

First evidence for a dose-response relationship in patients treated with ¹⁶⁶Ho-radioembolization: a prospective study

Bastiaannet R. et al. *Eur. J. Nucl. Med. Mol. Imaging* 2019

Background

The aim of radioembolization is to deliver a tumoricidal absorbed dose to tumors while sparing healthy liver tissues. It has been shown in many studies that the likelihood for tumor response critically depends on tumor absorbed dose, however in clinical practise the dosing methods do not seem to incorporate the local absorbed dose.

Objective

To explore the relationship between tumor absorbed dose, treatment response and survival in patients treated with ¹⁶⁶Ho-radioembolisation.

Methods

- Candidates for this study were patients treated in HEPAR 1 & HEPAR 2 studies
- Patients who underwent an ¹⁸F-fluorodeoxyglucose (¹⁸F-FDG)-PET/CT scan at baseline, a post-treatment ¹⁶⁶Ho-SPECT/CT scan and another FDG-PET/CT scan at three months follow-up, were included for analysis.
- In total **36 patients with a total of 98 tumours were included.**

Results

- The response of each individual tumor was based on the change in total lesion glycolysis (TLG) between baseline and follow-up and categorized in one of four categories, according to the PERCIST criteria, ranging from complete and partial response to stable disease and progressive disease.
- At a **tumor level**, a significant difference in geometric mean absorbed dose was found between response categories complete response and stable disease, and between complete response and progressive disease. This constitutes a robust absorbed dose-response relationship.
- At a **patient level**, a significant difference was found between patients with complete or partial response and patients with progressive or stable disease.
- **Overall Survival:** Patients were grouped according to their average change in TLG. Patients with **objective response** (complete or partial response) exhibited a significantly higher overall survival than **non-responding patients** (stable or progressive disease) (**median 19 months versus 7.5 months; Log-rank; P = 0.01**).

CONCLUSION

These results confirm a significant absorbed dose-response relationship in ^{166}Ho -radioembolization. Treatment response based on PERCIST is associated with a higher overall survival.

Key Takeaway

- This study shows a significant relationship between tumor absorbed dose and metabolic response (decrease in ^{18}F -FDG uptake)
- Metabolic response was significantly associated with an increase in overall survival
- Personalized dose optimization, which is possible with a ^{166}Ho -scout dose, is likely to have a significant impact on tumor response and overall survival and allow for a more precise patients' selection