## Supplementary Table S1
### Operative data and complications

| Patient | Stage-1 operation | Stage-2 operation | Time interval between stage-1 and stage-2 operation (days) | Postoperative stay (days) | Overall hospital stay (days) |
|---------|------------------|------------------|----------------------------------------------------------|---------------------------|-----------------------------|
|         | Type of ALPPS    | Operative time (min) | Blood loss (mL) | RBC transfusion (U) | Complications | Clavien-Dindo grade | | | |
| 1       | Right trisectionectomy ALPPS | 270 | 100 | 0 | Hepatic and renal insufficiency | I | Right trisectionectomy ALPPS | 310 | 2,500 | 2 | No complications | No complications | 9 | 14 | 30 |
| 2       | Right trisectionectomy ALPPS | 280 | 1,000 | 2 | No complications | No complications | 110 | 50 | 0 | No complications | No complications | 7 | 10 | 36 |
| 3       | Right hemihepatectomy ALPPS | 240 | 200 | 0 | No complications | No complications | 240 | 100 | 0 | No complications | No complications | 9 | 8 | 27 |
| 4       | Right hemihepatectomy ALPPS | 180 | 200 | 0 | Pleural effusion | I | Right hemihepatectomy ALPPS | 150 | 3,000 | 3 | Hepatic insufficiency | II | 10 | 17 | 49 |
| 5       | Right hemihepatectomy ALPPS | 210 | 300 | 0 | No complications | No complications | 100 | 100 | 0 | No complications | No complications | 16 | 14 | 33 |
| 6       | Right hemihepatectomy ALPPS | 210 | 300 | 0 | No complications | No complications | 130 | 300 | 0 | No complications | No complications | 13 | 9 | 27 |
| 7       | Right hemihepatectomy ALPPS | 180 | 100 | 0 | No complications | No complications | 80 | 50 | 0 | No complications | No complications | 7 | 11 | 24 |
| 8       | Right hemihepatectomy ALPPS | 230 | 150 | 0 | No complications | No complications | 125 | 100 | 0 | No complications | No complications | 7 | 8 | 22 |
| 9       | Right hemihepatectomy ALPPS | 240 | 200 | 0 | No complications | No complications | 290 | 600 | 2 | No complications | No complications | 12 | 20 | 41 |
| 10      | Right trisectionectomy ALPPS | 190 | 600 | 0 | Peritoneal abscess | II | Right trisectionectomy ALPPS | 150 | 500 | 0 | No complications | No complications | 12 | 29 | 47 |
| 11      | Right hemihepatectomy ALPPS | 295 | 800 | 1 | No complications | No complications | 205 | 800 | 3 | No complications | No complications | 7 | 15 | 31 |
| 12      | Right hemihepatectomy ALPPS | 280 | 2,000 | 4 | No complications | No complications | 280 | 1,000 | 0 | No complications | No complications | 14 | 10 | 29 |
| 13      | Right trisectionectomy ALPPS | 330 | 600 | 0 | No complications | No complications | 577 | 600 | 4 | No complications | No complications | 13 | 9 | 25 |
| 14      | Right trisectionectomy ALPPS | 327 | Missing data | 0 | No complications | No complications | 134 | 100 | 0 | Hepatic insufficiency | II | 11 | 28 | 58 |
| 15      | Right trisectionectomy ALPPS | Missing data | Missing data | 0 | No complications | No complications | 134 | 100 | 0 | Hepatic insufficiency | II | 11 | 28 | 58 |
| 16      | Right hemihepatectomy ALPPS | 360 | 200 | 0 | No complications | No complications | 235 | Missing data | 0 | No complications | No complications | 14 | 16 | 37 |
| 17      | Extended right hemihepatectomy ALPPS | 415 | 800 | 0 | No complications | No complications | 145 | 100 | 0 | No complications | No complications | 14 | 14 | 39 |
| 18      | Right trisectionectomy ALPPS | 270 | 300 | 0 | No complications | No complications | 210 | 200 | 0 | Thoracic and abdominal effusion | III | 12 | 10 | 31 |
| 19      | Right trisectionectomy ALPPS | 635 | 100 | 0 | No complications | No complications | 210 | 200 | 0 | Thoracic and abdominal effusion | III | 12 | 10 | 31 |
| 20      | Right hemihepatectomy ALPPS | 333 | Missing data | 0 | No complications | No complications | 134 | 100 | 0 | Hepatic insufficiency | II | 11 | 28 | 58 |
| 21      | Right trisectionectomy ALPPS | 340 | Missing data | 0 | No complications | No complications | 134 | 100 | 0 | Hepatic insufficiency | II | 11 | 28 | 58 |
| 22      | Missing data | 210 | 30 | 0 | No complications | No complications | 225 | 1,500 | 1.75 | No complications | No complications | 14 | 12 | 39 |
| 23      | Extended right hemihepatectomy ALPPS | 280 | 100 | 0 | No complications | No complications | 230 | 300 | 0 | No complications | No complications | 17 | 9 | 30 |

