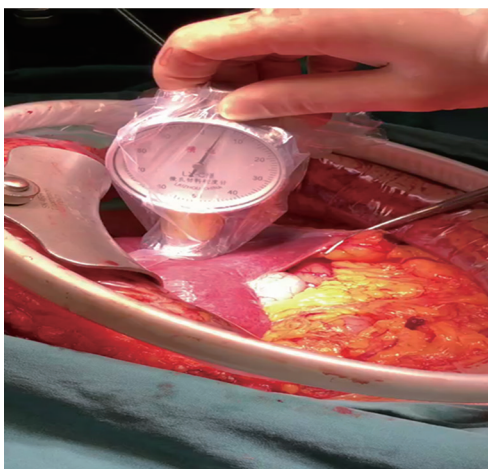


**Table S1** Pre-operative cirrhotic severity scoring system for staging liver cirrhosis

Clinical variables	Score		
	0	1	2
Varicosity	none	F1	F2
Portal vein diameter (mm)	<12	12-14	>14
Spleen thickness (cm)	<4.0	4.0-5.0	>5.0
Platelet count ( $10^9/L$ )	$\geq 100$	70-100	<70
Cirrhotic severity scoring	0-1	2-3	$\geq 4$
Severity of liver cirrhosis	Non/mild cirrhosis	Moderate cirrhosis	Severe cirrhosis

The grades of esophageal varices were classified as: F1, straight varices not disappearing with insufflations; F2, enlarged tortuous, occupying <1/3 of the lumen; and F3, coil-shaped, occupying >1/3 of the lumen.



**Figure S1** The picture of the LX-C Shore hardness tester (Laizhou, China) used for DSM during open operation. The device is 11.5 cm in height, 6 cm in width. The probe is a disc with a diameter of 2.5 cm.

**Table S2** Patient's characteristics in Tongji cohort and external cohort

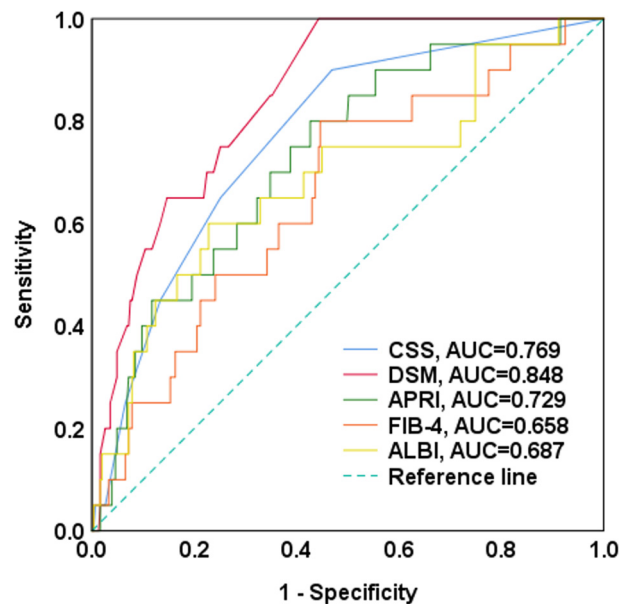
Variables	Tongji cohort (N=178)	External cohort (N=149)
Age* (years)	54.6±11.4	56.3±9.42
Gender		
Female	28 (15.7)	22 (14.8)
Male	150 (84.3)	127 (85.2)
HBsAg		
Negative	40 (22.5)	17 (11.4)
Positive	138 (77.5)	132 (88.6)
HBV-DNA (copies/mL)		
≤500	115 (64.6)	83 (55.7)
>500	63 (35.4)	66 (44.3)
ICG-R15* (%)	4.90 [3.30-7.40]	5.10 [2.50-7.80]
ALT* (U/L)	24.0 [18.0-39.0]	31.0 [21.7-46.0]
AST* (U/L)	27.0 [22.0-39.0]	33.7 [25.7-48.0]
ALB* (g/L)	41.2 [38.9-44.3]	40.3 [37.2-43.6]
TBIL* (μmol/L)	12.5 [9.50-16.3]	14.6 [11.3-19.4]
PT* (sec)	13.6 [13.2-14.2]	13.5 [12.3-15.2]
PTA* (%)	94.0 [86.0-100]	72.1 [35.2-93.0]
INR*	1.03 [1.00-1.10]	1.06 [1.01-1.16]
WBC* (×10 <sup>9</sup> /L)	5.36 [4.40-6.49]	5.01 [4.00-6.00]
RBC* (×10 <sup>12</sup> /L)	4.54 [4.12-4.91]	4.36 [4.00-4.73]
PLT* (×10 <sup>9</sup> /L)	172 [123-221]	150 [110-192]
Tumor size* (cm)	5.35 [3.70-8.12]	5.50 [3.20-7.80]
Child-Pugh grade		
A	175 (98.3)	128 (85.9)
B	3 (1.69)	21 (14.1)
CSS		
0	111 (62.4)	46 (30.9)
1	31 (17.4)	39 (26.2)
2	16 (8.99)	29 (19.5)
3	10 (5.62)	16 (10.7)
≥4	10 (3.93)	19 (8.05)
DSM value* (HC)	5.00 [3.00-6.00]	7.20 [4.00-8.80]
Extent of hepatectomy		
Minor	131 (73.6)	98 (65.8)
Major	47 (26.4)	51 (34.2)

Table S2 (continued)

**Table S2** (continued)

Variables	Tongji cohort (N=178)	External cohort (N=149)
Pringle's maneuver	130 (73.0)	100 (67.1)
Time of Pringle's maneuver* (min)	9.00 [0.00-14.5]	20.0 [0.00-40.0]
Blood loss* (mL)	150 [100-200]	300 [120-400]
Blood transfusion* (U)	0.43±1.77	0.55±1.37
PHLF		
No	165 (92.7)	129 (86.6)
Yes	13 (7.3)	20 (13.4)
Histopathological degree of liver cirrhosis (Laennec grade)		
No (F0-3)	75 (42.1)	66 (44.2)
Mild (F4A)	55 (30.9)	36 (24.2)
Moderate (F4B)	39 (21.9)	32 (21.5)
Severe (F4C)	9 (5.1)	15 (10.1)

\*Continuous variables were presented as mean ± SD/median (IQR). Categorical variables were expressed as cases (percentage). HBsAg, hepatitis B surface antigen; HBV, hepatitis B virus; ICG-R15, the retention rate of indocyanine green at 15 min; ALT, alanine transaminase; AST, aspartate aminotransferase; ALB, serum albumin; TBIL, total serum bilirubin; PT, prothrombin time; PTA, prothrombin activity; INR, international normalized ratio; WBC, white blood cell; RBC, red blood cell; PLT, platelet count; CSS, cirrhosis severity score; DSM, direct liver stiffness measurement; SD, standard deviation; IQR, interquartile range.



**Figure S2** ROC curves and the corresponding AUCs of CSS, DSM, APRI, FIB-4, and ALBI for predicting PHLF in the entire cohort (n=327). ROC, receiver operating characteristic; AUCs, areas under the ROC curves; PHLF, post-hepatectomy liver failure.