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Dose the Tumor Marker Regression Predict the Survival after External Beam Radiotherapy in Hepatocellular Carcinoma?



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Purpose

- This study was conducted to find out whether the changes in tumor markers according to the treatment response after radiotherapy (RT) were correlated with the prognosis of hepatocellular carcinoma (HCC).
- 2012 Jan~ 2021 Dec
- Retrospective study
- Single institution

Method (I)

Inclusion

- 1) HCC was diagnosed based on the Korean Liver Cancer Study Group (KLCSG) practice guidelines
- 2) ECOG performance scale 0-2
- 3) AFP >20 or PIVKA-II >50
- 3) External beam radiotherapy for viable HCC
- 4) Radiation dose > 30Gy with ≥ 10 fractions

Exclusion

- 1) Abdominal LN metastases excluded from RTx fields
- 2) Child-Pugh class C
- 3) Distant metastases
- 4) Follow-up loss before 3 months of the end of RTx

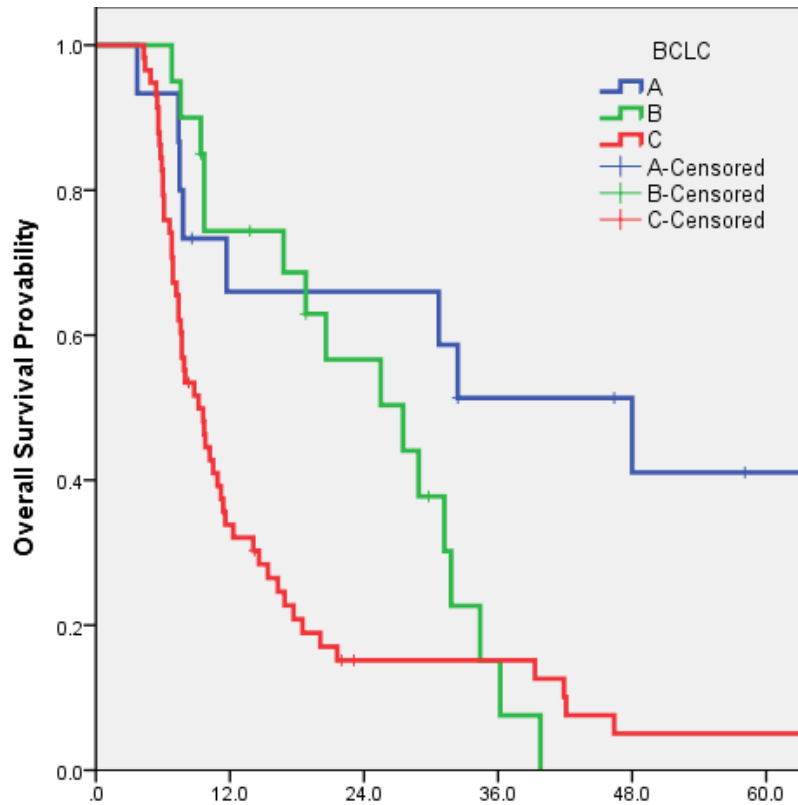
Method (II)

- Total N=122
- AFP cohort with initial $>20\text{ng/ml}$ (N=77)
- PIVKA-II cohort with initial $>50\text{mAU/ml}$ (N=81)
- Regression degree of AFP and PIVKA-II from pre-RT to post RT after ① 1 month (window period ± 2 weeks) & ② 3 month (window period ± 1 month)
- End points of An ROC curve analysis
 - ① Success of 1-year survival and ② 2-year survival

