

# Transarterial Chemoembolization and Microwave Ablation for Early Hepatocellular Carcinoma in a Nigerian

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## Abstract

The West African subregion has a high number of cases of hepatocellular carcinoma (HCC), and this is partly because of a lack of expertise and health infrastructure for the delivery of effective locoregional therapies for patients who present with early disease. This report documents the successful treatment of a case of early HCC in a Nigerian patient using a combination of transarterial chemoembolization and microwave ablation techniques. We showed that, despite difficulties, such techniques are possible. It is our hope that this publication will help stimulate discussion, policy changes, and other alterations necessary to establish beneficial high-end techniques for the

alleviation of the health burden of HCC patients in Nigeria.

**Keywords:** Early hepatocellular carcinoma, Nigeria, Transarterial Chemoembolization, Microwave Ablation, Interventional Radiology

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## Introduction

Serum sodium abnormalities are common in traumatic brain injury (TBI), and are usually associated with the primary brain injury or interventions such as hyperosmolar therapies used in the management of raised intracranial pressure (1, 2). Hyponatremia, defined as serum sodium ion concentration  $>145$  mmol/L, can result from a primary brain injury resulting in central diabetes insipidus or as a result of hyperosmolar therapies such as the use of hypertonic saline (3, 4). Hyponatremia is associated with increased mortality, longer hospitalization and greater hospital costs (3–5). Hyponatremia, serum sodium ion concentrations  $<135$  mmol/L, may also occur after TBI and contributes to secondary brain insults by causing

cerebral edema, seizures, and depression of consciousness (6). Hyponatremia in TBI is usually caused by cerebral salt wasting syndrome and syndrome of inappropriate secretion of antidiuretic hormone (7). Severe TBI, defined as Glasgow Coma Scale (GCS)  $\leq 8$ , is a major cause of death and incapacity worldwide and is associated with huge direct and indirect costs to the public (8–10). In addition, the World Health Organization projected that by 2020, TBI would be the main cause of death and disability (11). TBI is more prevalent in developing nations because of the increasing number of road traffic accidents (12, 13). In our setup, most hospital-based studies have revealed that severe head injury is associated with mortality of  $>50\%$

and poor functional outcomes (14–16). These bad outcomes may be associated with secondary brain insults such as electrolyte abnormalities that arise from inflammatory and biochemical cascades initiated by the primary injury insult to the brain (9, 17, 18). This study aimed at determining the incidence of serum sodium ion abnormalities in severe TBI patients, and their association with specific clinical and radiological parameters.

**Case report**

A 60-year-old man with a 5-month history of unintentional weight loss, anorexia, and malaise was referred to the hepatology clinic after an abdominal ultrasound scan had revealed a hyperechogenic, intrahepatic lesion on a background of cirrhotic disease. He had no family history of liver ailment nor was there any history of alcohol ingestion. A 15-year history of well-controlled type 2 diabetes mellitus was noted. Two years earlier, he had been informed of a liver “condition” after he underwent computed tomography (CT), but was not followed up with any consultation or therapy at that time. A review of the previous CT scan showed that it had reported features of cirrhosis and portal hypertension as well. On examination, he was lucid and not obese. Hepatitis A, B, and C screens were negative, and his hemoglobin, transaminase, and alpha-fetoprotein levels were normal. Further evaluation with a repeat CT image confirmed the cirrhotic disease and a 1.5x1.5x1.9-cm arterially enhancing lesion in segment VIII with associated portal venous washout on delayed imaging (Figure 1).

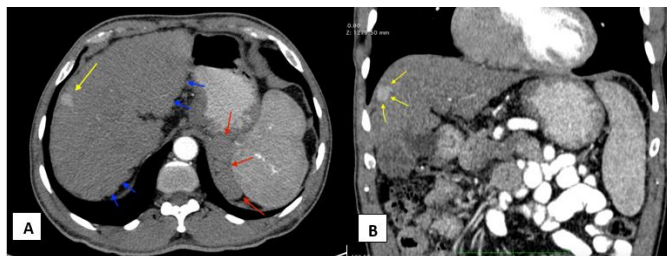


Figure 1. CT scan showing cirrhotic disease and an arterially enhancing lesion in segment VIII

The Liver Imaging Reporting and Data System score of the mass was LR-5. There was no ascites. His Child-

Pugh score was 6, indicating the least severe, compensated cirrhotic liver disease.

In view of the Barcelona Clinic Liver Cancer (BCLC) classification of stage 0 (early HCC), the option of liver resection along with the possibility of other locoregional interventions that had potential for cure, were discussed with the patient. The patient refused surgery. Thus, an interventional radiology (IR) specialist was consulted, who recommended dual therapy with simultaneous TACE and MWA for this case.

The intraoperative selective arteriogram of the segment VIII branch of the right hepatic artery confirmed that the tumor was highly vascularized. This access allowed for the lipiodol and doxorubicin mixture to be injected under fluoroscopic visualization to this branch of the right hepatic artery. Post-embolization arteriography of the treated vessel and real-time ultrasound scan of the liver showed stasis of blood flow within the treated vascular territory and staining of tumor with lipiodol. Subsequently, a 14-gauge ECO medical MWA needle was advanced into the tumor from a left approach. Ablation was then performed initially for 3 minutes, then for an additional 1 minute. Track cauterization was performed. Appropriate cloud-type pattern in real-time post-ablative ultrasound was seen following ablation (Figure 2).

