

Level of Glypican-3 in primary liver cancer and its clinical significance

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Summary: The aim of this study from Etiology Laboratory of Shanxi Cancer Institute was to determine the value of Glycan-3 in the early diagnosis of primary hepatocellular carcinoma (PHC) by detecting the level of Glypican-3 and Alpha Fetoprotein (AFP) in the serum of PHC patients. The cohort used for this study includes **277 PHC** patients (75.8% male and 24.2% female) who were admitted to the hospital from June 2018 to January 2019; **108** patients (76.9% male and 23.1% female) with primary gastric cancer (**PGC**); **40** patients (57.5% male and 42.5% female) with Hepatitis B (**HB**); **19** patients (47.4% male and 52.6% female) with Hepatitis B combined with other cancers other than liver cancer (**HB+C**); **54** healthy controls (**HC**)(63.0% male and 37.0% female). The study has been approved by the Ethics Committee of Shanxi Provincial Cancer Hospital, and patients have signed the informed consent.

Results: When looking at PHC diagnosis for Glypican-3 alone, the area under the curve (AUC) was 0.809 (CI 0.759~0.859 at 95%), with a sensitivity of 69.2% and a specificity of 94.1%, at a detection threshold of 51 pg/ml. AFP alone had an AUC of 0.814, (CI 0.767~0.860 at 95%), with a sensitivity of 64.1%, and a specificity of 90.2% at a detection threshold of 7.9. When Glypican-3 was combined with AFP, the AUC increased to 0.872 (CI 0.824~0.920 at 95%), with a sensitivity and specificity of 80.2% and 94.3%, respectively.

Efficiency of Glypican-3 and AFP in the diagnosis of PHC

	AUC	Sens	Spec
Glypican-3	0.809	69.2%	94.1%
AFP	0.814	64.1%	90.2%
Glypican-3+AFP	0.872	80.2%	94.3%

Furthermore, there is a weak correlation between the expressions of Glypican-3 and AFP in the serum of PHC patients ($r=0.34$, $P<0.01$). Even though there is an overlap between the markers, a significant number of patients are positive only for AFP or Glypican-3. In the AFP-negative group, Glypican-3 positive rate reached 47.0%.

Correlation (cases) of Glypican-3 and AFP expression in the serum of PHC patients

Glypican-3	AFP		Total
	Negative	Positive	
Negative	53	32	85
Positive	47	145	192
Total	100	177	277

Note: If Glypican-3 is > 51 pg/ml, it is positive; if AFP > 7 ng/ml, it is positive.

Conclusions:

- Serum Glypican-3 levels are higher in PHC patients compared to HC and other malignant patients (PGC and HB+C).
- In PHC AFP-negative patients, Glypican-3 positive rate is as high as 47%. This suggests that Glypican-3 may indeed improve PHC diagnosis.
- Glypican-3 (alone or in combination with AFP) has higher sensitivity and specificity compared to AFP alone in PHC diagnosis.