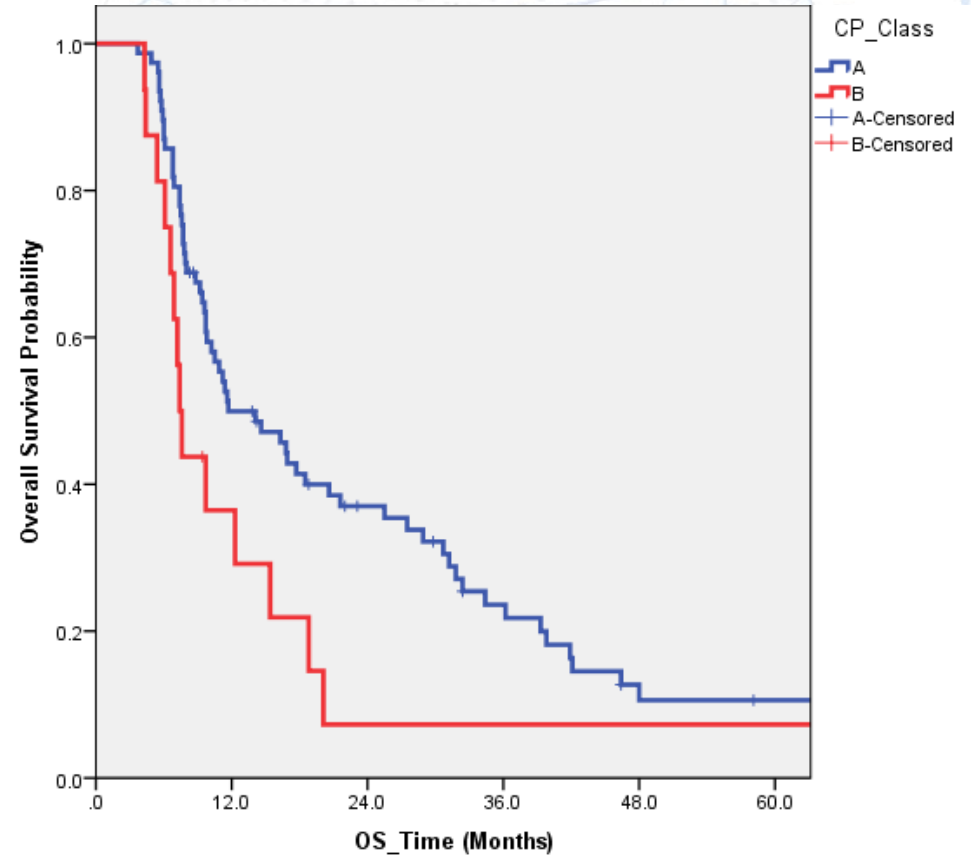
Patients Characteristics

		Entire (N=123)	AFP >20 (N=77)	PIVKA-II >50 (N=93)
Sex	Male: Female	111: 12	68: 9	77: 16
Age (years)	< 65: ≥65	84: 39	57: 20	65: 28
Cause	HBV: HCV: Alcohol: Other	78: 13: 20: 12	54: 7: 10: 6	61: 9: 14: 9
Child-Pugh class	A: B	105: 18	68: 9	77: 16
Size (cm)	≤5: >5	42: 81	22: 55	25: 68
Number	1: 2-4: ≥5	34: 59: 30	17: 35: 25	21: 45: 27
Portal vein tumor thrombus	No: Yes	59: 64	32: 45	36: 57
mUICC	T1: T2: T3: T4	4: 23:42:54	1: 10: 28: 38	0: 9: 32:49
BCLC	A: B: C	30: 27: 66	14: 18: 45	15: 20: 58
AFP (ng/ml)	<500: ≥500	55: 68	9: 68	36: 57
PIVKA-II (mAU/ml)	<2000: ≥2000: unknown	60: 57: 10	34: 41: 2	36: 57
Combined therapy with Radiotherapy	No: Yes	16: 107	4: 73	10: 83

