

## Supplementary Table 1 Search Strategy

### Complete systematic review search strategy (November 2019 to December 2022)

EMBASE:

1. liver resection/
2. hemihepatectomy/
3. liver lobectomy/
4. partial hepatectomy/
5. ((liver or hepatic) adj3 (resection or lobectomy)).mp.
6. hepatectom\*.mp.
7. hemihepatectom\*.mp.
8. or/1-7
9. predict\*.ti.
10. rule\*.af.
11. validat\*.af.
12. prediction/
13. predictive value/
14. predictive validity/
15. "prediction and forecasting"/
16. nomogram/
17. nomogram\*.mp.
18. statistical model/
19. (predict\* and (outcome\* or risk\* or model\*)).af.
20. ((predict\* or model\* or decision\* or identif\* or prognos\*) and (history or variable\* or criteria or scor\* or characteristic\* or finding\* or factor\*)).af.
21. (decision\* and (model\* or clinical\*)).af.
22. (stratification or discrimination or discriminate or "c-statistic" or "c statistic" or "area under the curve" or AUC or calibration or indices or algorithm or multivariable).af.
23. exp area under the curve/
24. receiver operating characteristic/
25. (predict\* adj4 value\*).mp.
26. or/9-25
27. 8 and 26
28. liver failure/ or acute liver failure/ or acute on chronic liver failure/ or chronic liver failure/ or end stage liver disease/ or fulminant hepatic failure/ or hepatic encephalopathy/ or mild hepatic impairment/ or moderate hepatic impairment/ or severe hepatic impairment/
29. ((hepatic or liver) adj2 (fail\* or insufficien\* or impair\*)).mp.
30. decompensated liver cirrhosis/
31. decompensat\*.mp.
32. postoperative complication/
33. (postoperative adj3 complication\*).mp.

34. (post-operative adj3 complication\*).mp.
35. (complication\* adj4 (after\* or following) adj4 (surgery or resection)).mp.
36. jaundice/ or eye jaundice/ or obstructive jaundice/
37. jaundice.ti,ab,kw.
38. exp ascites/
39. paracentesis/
40. paracentesis.ti,ab,kw.
41. varicosis/
42. esophagus varices bleeding/
43. esophagus varices/
44. ascites.ti,ab,kw.
45. varicosis.ti,ab,kw.
46. varices.ti,ab,kw.
47. variceal.ti,ab,kw.
48. encephalopathy.ti,ab,kw.
49. exp brain disease/
50. or/28-49
51. 8 and 26 and 50
52. limit 51 to conference abstract
53. 51 not 52
54. limit 53 to "review"
55. 53 not 54

Ovid MEDLINE:

1. Hepatectomy/
  2. ((liver or hepatic) adj3 (resection\* or lobectom\*)).mp.
  3. hepatectom\*.mp.
  4. hemihepatectom\*.mp.
  5. 1 or 2 or 3 or 4
  6. predict\*.ti.
  7. "Predictive Value of Tests"/
  8. logistic models/
  9. nomograms/
  10. nomogram\*.mp.
  11. (predict\* adj4 value\*).mp.
  12. (Predict\$ and (Outcome\$ or Risk\$ or Model\$)).af.
  13. ((Predict\$ or Model\$ or Decision\$ or Identif\$ or Prognos\$) and (History or Variable\$ or Criteria or Scor\$ or Characteristic\$ or Finding\$ or Factor\$)).af.
  14. (Decision\$ and (Model\$ or Clinical\$)).af.
  15. (Stratification or Discrimination or Discriminate or "c-statistic" or "c statistic" or "Area under the curve" or "AUC" or "Calibration" or "Indices" or "Algorithm" or "Multivariable").af.
  16. ROC Curve/
  17. validat\*.af.
  18. rule\$.af.
-

19. or/6-18
20. exp Liver Failure/
21. exp Liver Cirrhosis/
22. ((hepatic or liver) adj2 (fail\* or insufficien\* or impair\*)).mp.
23. decompensat\*.mp.
24. Postoperative Complications/
25. (postoperative adj3 complication\*).mp.
26. (post-operative adj3 complication\*).mp.
27. (complication\* adj4 (after\* or following) adj4 (surgery or resection)).mp.
28. exp Jaundice/
29. jaundice.mp.
30. Chylous Ascites/ or Ascites/
31. exp Paracentesis/
32. exp Varicose Veins/
33. "Esophageal and Gastric Varices"/
34. exp Brain Diseases/
35. paracentesis.mp.
36. ascites.mp.
37. varicosis.mp.
38. varices.mp.
39. variceal.mp.
40. encephalopathy.mp.
41. or/20-40
42. 5 and 19 and 41
43. limit 42 to "review"
44. 42 not 43

Web of Science Core Collection:

