

**Supplemental Table 1 The initial patient features of the validation cohort were assessed (*n* = 164)**

Variable	All patients(n = 164)	Benign(n = 34)	Malignant(n = 130)	<i>P</i> Value <sup>a</sup>
<b>Clinical data</b>				
Age (y)	55.1±10.4	54.2±10.6	55.3±10.4	0.578
Sex(%)				0.595
Men	140(85.4%)	30(88.2%)	110(84.6%)	
Women	24(14.6%)	4(11.8%)	20(15.4%)	
Body mass index (kg/m <sup>2</sup> )	24.1±3.9	24.3±6.1	24.0±3.1	0.712
Nation(%)				0.587
Han nationality	161(98.2%)	33(97.1%)	128(98.5%)	
not Han nationality	3(1.8%)	1(2.9%)	2(1.5%)	
History of tumor(%)				0.337
Yes	9(5.5%)	3(8.8%)	6(4.6%)	
No	155(94.5%)	31(91.2%)	124(95.4%)	
<b>Laboratory data</b>				
ALT (IU/L)	31.6±22.2	30.1±20.1	31.9±22.8	0.673
AST (IU/L)	32.7±21.7	34.5±31.9	32.3±18.2	0.597
GGT (IU/L)	90.1±97.2	89.4±87.3	90.2±99.9	0.966
Prothrombin time (sec)	12.8±9.3	11.9±1	13±10.4	0.545
INR	1±0.1	1±0.09	1±0.08	0.323
PLT(10 <sup>9</sup> /L)	186.1±73.3	220.8±66.2	177±72.6	0.002
Albumin (g/L)	41.5±4	40.7±3.8	41.8±4	0.780
Total bilirubin (μmol/L)	68.1±5.2	68.1±5.4	68.1±5.1	0.939
<b>Ultrasonic data</b>				
Number(%)				0.523

Single	145(88.4%)	29(85.3%)	116(89.2%)	
Multiple	19(11.6%)	5(14.7%)	14(10.8%)	
Diameter(cm)	5.8±3.1	5.2±3.5	5.3±2.8	0.629
Shape(%)				0.108
Roundness	101(61.6%)	25(73.5%)	76(58.5%)	
Ellipse	63(38.4%)	9(26.5%)	54(41.5%)	
Echo(%)				0.797
Hypoecho	64(39.3%)	14(41.2%)	50(38.8%)	
Hyperecho	99(60.7%)	20(58.8%)	79(61.2%)	
Edge(%)				0.083
Smooth	61(37.2%)	17(50%)	44(33.8%)	
Coarse	103(62.8%)	17(50%)	86(66.2%)	
Cirrhosis(%)				0.010
Yes	49(29.9%)	4(11.8%)	45(34.6%)	
No	115(70.1%)	30(88.2%)	85(65.4%)	
Blood(%)				0.438
Yes	115(70.1%)	22(64.7%)	93(71.5%)	
No	49(29.9%)	12(35.3%)	37(28.5%)	
E <sub>max</sub> of the tumors (m/s)	2.4±0.6	2±0.4	2.5±0.6	<0.001
E <sub>mean</sub> of the tumors (m/s)	1.9±0.5	1.6±0.4	2±0.4	<0.001
E <sub>max</sub> of the periphery of tumors (m/s)	1.6±0.4	1.4±0.4	1.6±0.4	0.030
E <sub>mean</sub> of the periphery of tumors (m/s)	1.5±0.4	1.4±0.4	1.5±0.4	0.049

Note – The data enclosed between parenthesis represents the intervals of confidence at 95%. ALT = alanine aminotransferase, AST = aspartate aminotransferase, GGT = g-glutamyl transferase, PLT = platelet count, E<sub>max</sub>: Maximal elasticity, E<sub>mean</sub>: mean elasticity

<sup>a</sup> P value for comparisons between Benign cohort and Malignant cohort.

**Supplemental Table 2 Baseline patients characteristics of the experimental cohort of liver cancer patients (*n* = 520)**