Survival Curve

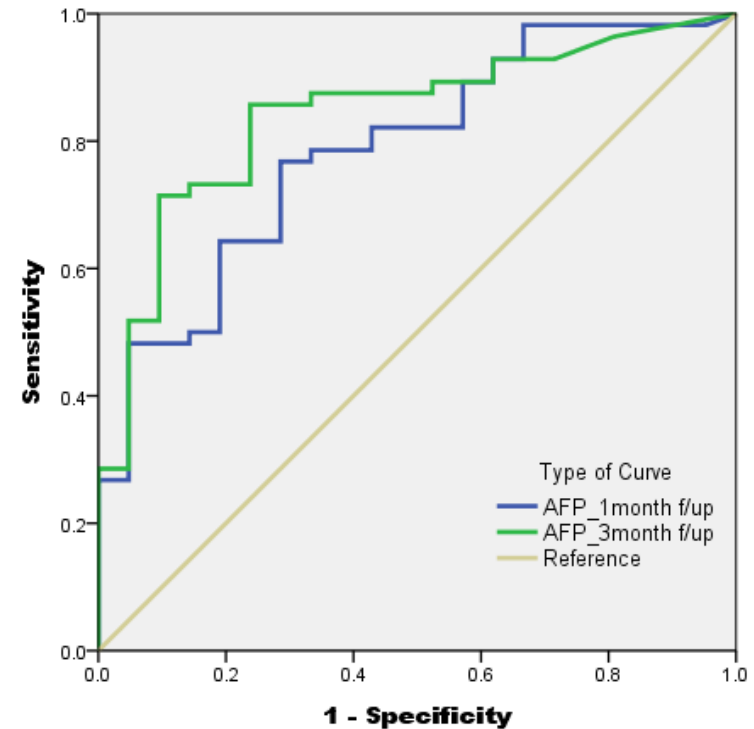
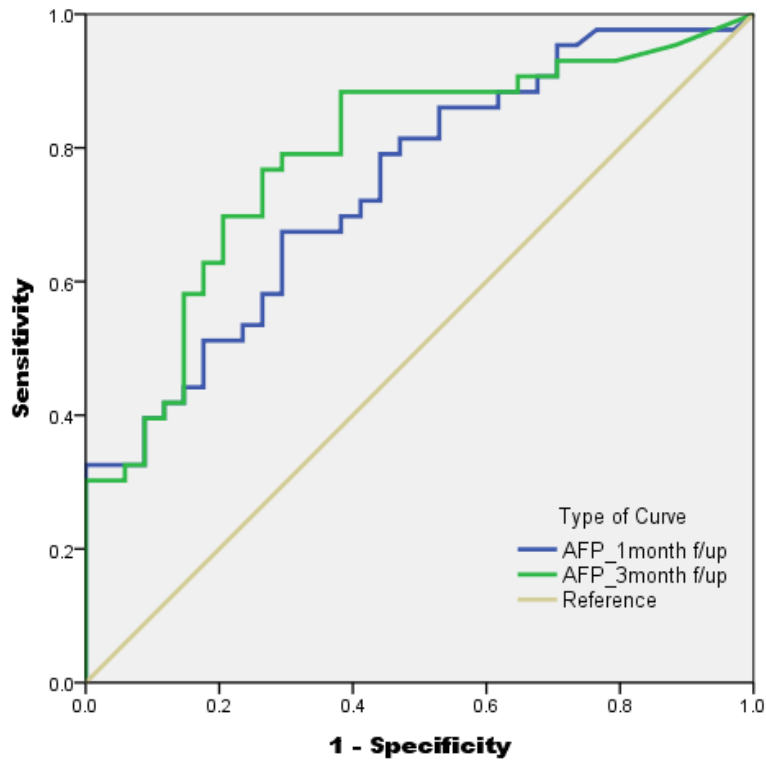


	Median (Months)	SE	95% CI	
			Upper	Lower
BCLC A	48.0	13.8	20.9	75.11
BCLC B	27.5	6.6	14.6	40.4
BCLC C	9.2	1.2	6.9	11.5



	Median (Months)	SE	95% CI	
			Upper	Lower
CP A	11.7	3.1	5.7	17.7
CP B	7.4	0.4	6.6	8.2

