

ECT TREATMENT VERIFICATION

Nina Boc

Institute of Oncology Ljubljana, Department of Radiology, Zaloska cesta 2, SI-1000 Ljubljana, Slovenia

E-mail: nboc@onko-i.si

Ablative techniques provide an effective tool for local treatment of liver tumors. Radiofrequency ablation is the most frequently used local method, whereas electroporation-based treatments are being explored as possible alternatives. US imaging is mostly used for the identification of the electrode placement according to the treatment plan and US specific changes are detected for identification of adequate tumor coverage. Treatment monitoring and understanding the imaging findings to predict the tumor response to ECT are important.

The effect after ECT is slow. We observed tumor response in three phases after ECT: Immediate effects, Intermediate effects after a few days and late effects.

We observed immediate effects with US, the changes in the ablation zone were followed to identify whether they appear in the entire treated tumor, therefore indicating an effective electroporation of the tumor.

Intermediate and late effects can be evaluated with US, CT or MRI.

Morphologic methods such as the Response Evaluation Criteria in Solid Tumors (RECIST 1.1) are considered the gold standard for response assessment in the management of cancer. However conventional morphologic methods are confronting limitations in response assessment (1).

All local treatments attempt to induce necrosis of the tumor, which may delay tumor shrinkage during the early post-treatment period. Given these limitations of morphologic response criteria, the American Association for the Study of Liver Disease (AASLD) proposed the

modified RECIST (mRECIST) criteria, which conceptualized viable tumor measurements (2). mRECIST had better overall response rate than conventional morphologic criteria such as RECIST 1.1 (3) and a better correlation with survival.

Diffusion-weighted MRI (DWI) is unique among imaging technique, although many studies have confirmed the usefulness of DWI and its diagnostic role in cancer imaging. A significant and growing volume of data are now gathering to support its use for tumour response assessment (4). Restriction in the diffusion of water molecules is directly proportional to the degree of cellularity of the tissue. In general, an increase in ADC value in response to treatment has been shown to be associated with better outcome (5,6).

References

1. Forner A, Ayuso C, Varela M, Rimola J, Hessheimer AJ, de Lope CR, et al. Evaluation of tumor response after locoregional therapies in hepatocellular carcinoma: Are response evaluation criteria in solid tumors reliable? *Cancer* 2009;115:616–23.
2. Lencioni R, Llovet JM. Modified RECIST (mRECIST) assessment for hepatocellular carcinoma. *Semin Liver Dis* 2010;30:52–60.
3. Prajapati HJ, Spivey JR, Hanish SI, El-Rayes BF, Kauh JS, Chen Z, et al. mRECIST and EASL responses at early time point by contrast-enhanced dynamic MRI predict survival in patients with unresectable hepatocellular carcinoma (HCC) treated by doxorubicin drug-eluting beads transarterial chemoembolization (DEB TACE) *Ann Oncol* 2013;24:965–73.
4. Choi H, Charnsangavej C, Faria SC, Macapinlac HA, Burgess MA, Patel SR, et al. Correlation of computed tomography and positron emission tomography in patients

with metastatic gastrointestinal stromal tumor treated at a single institution with imatinib mesylate: Proposal of new computed tomography response criteria. *J Clin Oncol* 2007;25:1753–9.

5. A. Afaq, A. Andreou and D.M. Koh. Diffusion-weighted magnetic resonance imaging for tumour response assessment: why, when and how? *Cancer Imaging* 2010, S179-S188
6. Pedram Rezai, Mark J. Pisaneschi, Chun Fenf+g, Vahid Yaghmai. A radiologist's guide to treatment response criteria in oncologic imaging: functional, molecular and disease-specific imaging biomarkers. *AJR* 2013, Vol. 201, No. 2