

CT ASSESSMENT OF DIAGNOSTIC FINDINGS IN PATIENTS WITH HEPATOCELLULAR CARCINOMA (HCC)

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ABSTRACT

This article evaluates the role of radiofrequency ablation (RFA) in the management of hepatocellular carcinoma (HCC) in patients with hepatitis B-associated cirrhosis. RFA has emerged as a favored therapeutic approach due to its low recurrence rates and applicability in patients unfit for surgical resection. The case report details a patient with a 30 mm lesion, which was effectively treated with RFA under ultrasound guidance, resulting in a significant reduction in size and absence of complications at six-month follow-up. The findings highlight the importance of individualized treatment approaches, interdisciplinary collaboration, and the use of advanced imaging techniques in monitoring therapeutic outcomes.

Keywords: radiofrequency ablation (RFA), hepatocellular carcinoma (HCC), imaging diagnostics, thermal ablation

INTRODUCTION

Over time, thermal ablation has gained a reputation as a reliable therapeutic method for treating primary or metastatic liver lesions, with a very low rate of local recurrence (1,2,3,6,7). Radiofrequency ablation (RFA) and microwave ablation are the most commonly used modalities, with postprocedural clinical verification of the results. The main advantage of the RFA technique is its applicability in treating unresectable tumor formations or in patients with comorbidities (1,2,4). Preprocedural imaging diagnostics allow for precise planning of the volume and exact localization of the lesion (1,9). The desired thermal denaturation of proteins results in coagulative necrosis of the ablation zone, leading to tissue destruction. The primary goal is to achieve smooth, clear borders, comparable to the lesion's resection state, while minimizing the involvement of surrounding tissue.

According to the Barcelona Clinic Liver Cancer (BCLC) staging system, RFA is the method of choice for patients with comorbidities in stages 0 and A (6,8). Furthermore, thermal ablation can also be combined with chemotherapy for lesions larger than 3 cm (1,2,4,6,7,10). Technological advancements and recent research have led to an expansion of the criteria for ablation in recent years. Today, the RFA meth-

od often surpasses BCLC guidelines and other criteria when making final decisions in interdisciplinary teams (2,5). An individualized approach to patient pathology helps overcome "relative" and "absolute" contraindications, improving survival rates, particularly when palliative techniques are applied prior to the RFA procedure.

PRESENTATION OF THE CASE REPORT:

We present a patient with known hepatitis B-associated cirrhosis and hepatocellular carcinoma (HCC), diagnosed by CT. The first diagnostic CT images show post-contrast enhancement of a well-demarcated lesion in the left lobe, measuring 30 mm in the arterial phase (Fig. 1 and 2). The lesion appears with heterogeneous contrast enhancement and is roughly round in shape. In the portal and late phases, the same lesion is highly hypodense. This type of lesion is entirely compatible with atypical HCC. The carcinoma has been morphologically verified as a moderately differentiated subtype. Thermal radiofrequency ablation (RFA) under ultrasound (US) guidance was performed up to maximum impedance, without postprocedural complications. For this lesion, located in the left lobe of the liver, the subcostal approach was the most appropriate. A monopolar bipolar nee-

dle was inserted into the central zone of the tumor, after a subcutaneous lidocaine injection. The needle tip was placed in the center of the neoplasm under US guidance, and the electrode's repositioning was minimized to prevent tumor dissemination. During the ablative procedure, we assessed efficacy through the size of the area's echogenicity. The patient underwent postprocedural follow-up and results assessment. Subsequent CT images showed a reduction in the size of the lesion, down to 23 mm. No post-contrast enhancement was observed in all three phases compared to the native density of the lesion (Fig. 3 and 4). The postablative response criteria were successfully met, with a reduction in lesion size and no evidence of periablative inflammatory reaction up

