Association between the expression of HIF-1α and VEGF and prognostic implications in primary liver cancer

L.Y. Guo, P. Zhu and X.P. Jin

Department of Gastroenterology, First Affiliated Hospital of Liaoning Medical College, Liaoning, China

Corresponding author: X.P. Jin
E-mail: jinxupeng_ll@163.com

Received November 19, 2015
Accepted January 18, 2016
Published May 6, 2016
DOI http://dx.doi.org/10.4238/gmr.15028107

ABSTRACT. The goal of this study was to investigate the expression of hypoxia-inducible factor-1α (HIF-1α) and vascular endothelial growth factor (VEGF) in primary liver cancer (PLC) and their association with prognosis. Tumor tissue, non-tumor tissue, and blood samples of 75 PLC patients were collected. Blood samples of 20 volunteers were also collected as healthy controls. Real-time quantitative reverse transcription-polymerase chain reaction was used to analyze the mRNA levels of HIF-1α and VEGF in the tissues. Protein expression of HIF-1α and VEGF was analyzed by immunohistochemistry. Enzyme-linked immunosorbent assay was used to detect the expression of HIF-1α and VEGF at the serum level. Univariate tests, multivariate Cox proportional hazards model, and the Student t-test were used to analyze the data. HIF-1α and VEGF showed higher expression in PLC tumor tissue both at the mRNA and protein levels. HIF-1α and VEGF expression was positive in 62.67 and 66.67% of PLC patients, respectively. HIF-1α and VEGF expression was significantly related to tumor stage and lymph nodes and lung metastases (P < 0.05). HIF-1α expression correlated with...
VEGF expression in PLC (r = 0.665, P < 0.05). Both HIF-1α and VEGF were significantly associated with overall survival (P < 0.05), while HIF-1α was identified as an independent prognostic factor. Both HIF-1α and VEGF, as the predictors of efficacy of TACE and metastasis of PLC, are biomarkers indicating PLC in advanced stage, and implied poor prognosis in patients with PLC. HIF-1α and VEGF could potentially be targets to improve outcomes in PLC.

**Key words:** HIF-1α; VEGF; Primary liver cancer; Prognosis