

# Predictive factors for Child-Pugh score elevation in hepatocellular carcinoma patients treated with conformal radiation therapy: dose-volume histogram analysis

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## ABSTRACT

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**Aims and background.** We designed the study to identify the clinical and dose-volumetric parameters associated with the risk of Child-Pugh score elevation in hepatocellular carcinoma patients treated with conformal radiation therapy.

**Methods and study design.** All 161 hepatocellular carcinoma patients in the study underwent 4D-computed tomography simulation, and a dose-volume histogram was generated after radiotherapy planning. Patients who had an elevated Child-Pugh (e-CP) score of 2 or more without progressive disease within 3 months were defined as e-CP positive.

**Results.** Twenty-six of 142 patients without progressive disease were e-CP positive. Pretreatment Child-Pugh class, further treatment within 30 days of radiotherapy, lymph node metastasis, mean liver dose,  $V_{20\text{ Gy}}$ ,  $V_{25\text{ Gy}}$ , and  $V_{30\text{ Gy}}$  were significantly correlated with e-CP positivity. The e-CP developed in 13 of 106 patients (12.3%) with  $V_{30\text{ Gy}}$  of  $\leq 28.1\%$  and in 13 of 36 patients (36.1%) with  $V_{30\text{ Gy}} > 28.1\%$  ( $P = 0.001$ ).

**Conclusions.** Our data demonstrate that mean liver dose,  $V_{10\text{ Gy}}$ ,  $V_{20\text{ Gy}}$ ,  $V_{25\text{ Gy}}$ , and  $V_{30\text{ Gy}}$  are independent dose-volumetric predictors for e-CP positivity in hepatocellular carcinoma patients treated with conformal radiation therapy.  $V_{30\text{ Gy}}$  should be limited to less than 28.1% to minimize the risk of e-CP.

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**Key words:** Child-Pugh score, dose-volume histogram, hepatocellular carcinoma, radiation therapy.

*Conflict of Interest Notification:* The authors have no conflicts of interest to disclose.

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