

CT Follow-up After Electrochemotherapy of Hepatocellular Carcinoma: Evolution of the Ablation Zone

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Background:

Electrochemotherapy (ECT) is a novel non-thermal local ablative technique for hepatocellular carcinoma (HCC), particularly valuable for tumors adjacent to major vascular structures where thermal ablation may be limited. As clinical use of ECT expands, recognition of expected post-procedural imaging findings is essential for reliable radiological follow-up. The aim of this study was to characterize longitudinal computed tomography (CT) changes of the ablation zone after ECT.

Methods:

A retrospective institutional analysis included 23 patients with HCC treated with intraoperative or percutaneous ECT. Standardized multiphasic CT follow-up was performed at 1, 3, 6, and 12 months after treatment. Ablation zone volume, lesion attenuation, and qualitative post-treatment imaging features were assessed over time.

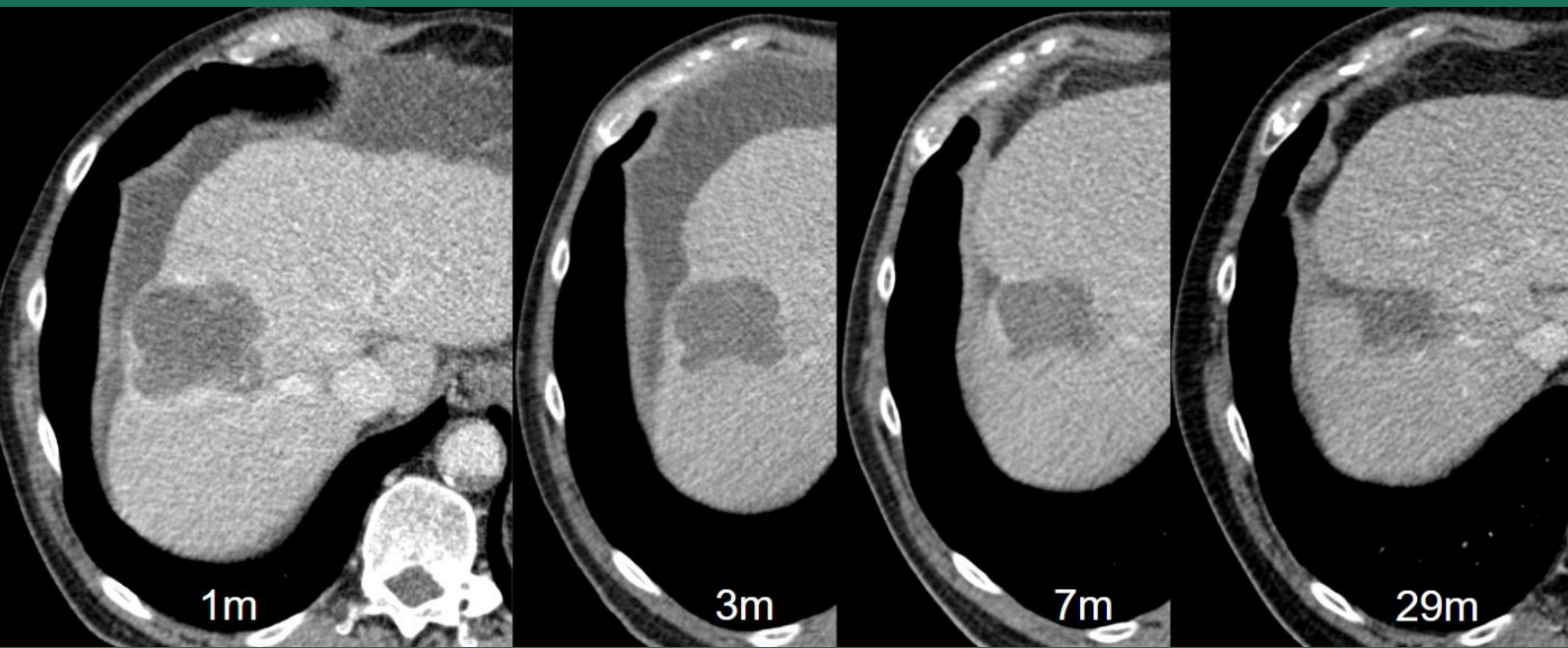


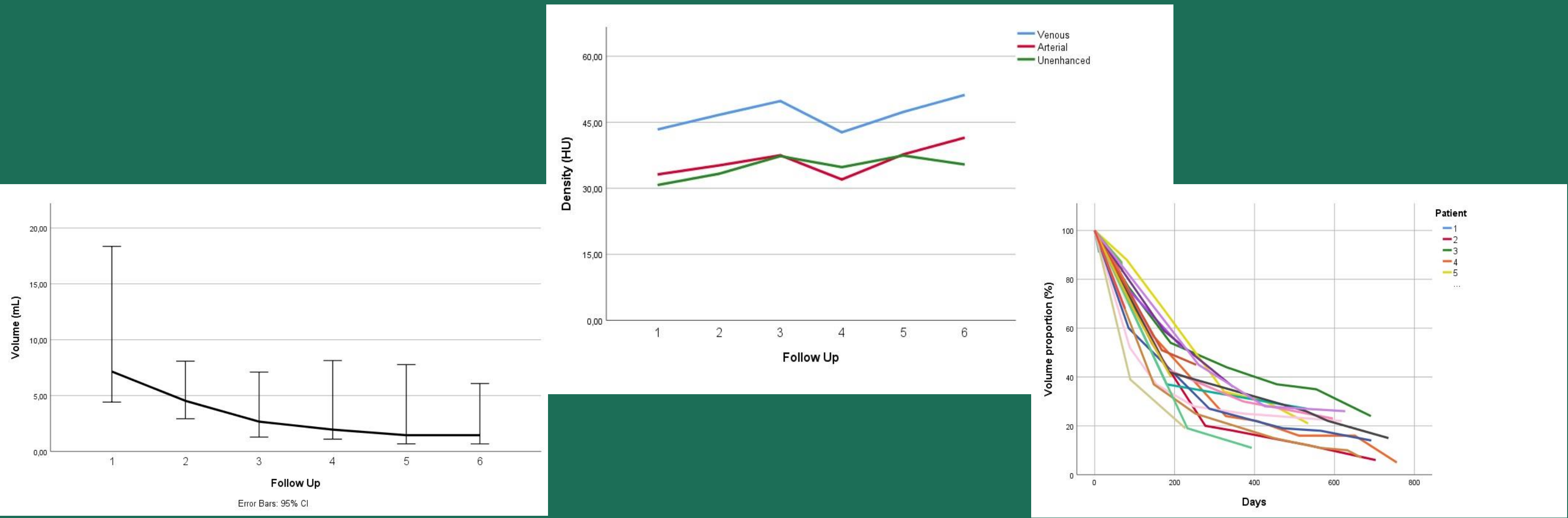
Figure 1: Hypointense post-interventional lesion volume dynamic seen on the venous phase CT scans taken 1 month, 3, 7 and 29 months post-intervention.



Figure 2: Hyperenhanced rim sign on arterial phase imaging.



Figure 3: Vessel Sparring seen on the venous phase CT images after the ablation.



Graphs:

- a) The volume of the ablation zone at different follow up time points.
- b) The density of the ablation zone at different follow up time points on unenhanced, arterial and venous phases of the CT images.
- c) Ablated area size proportion dynamic of 22 patients where 100% represents the size measured at the first postprocedural study and Day 0 represents the day of the first postprocedural study.

Results:

All treated lesions demonstrated a sharply demarcated hypoattenuating non-enhancing ablation zone on follow-up CT. Lesion attenuation remained relatively stable throughout follow-up in unenhanced, arterial, and venous phases. A transient peripheral hypervascular rim was observed in 23% of patients, while vessel preservation within the treated area was noted in three patients. A continuous statistically significant involution of the ablation zone was observed, with median lesion volume decreasing from 7.1 mL at 1 month to 2.0 mL at 12 months ($p<0.05$).

Conclusion:

ECT demonstrates a reproducible pattern of CT evolution characterized by **stable hypoattenuation, progressive volume regression, transient peripheral rim enhancement, and preservation of vascular structures**. Knowledge of these characteristic imaging findings may improve confidence in post-treatment assessment and reduce misinterpretation of expected ablation changes as residual or recurrent tumor.