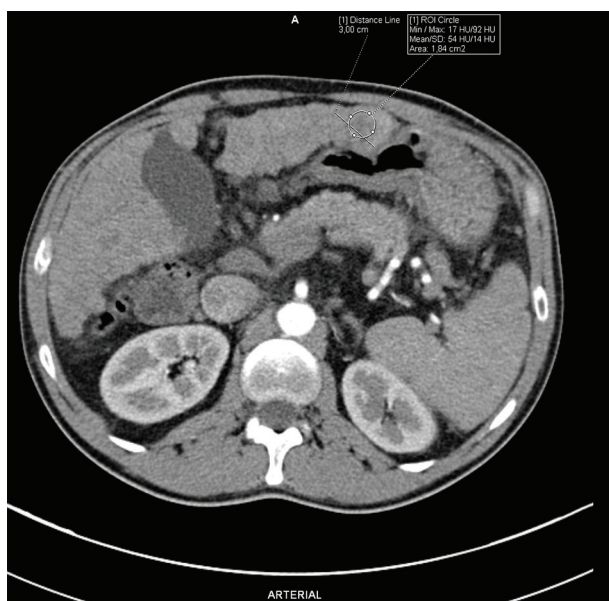


Fig. 1. Arterial phase (pre-procedure) – the finding in the left lobe (30 mm) of the liver is presented with post-contrast enhancement compared to the native scanning.

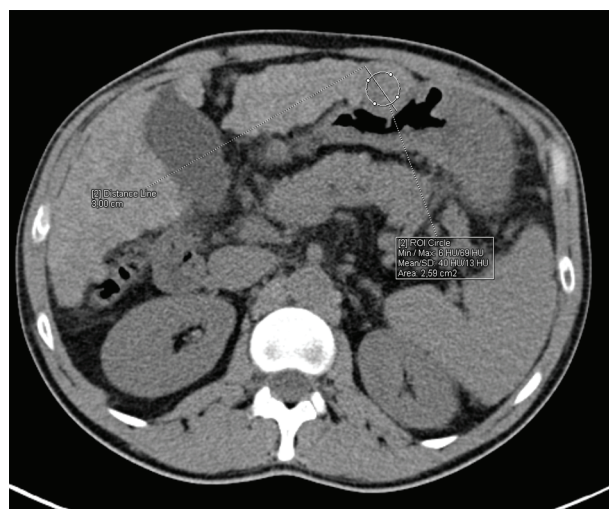


Fig. 2. Native CT (pre-procedure) – the finding in the left lobe (30 mm) of the liver is presented with an average measured density of up to 40 Hounsfield units (HU).

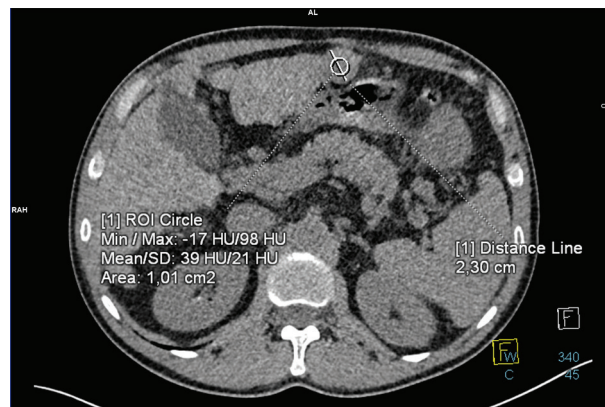


Fig. 3. After thermal ablation (post-procedure) – the finding in the left lobe is presented with reduced size down to 23 mm and an average native density of up to 39 HU.

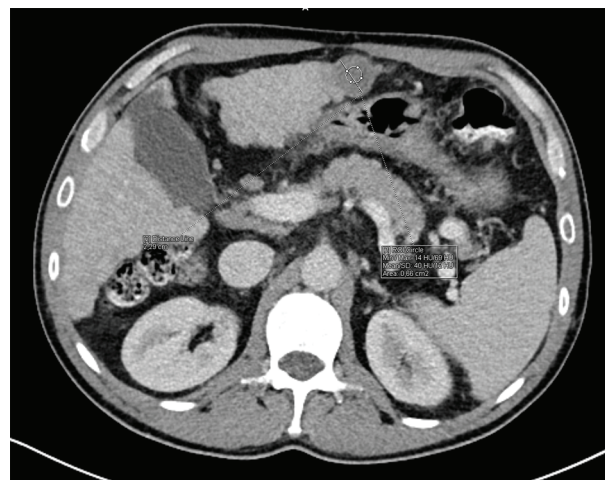


Fig. 4. After thermal ablation (post-procedure) – in all three phases after the administration of contrast material, no post-contrast enhancement is observed following the procedure.