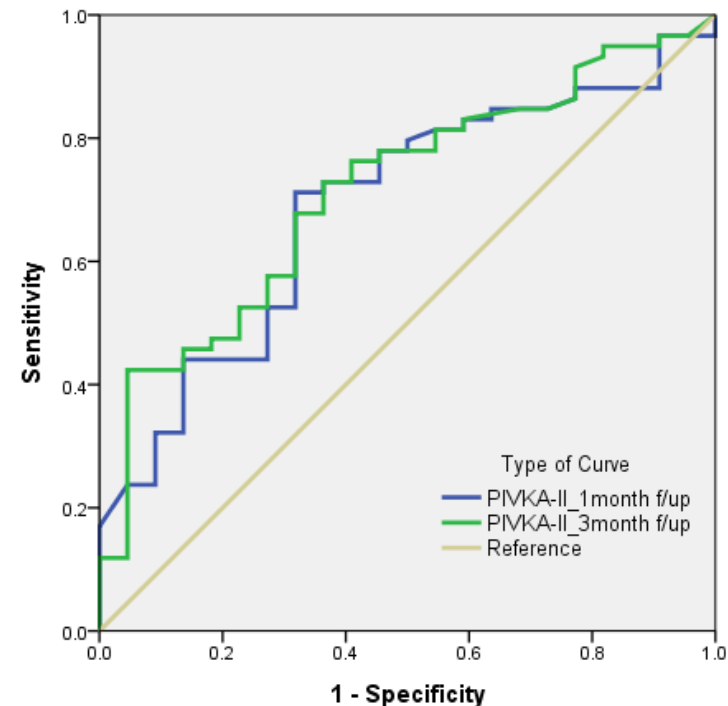
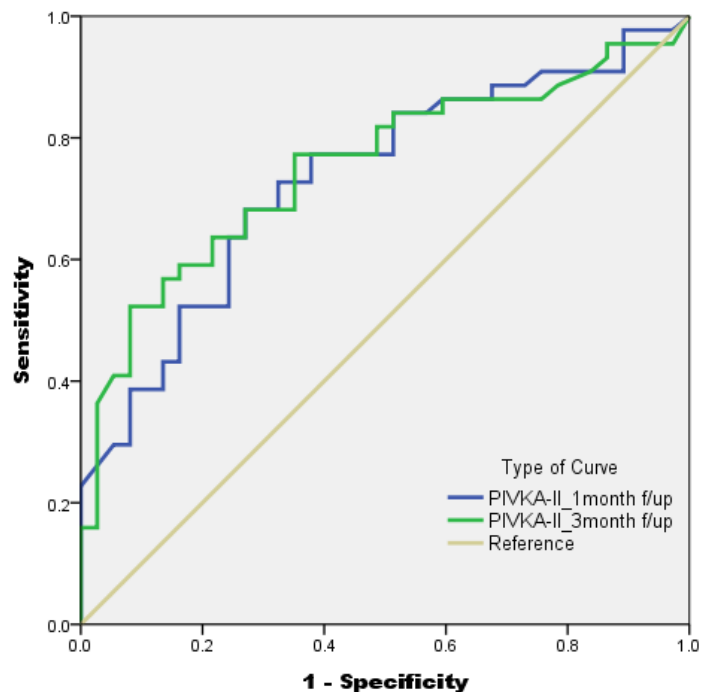
AFP regression rate (ROC curve)



1-year OS	Area	95% CI		Cutoff (%)	Sensi.	Speci.
		Upper	Lower			
1 mon_reg	.742	.633	.851	29.60	67.4	70.6
3 mon reg	.788	.685	.891	17.50	76.7	73.5

2-year OS	Area	95% CI		Cutoff (%)	Sensi.	Speci.
		Upper	Lower			
1 mon_reg	.787	.618	.896	14.50	76.8	71.4
3 mon reg	.841	.746	.936	17.5	71.4	90.5

PIVKA-II regression rate (ROC curve)



1-year OS	Area	95% CI		Cutoff (%)	Sensi.	Speci.
		Upper	Lower			
1 mon_reg	.734	.626	.842	17.65	68.2	67.8
3 mon reg	.752	.646	.859	13.05	68.2	67.6

2-year OS	Area	95% CI		Cutoff (%)	Sensi.	Speci.
		Upper	Lower			
1 mon_reg	.688	.564	.812	14.80	67.8	68.2
3 mon reg	.713	.594	.833	7.65	67.8	63.6

Multivariate Analyses

- Sex (male/Female);
- Tumor Number (1/2-4/ ≥ 5);
- Portal vein tumor thrombus (No/Yes);
- Age (years, ≤ 65 / >65);
- Tumor size (cm, ≤ 5 / >5);
- Child-Pugh class (A/B);
- BCLC stage (A/B/C);
- AFP regression (20% cutoff)



	Exp (B)	SE	Wald	P
AFP	4.431	.300	4.858	<0.001
PVTT	1.816	.271	.24.693	0.028

Conclusion

- The regression degree of AFP at 3 months after completion of RT were associated with OS as major prognostic factor.