cell seeding into the liver microcirculation and thus theoretically decreases the risk of tumor seeding. Moreover, it provides a wider ablation zone compared with the direct intratumoral ablation decreasing the incidence of margin site recurrence.5 Although there are a few reports of increased incidence of liver failure due to a wide ablation zone, no-touch RFA is considered relatively safe.5 Studies have shown a clinical success rate of 98% for subcapsular HCC treated with no-touch RFA with complication rates of 5.2%.4 A major concern during no-touch multibipolar RFA for subcapsular HCC is thermal injury to the adjacent vital structures. A minimally invasive innovative approach that can be used is hydrodissection with creation of artificial ascites or by inflation of a balloon catheter between the tumor and surrounding structures like abdominal wall, colon, and kidneys. Apart from protecting the critical strictures, artificial ascites increases the visibility of the tumor under US.

In conclusion, “no-touch RF ablation” is a relatively novel, safe, and effective treatment option for subcapsular HCC that cannot be approached through the normal liver parenchyma.

Credit Author Statement
Sundeep Malla was involved in original draft-writing and conceptualization.
Manas Vaishnav, Shalimar, and K S Madhusudhan were involved in conceptualization and draft writing.

Sources of Support
None.

Conflict of Interest
None.

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Fig. 3 Axial arterial (A) and venous (B) phase T1-weighted contrast-enhanced magnetic resonance imagings obtained 6 months postablation show no residual arterial phase enhancement (arrow) suggestive of complete response.