to six months of monitoring (6,8). The liver's macronodular cirrhotic structure remained persistent. Further patient monitoring at 3-month intervals showed satisfactory postprocedural results without significant changes in dynamics.

There is no universal ablation technique available; the individualized approach and method of choice are crucial and take advantage of the patient's treatment (3,8). In our case, we chose radiofrequency ablation (RFA) to achieve devitalization and clearer borders of the lesion. Existing criteria for locoregional response allow us to make an adequate assessment of the condition. There are a few standardized scales for locoregional therapy monitoring: RECIST, mRECIST, and EASL. In our patient's case, it is important to note the following:

- Partial response to the procedure (on RECIST – reduction in lesion size);

- Full response after thermal ablation (on mRECIST – the tumors do not show post-contrast enhancement);
- Full response on EASL (there is no enhancement compared to the native density).

DISCUSSION

The presented case report highlights the importance of conducting the radiofrequency ablation (RFA) procedure in patients with hepatocellular carcinoma (HCC) for achieving neoplastic lesion size reduction. The right choice of preprocedural imaging methods and interventional procedures gives us the opportunity to accurately assess the postprocedural results and provide appropriate images for comparison—ensuring perfect correlation for patient condition monitoring. Indeed, the presence of these images can categorically confirm the success of the procedure (9). The absence of any vascular, biliary, infectious, or gastrointestinal complications is the greatest evidence of the procedure's safety and the operator's experience (3,4,8).

There are several advantages to performing RFA under ultrasound (US) guidance: real-time imaging, lower costs compared to other available alternatives, and no radiation exposure for the patient or the operator. US diagnostics also allows for the use of color Doppler imaging, enabling us to evaluate the blood supply to the tumor as well as the dimensional relationships with nearby anatomical structures (liver capsule, hilum, blood vessels, biliary tree, etc.). The radiologist faces the challenges of postprocedural imaging diagnostics in terms of finding the best modality to accurately follow up on locoregional response. A good understanding of postprocedural complications allows the selection of the right method with high predictive value and significance (1,2,4).

It is worth noting the increasing number of patients undergoing the RFA procedure; what were once considered “forbidden zones” or “nonstandard indications” are now relative contraindications. The expansion of ablative criteria provides great opportunities for treating existing lesions (1). Another important milestone is the screening recommendations for monitoring patients with cirrhosis or chronic hepatitis B infection. Despite the well-known pathology in these cases, these patients continue to present with advanced comorbid conditions that are inappropriate for resection, transplantation, or RFA (4).

Optimization and personalization of therapeutic perspectives concerning size, localization, anatomical relationships, histopathological variants of the carcinoma, and the presence of comorbidities are of

key significance for extending patients' survival and improving their quality of life. Interdisciplinary collaboration and preprocedural imaging diagnostics are highly important, especially since patients are conventionally treated in other departments. Accurate image evaluation should involve noting every new radiological finding and its correlation with the combined therapy (if applicable). Patient monitoring every three months is crucial for adequate control of the current condition.

The method of choice for monitoring in our case is CT. CT with intravenous contrast media application is an excellent modality due to the unaffected kidney function. The devitalized lesion should be presented with native density in Hounsfield units after contrast media application—without enhancement. We do not expect significant changes in the dynamics of the macronodular liver structure. Furthermore, any of the following CT diagnostics could serve not only to check the existing condition but also as diagnostic imaging, since we cannot exclude any possible changes during chemotherapy. If there are any contraindications for surveillance with CT, alternatives such as US or MRI are available.

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