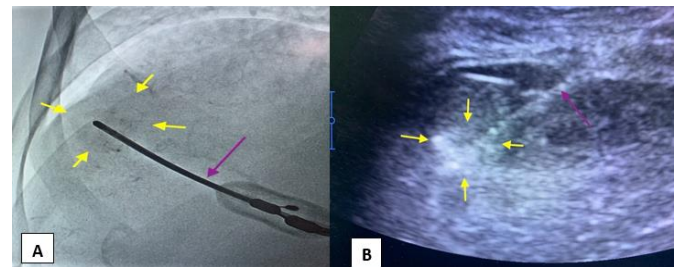


Figure 2. Ultrasound image showing cloud-type pattern post-ablation

The patient returned after 10 weeks with a follow-up magnetic resonance imaging (MRI) (Figure 3), which showed a pre-contrast ablation cavity in the same area of the previously treated lesion and T1 hyperintensity around the tumor, representing hemorrhage and ablation margins. The post-contrast image shows an ablation cavity in the same area as the previously treated lesion, with no evidence of residual enhancement.

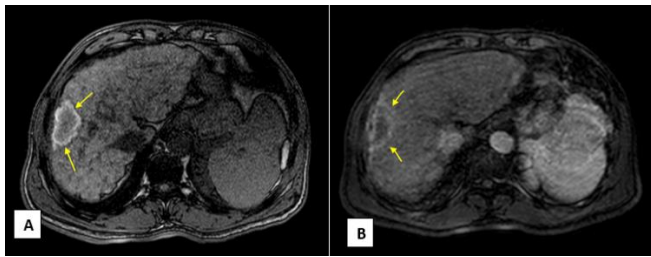


Figure 3. MRI images showing pre-contrast ablation cavity in the same area of the previously treated lesion and T1 hyperintensity around the tumor. The post-contrast image shows an ablation cavity in the same area as the previously treated lesion, with no evidence of residual enhancement.

### Discussion

In Africa, a major contributor to the high health-related morbidity and mortality associated with HCC is the prevalent phenomenon of late-disease presentation along with problems related to the availability, accessibility, and affordability of interventions for the few who do present early enough (2, 4). This, to the best of our knowledge, is the first time that such a potentially curative combination therapy was administered, and with successful results, in a patient with early HCC in Nigeria.

Hepatitis B infection and alcohol consumption are the commonest factors associated with HCC causality in our environment, but these two elements were not found in this patient (5). The long-term history of diabetes mellitus might point us to an alternate underlying cause of his cirrhosis being non-alcoholic fatty liver disease, which has been playing an ever-increasing role in HCC on the continent (5). Whatever the underlying etiology, the finding of HCC on a cirrhotic background usually carries poor prognosis for many black Africans (4).

The importance of early detection on the impact of disease cannot be overemphasized, as pointed out by guidelines for HCC management from major hepatology/oncology bodies (6, 7). Surveillance remains key to the detection of early HCC, which is usually asymptomatic and whose clinical picture is deceitfully protean. Studies among populations in developed countries have shown that surveillance is associated with improved overall survival through detection of HCC at early stages, when patients' conditions were amenable to potentially curative treatments (8, 9). Some

researchers have thus advocated for its widespread adoption in Africa (4). The authors note that Nigeria, as is the case for many other sub-Saharan countries, has yet to develop any such structured surveillance schemes. The great impact of such health policy gaps is illustrated in this index patient who had been diagnosed with cirrhosis 2 years earlier but had not done anything to address the potential for HCC.

Various schemes and modalities have tried to classify HCC using different parameters, but perhaps the most widely deployed is the BCLC classification scheme (10). A particular benefit of its widespread use is that it is more of a treatment guide and clinical directory as to what therapeutic options are available for use in which stage of HCC (11). The good news for our patient was that he qualified for liver resection surgery and other possible locoregional therapies. Since he refused the surgery, management for potential curative therapy was offered with locoregional interventions, which, when carried out properly, have been shown to be equally effective (10, 12). It is noted that the ablative therapies are being used as first choice in many centers around the world for such small lesions (13).

Either of the two local ablative methods, MWA or, more commonly, radiofrequency ablation (RFA), is usually deployed for BCLC stage 0 lesions. Although it appears that MWA shows a more favorable profile in terms of duration of procedure and ability to generate higher and more efficient temperatures, neither modality has much superiority to the other (3, 14). However, specific scenarios appear to favor the use of one over the other. The presence of a large vessel near the hepatic mass is one such scenario. In these cases (as in our patient), the likelihood of heat dissipation by conduction reduces the efficiency of RFA, and thus, MWA is usually preferred (14).

MWA or RFA can be used in combination with TACE, but views on this topic differ. On the one hand, some consider that the addition of RFA has no advantage to TACE therapy for HCC lesions <3cm perhaps because RFA alone can achieve complete necrosis, making TACE a redundant addition (15). On the other hand, Chen et al. showed that the TACE-MWA combination was superior to TACE alone in terms of total ablative

rates in lesions  $\leq 3$  cm as well as those 3–5 cm (16). Several other studies as well as a recent meta-analysis have confirmed the superiority of combined use of TACE and RFA/MWA (17). The science was valid, and since the necessary tools were available, the choice was made to administer both procedures in the index case. The 10-week post-procedure MRI results show no evidence of residual enhancement in the tumor, and the patient also reported improvement in his clinical condition. These brought us great professional satisfaction, as, in our country, we hardly ever get to see lesions as early as this or when we do find such early HCC masses, we usually do not have the capacity or finances to deliver definitive therapy locally.

### Conclusion

Dual locoregional therapy was successfully administered to an early HCC lesion in a cirrhotic Nigerian patient. This case report documents how that such a pioneering work was carried out here in Lagos State. We acknowledge that the price of such procedure is prohibitive and that such services and the necessary expertise are scarcely available in the country. Nonetheless, we sought to clarify that a handful of our patients present with early HCC disease, when such minimally invasive interventions are still viable. We also hope to emphasize that such high-end and technically demanding life-saving procedures are possible in the country, despite the many challenges.

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