Variable	All patients(n = 520)	With MVI(n = 101)	Without MVI(n = 419)	<i>P</i> Value <sup>a</sup>
<b>Clinical data</b>				
Age (y)	55.5±11.8	56.6±10.9	55.2±12	0.302
Sex(%)				0.780
Men	417(80.2%)	82(81.2%)	335(80.0%)	
Women	103(19.8%)	19(18.8%)	84(20.0%)	
Body mass index (kg/m <sup>2</sup> )	24±3.4	23.8±3.3	24.0±3.4	0.480
Nation(%)				0.848
Han nationality	506(97.3%)	98(97%)	408(97.4%)	
not Han nationality	14(2.7%)	3(3%)	11(2.6%)	
History of tumor(%)				0.566
Yes	49(9.4%)	8(7.9%)	41(9.8%)	
No	471(90.6%)	93(92.1%)	378(90.2%)	
<b>Laboratory data</b>				
ALT (IU/L)	47.2±118.2	30.4±18.5	51.3±131.1	0.054
AST (IU/L)	44±111.8	32.6±30	46.8±123.6	0.291
GGT (IU/L)	87.4±121	74.6±114.3	90.4±122.5	0.246
Prothrombin time (sec)	12.2±3.6	12.8±7.9	12±1.2	0.242
INR	1±0.5	1±0.1	1±0.5	0.605
PLT(10 <sup>9</sup> /L)	172.4±70.7	173.1±69.5	172.2±71.1	0.909
Albumin (g/L)	41.4±3.8	41.5±3.5	41.3±3.8	0.622
Total bilirubin (μmol/L)	67.7±5.3	67.7±5.1	67.6±5.3	0.872
<b>Ultrasonic data</b>				
Number(%)				0.650

Single	419(80.6%)	83(82.2%)	336(80.2%)	
Multiple	101(19.4%)	18(17.8%)	83(19.8%)	
Diameter(cm)	5.3±2.8	5.5±3	5.3±2.8	0.384
Shape(%)				0.395
Roundness	272(52.3%)	49(48.5%)	223(53.2%)	
Ellipse	248(47.7%)	52(51.5%)	196(46.8%)	
Echo(%)				0.796
Hypoecho	160(30.8%)	30(29.7%)	130(31%)	
Hyperecho	360(69.2%)	71(70.3%)	289(69%)	
Edge(%)				0.112
Smooth	272(52.3%)	60(59.4%)	212(50.6%)	
Coarse	248(47.7%)	41(40.6%)	207(49.4%)	
Cirrhosis(%)				0.932
Yes	204(39.2%)	40(39.6%)	164(39.1%)	
No	316(60.8%)	61(60.4%)	255(60.9%)	
Blood(%)				0.610
Yes	365(70.2%)	73(72.3%)	292(69.7%)	
No	155(29.8%)	28(27.7%)	127(30.3%)	
E <sub>max</sub> of the tumors (m/s)	2.5±1.1	1.8±0.4	1.9±0.5	0.931
E <sub>mean</sub> of the tumors (m/s)	1.9±0.5	1.8±0.4	1.9±0.5	0.003
E <sub>max</sub> of the periphery of tumors (m/s)	1.7±1.2	1.7±1.5	1.7±1.2	0.767
E <sub>mean</sub> of the periphery of tumors (m/s)	1.5±0.7	1.5±0.4	1.5±0.8	0.387

Note—The data enclosed between parenthesis represents the intervals of confidence at 95%. ALT = alanine aminotransferase, AST = aspartate aminotransferase, GGT = g-glutamyl transferase, PLT = platelet count, E<sub>max</sub>: Maximal elasticity, E<sub>mean</sub>: mean elasticity.

<sup>a</sup> P value for comparisons between Benign cohort and Malignant cohort.

**Supplemental Table 3 Baseline patients characteristics of the experimental cohort of hepatitis-B patients (n = 307)**

Variable	All patients(n = 307)	Treatment(n = 159)	NOT Treatment(n = 148)	P Value <sup>a</sup>
<b>Clinical data</b>				
Age (y)	55.1±11.1	55.1±10.2	55.1±12	0.578
Sex(%)				0.965
Men	259(84.4%)	134(84.3%)	125(84.5%)	
Women	48(15.6%)	25(15.7%)	23(15.5%)	
Body mass index (kg/m <sup>2</sup> )	24.3±3.4	24.5±3.3	24.0±3.5	0.712
Nation(%)				0.929
Han nationality	301(98%)	156(98.1%)	145(98%)	
not Han nationality	6(2%)	3(1.9%)	3(2%)	
History of tumor(%)				0.076
Yes	23(7.5%)	16(10.1%)	7(4.7%)	
No	284(92.5%)	143(89.9%)	141(95.3%)	
<b>Laboratory data</b>				
ALT (IU/L)	51.1±147	64.3±201.1	37±33	0.673
AST (IU/L)	48.3±141	60.5±194.3	35.1±20.4	0.597
GGT (IU/L)	76.5±98	67.3±96.2	86.4±99.4	0.966
Prothrombin time (sec)	12.4±4.6	12.6±6.4	12.1±1	0.545
INR	1±0.6	1±0.9	1±0.1	0.323
PLT(10 <sup>9</sup> /L)	161.2±64.1	152.8±59.1	170.2±68	<b>0.002</b>
Albumin (g/L)	41.3±3.8	41.6±3.8	41±3.8	0.780
Total bilirubin (μmol/L)	67.7±5.3	67.7±5.2	67.7±5.4	0.939