- #1. TS= (((liver or hepatic) NEAR/3 (resection\* or lobectom\*))) OR TS=(hepatectom\*)  
OR TS=(hemihepatectom\*)
  - #2. TS=(((hepatic or liver) NEAR/2 (fail\* or insufficien\* or impair\*))) OR  
TS=(decompensat\*) OR TS=((postoperative NEAR/3 complication\*)) OR  
TS=((post-operative NEAR/3 complication\*)) OR TS=((complication\* NEAR/4  
(after\* or following) NEAR/4 (surgery or resection))) OR TS=(jaundice) OR  
TS=(paracentesis) OR TS=(ascites) OR TS=(varicosis) OR TS=(varices) OR  
TS=(variceal) OR TS=(encephalopathy)
  - #3. TS=(validat\* OR rule\*) OR TS=((Predict\* and (Outcome\* or Risk\* or Model\*))) OR  
TS=(((History or Variable\* or Criteria or Scor\* or Characteristic\* or Finding\* or  
Factor\*) and (Predict\* or Model\* or Decision\* or Identif\* or Prognos\*))) OR  
TS=((Decision\* and (Model\* or Clinical\*))) OR TS=((Stratification or Discrimination  
or Discriminate or "c-statistic" or "c statistic" or "Area under the curve" or "AUC" or  
"Calibration" or "Indices" or "Algorithm" or "Multivariable"))
  - #4. TI=(predict\*) OR TS=(nomogram\*) OR TS=(predict\* NEAR/4 value\*)
  - #5. #4 OR #3
  - #6. #5 AND #2 AND #1
-

#7. #6 Refined by: DOCUMENT TYPES: ( article or letter or note or correction or retracted publication or proceedings paper or early access or book chapter).

---

**Supplementary 3.** Basic characteristics of the included models in our review (N=34).

Characteristics		Studies, n (%)
<b>Study Characteristics</b>		
<b>Year of publication</b>		
2019		3(8.8)
2020		6(17.6)
2021		12(35.3)
2022		10(29.4)
2023		3(8.8)
<b>Country of the study</b>		
China		24(70.5)
Korea		3(8.8)
Japan		2(5.8)
France		2(5.8)
USA		1(2.9)
Singapore		1(2.9)
<b>Journal Impact Factor</b>		
≤5		22(64.7)
5 < IF ≤ 10		9(26.5)
> 10		3(8.8)
<b>Population Characteristics</b>		
<b>Specific diseases</b>		
HCC		29(85.3)
HCC+CRLM		1(2.9)
PHCC		2(5.8)
No limited to liver tumor		2(5.8)
<b>Age Group</b>		
No limitation of age		23(67.6)
Above the age of 18		7(20.6)
Aged 18–85 years		2(5.8)
Aged 18–75 years		1(2.9)
Aged 25–80 years		1(2.9)
<b>Dataset Characteristics</b>		
<b>Training set sample size (Patients)</b>		
100-500		22(64.7)
500-1000		7(20.6)
> 1000		5(14.7)
<b>Single or Multicentric center(s)</b>		
Single center study		17(50.0)
Multicentric study		17(50.0)
<b>The type of imaging</b>		
Ultrasound		1(2.9)
CT		8(23.5)
MRI		3(8.8)

CT or/and MRI	8(23.5)
CT,MRI,and chest radiograph	1(2.9)
CT,MRI,and ultrasound	2(5.8)
CT,MRI,and gastroscopy	1(2.9)
no imaging	10(29.4)
<b>Definition of the outcome</b>	
PHLF-ISGLS	28(82.4)
"50-50" Criteria	4(11.8)
Previous study: encephalopathy with hyperbilirubinemia; total bilirubin > 4.1 mg/dL; INR > 2.5; ascites (drainage > 500 mL/d)	1(2.9)
INR≥1.5 or total bilirubin concentration ≥ 2.9 mg/dL on or after POD 5	1(2.9)
<b>Event number</b>	
≤50	12(35.3)
> 50 and ≤100	10(29.4)
> 100	12(35.3)
<b>Event percentage</b>	
≤10%	7(20.6)
> 10% and ≤30%	19(55.9)
>30%	8(23.5)
<b>The number of predictors in final model</b>	
≤3	8(23.5)
> 3 and ≤5	15(44.1)
>5	11(32.4)
<b>Events-per-predictor variable (EPV) (n=31)</b>	
≤10	10(32.3)
> 10 and ≤20	14(45.2)
> 20	7(22.6)

#### **Development Model performance (n=32)**

##### **Training model performance**

##### **Sensitivity**

no information	23(71.9)
<70%	3(9.4)
70%-90%	6(18.8)
>90%	2(6.3)

##### **Specificity**

no information	23(71.9)
<70%	1(3.1)
70%-90%	9(28.1)
>90%	1(3.1)

##### **AUC(c-stastic)**

<70%	1(3.1)
70%-80%	8(25.0)
80%-90%	19(59.4)
>90%	4(12.5)

<b>Internal validation (n=19)</b>	19(59.4)
<b>AUC(c-stastic)</b>	
<70%	2(10.5)
70%-80%	5(26.3)
80%-90%	12(63.2)
>90%	0
<b>External validation (n=11)</b>	11(34.4)
<b>AUC(c-stastic)</b>	
<70%	0
70%-80%	4(36.4)
80%-90%	6(54.5)
>90%	1(9.1)
<b>Internal and External validation</b>	6(18.8)
<b>Validation Model performance (n=2)</b>	
<b>AUC(c-stastic)</b>	
<70%	2(100)

---