Predictive value of liver MRI parameters in patients with liver metastases of neuroendocrine tumors

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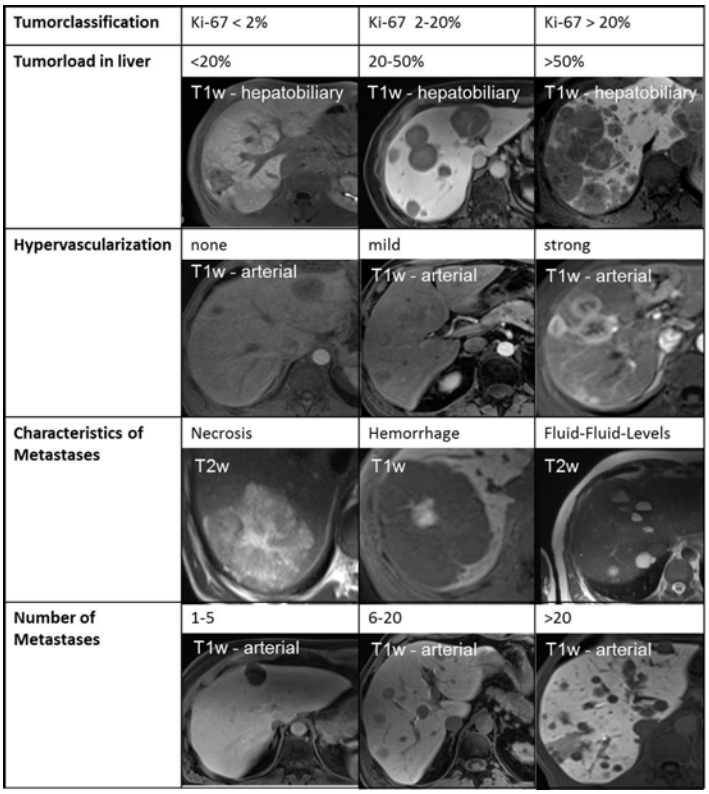
Introduction:

Radioembolization of the liver with 90-Yttrium microspheres is used in patients with unresectable metastases. Some patients show very long progression-free survival after this treatment (1). The aim of this study was to define the role of MRI in the pretherapeutic prediction of treatment response (2).



Material and Methods

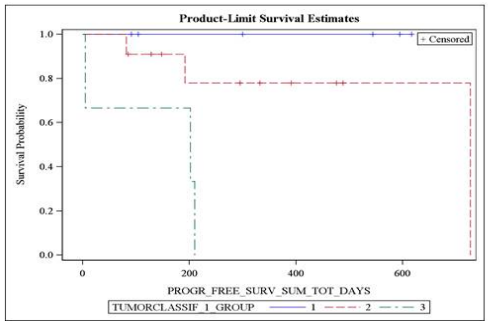
In 45 patients with proven hepatic metastases of neuroendocrine tumors (NET) MRI examinations were performed at baseline in all patients, consisting of standard T1w and T2w sequences,as well as arterial, portal-venous, late-venous and hepatobiliary phase post-contrast sequences (3T MRI scanner, Verio Siemens Medical Solutions, Erlangen, Germany, Gd-EOB-DTPA; Primovist®, BAYER Healthcare, Leverkusen, Germany; 0.025mmol/kgBW, injection rate 2ml/sec). Furthermore, PET-CT examinations (with somatostatin-specific tracer Ga-DOTATATE) were performed at baseline. The following imaging predicors were defined: patient age and gender, proliferation marker Ki-67, tumorload in the liver (%), vascularisation of metastases, tumor necrosis, hemorrhage and fluid-fluid levels. In addition to that the status of somatostatin II receptor was defined by analysing mean and maximum SUV in PET-CT. As primary end point we defined the progression free survival (PFS) using RECIST criteria in MRI follow-up examinations (time interval: 3 months). The effect of the predictors on the progression-free.survival have been analyzed by using Kaplan-Meier statistics. The mean follow-up time was 445 ±411 days.

Results

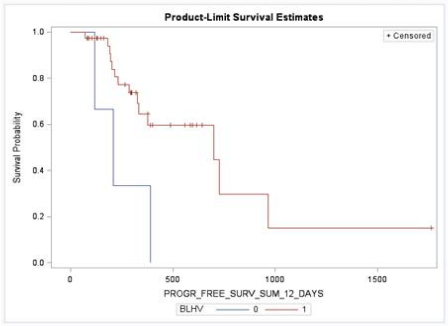
The mean PFS was 699 days (95% CI 326-964). Hypovascular metastases showed significant earlier progress (255 vs. 727 days; $p<0.01$). A proliferation marker <2% (G1) was siginificantly associated with a longer PFS than a proliferation marker between 2-20% (G2) or >20% (G3) ($p<0.001$). Patient age, gender, tumor load in the liver, tumor necrosis, hemorrhage as well as radioreceptor status pre-SIRT did not show any impact on PFS ($p>0.05$); see Kaplan Meier Statistics.

Kaplan Meier Statistics: Influence of Predictors on Progression-Free-Survival

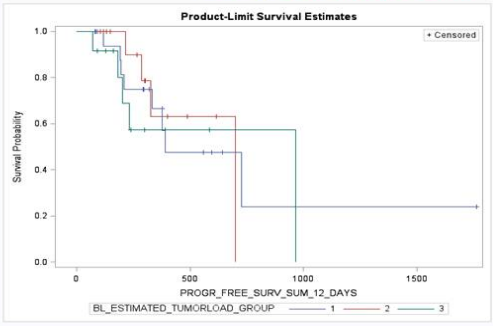
Ki67: <2%, 2-20%, >20%



Hypervascularization: no, yes



Tumorload: <20%, 20-50%, >50%



Conclusion:

Pretherapeutical MRI parameters may serve as valuable predictors for long progression-free survival after radioembolization of neuroendocrine tumors. Selective internal radiation therapy in neuroendocrine tumors turns out to be most efficient in hypervascular tumors with low proliferation index. Tumor-liver-ratio as well as radioreceptor status don't have influence on the progression free survival in contrast to other therapeutic options in NETs.

References:

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2. Dynamic contrast-enhanced **magnetic resonance imaging** biomarkers predict **survival** and response in hepatocellular carcinoma patients treated with sorafenib and metronomic tegafur/uracil.Hsu CY, Shen YC, Yu CW, Hsu C, Hu FC, Hsu CH, Chen BB, Wei SY, Cheng AL, Shih TT.J Hepatol. 2011 Oct;55(4):858-65. Epub 2011 Feb 19.