Ultrasonic data				
Number(%)				0.080
Single	247(80.5%)	134(84.3%)	113(76.4%)	
Multiple	60(19.5%)	25(15.7%)	35(23.6%)	
Diameter(cm)	5.3±2.9	4.5±2.4	6.1±3	0.629
Shape(%)				0.291
Roundness	161(52.4%)	88(55.3%)	73(49.3%)	
Ellipse	146(47.6%)	71(44.7%)	75(50.7%)	
Echo(%)				0.198
Hypoecho	99(32.2%)	46(28.9%)	53(35.8%)	
Hyperecho	208(67.8%)	113(71.1%)	95(64.2%)	
Edge(%)				0.507
Smooth	162(52.8%)	81(50.9%)	81(54.7%)	
Coarse	145(47.2%)	78(49.1%)	67(45.3%)	
Cirrhosis(%)				0.391
Yes	153(49.8%)	83(52.2%)	70(47.3%)	
No	154(50.2%)	76(47.8%)	78(52.7%)	
Blood(%)				0.915
Yes	219(71.3%)	113(71.1%)	106(71.6%)	
No	88(28.7%)	46(28.9%)	42(28.4%)	
E <sub>max</sub> of the tumors (m/s)	2.5±1.3	2.3±0.6	2.5±0.7	<b>0.033</b>
E <sub>mean</sub> of the tumors (m/s)	1.9±0.4	1.8±0.4	1.9±0.5	<b>0.042</b>
E <sub>max</sub> of the periphery of tumors (m/s)	1.1±1	1.6±0.3	1.8±1.4	<
E <sub>mean</sub> of the periphery of tumors (m/s)	1.5±0.4	1.5±0.3	1.6±0.4	<b>0.001</b>
				<b>0.003</b>

Note – The data enclosed between parenthesis represents the intervals of confidence at 95%. ALT = alanine aminotransferase, AST = aspartate aminotransferase, GGT =

g-glutamyl transferase, PLT = platelet count, Emax: Maximal elasticity, Emean: mean elasticity

<sup>a</sup> *P* value for comparisons between Treatment cohort and Not Treatment cohort.

**Supplemental Table 4 Univariable logistic regression analysis to assess the danger of MVI in the experimental cohort of liver cancer patients (*n* = 520)**

Variable	Odds Ratio	<i>P</i> Value
Clinical data		
Age (y)	1.01(0.99,1.03)	0.302
Sex(%)	0.92(0.53,1.61)	0.780
Body mass index (kg/m <sup>2</sup> )	0.98(0.92,1.04)	0.479
Nation(%)	1.14(0.31,4.15)	0.848
History of tumor(%)	0.79(0.36,1.75)	0.566
Laboratory data		
ALT (IU/L)	1(0.98,1)	0.054
AST (IU/L)	1(0.99,1)	0.291
GGT (IU/L)	1(0.99,1)	0.246
Prothrombin time (sec)	1.05(0.97,1.14)	0.242
INR	0.53(0.05,5.82)	0.605

PLT( $10^9/L$ )	1(0.99,1)	0.909
Albumin (g/L)	1.02(0.96,1.08)	0.621
Total bilirubin ( $\mu\text{mol/L}$ )	1(0.96,1.05)	0.871
Ultrasonic data		
Number(%)	0.88(0.5,1.54)	0.651
Diameter(cm)	1.03(0.96,1.12)	0.384
Shape(%)	1.21(0.78,1.87)	0.396
Echo(%)	1.07(0.66,1.71)	0.796
Edge(%)	0.7(0.45,1.09)	0.113
Cirrhosis(%)	1.02(0.65,1.59)	0.932
Blood(%)	1.13(0.7,1.84)	0.61
E <sub>max</sub> of the tumors (m/s)	0.99(0.81,1.22)	0.931
E <sub>mean</sub> of the tumors (m/s)	0.45(0.27,0.76)	0.003
E <sub>max</sub> of the periphery of tumors (m/s)	1.03(0.87,1.2)	0.768
E <sub>mean</sub> of the periphery of tumors (m/s)	0.77(0.44,1.3)	0.354

Note – The data enclosed between parenthesis represents the intervals of confidence at 95%. ALT = alanine aminotransferase, AST = aspartate aminotransferase, GGT = g-glutamyl transferase, PLT = platelet count, E<sub>max</sub>: Maximal elasticity, E<sub>mean</sub>: mean elasticity.