RBC, red blood cell; ALPPS, associating liver partition and portal vein ligation for staged hepatectomy.
| Patient | Time interval (days) | SLV (mL) | Pre-stage-1 operation | Post-stage-1 operation | FLR volume increase | KGR |
|---------|---------------------|----------|-----------------------|-----------------------|---------------------|-----|
|         |                     |          | FLR volume (mL)       | FLR/SLV               | FLR volume (mL)     | FLR/SLV | FLR volume increase | Absolute KGR (mL/day) | RKGR (%)/day |
| 1       | 6                   | 1,170    | 330                   | 0.28                  | 560                 | 0.48   | 230                  | 69.70               | 38.33        | 11.62        |
| 2       | 7                   | 1,060    | 310                   | 0.29                  | 480                 | 0.45   | 170                  | 54.80               | 24.29        | 7.83         |
| 3       | 7                   | 1,140    | 400                   | 0.35                  | 600                 | 0.53   | 200                  | 50.00               | 28.57        | 7.14         |
| 4       | 7                   | 1,142    | 316                   | 0.28                  | 520                 | 0.46   | 204                  | 64.60               | 29.14        | 9.23         |
| 5       | 13                  | 1,241    | 400                   | 0.32                  | 493                 | 0.40   | 93                   | 23.30               | 7.15         | 1.79         |
| 6       | 9                   | 1,240    | 287                   | 0.23                  | 463                 | 0.37   | 176                  | 61.30               | 19.56        | 6.81         |
| 7       | 7                   | 1,142    | 254                   | 0.22                  | 495                 | 0.43   | 241                  | 94.90               | 34.43        | 13.56        |
| 8       | 7                   | 1,312    | 380                   | 0.29                  | 706                 | 0.54   | 326                  | 85.80               | 46.57        | 12.26        |
| 9       | 9                   | 1,272    | 329                   | 0.26                  | 575                 | 0.45   | 246                  | 74.80               | 27.33        | 8.31         |
| 10      | 8                   | 1,238    | 272                   | 0.22                  | 383                 | 0.31   | 111                  | 40.81               | 13.88        | 5.10         |
| 11      | 7                   | 1,276    | 358                   | 0.28                  | 570                 | 0.45   | 212                  | 59.20               | 30.29        | 8.46         |
| 12      | 8                   | 1,324    | 314                   | 0.24                  | 555                 | 0.42   | 241                  | 76.80               | 30.13        | 9.60         |
| 13      | 13                  | 1,328    | 424                   | 0.32                  | 685                 | 0.52   | 261                  | 61.56               | 20.08        | 4.74         |
| 14      | 16                  | 1,201    | 257                   | 0.21                  | 302                 | 0.25   | 45                   | 17.70               | 2.83         | 1.11         |
| 15      | 7                   | 1,200    | 350                   | 0.29                  | 459                 | 0.38   | 109                  | 31.10               | 15.57        | 4.44         |
| 16      | 7                   | 1,335    | 366                   | 0.27                  | 544                 | 0.41   | 178                  | 48.60               | 25.43        | 6.94         |
| 17      | 10                  | 1,241    | 290                   | 0.23                  | 336                 | 0.27   | 46                   | 15.90               | 4.60         | 1.59         |
| 18      | 25                  | 1,323    | 207                   | 0.16                  | 305                 | 0.23   | 98                   | 47.30               | 3.92         | 1.89         |
| 19      | 7                   | 1,313    | 510                   | 0.39                  | 687                 | 0.52   | 177                  | 34.80               | 25.29        | 4.97         |
| 20      | 10                  | 1,272    | 348                   | 0.27                  | 483                 | 0.38   | 135                  | 38.80               | 13.50        | 3.88         |
| 21      | 9                   | 1,216    | 418                   | 0.34                  | 488                 | 0.40   | 70                   | 16.75               | 7.78         | 1.86         |
| 22      | 19                  | 1,270    | 226                   | 0.18                  | 383                 | 0.30   | 157                  | 69.50               | 8.26         | 3.66         |
| 23      | 12                  | 1,348    | 379                   | 0.28                  | 452                 | 0.34   | 73                   | 19.26               | 6.08         | 1.61         |

FLR, future liver remnant; SLV, standard liver volume; KGR, kinetic growth rate; RKGR, relative KGR.
Figure S1 ROC curve analysis for determination of the cut-off value for RKGR in patients with HBV-related HCC. ROC, receiver operating characteristic; RKGR, relative kinetic growth rate; HBV, hepatitis B virus; HCC, hepatocellular carcinoma.

Table S3 Comparisons of baseline characteristics of HBV-related HCC patients receiving ALPPS and TACE before and after PSM

| Characteristics | Before PSM (original cohort) | After PSM (matched cohort) | P value | Before PSM (original cohort) | After PSM (matched cohort) | P value |
|-----------------|-----------------------------|-----------------------------|---------|-----------------------------|-----------------------------|---------|
| Age (y)         | 38.5 [32–59]                | 50 [19–74]                  | 0.004   | 38.5 [32–59]                | 41 [26–71]                  | 0.782   |
| PVTT            |                             |                             |         |                             |                             |         |
| Yes             | 5                           | 55                          | 0.000   | 5                           | 5                           | 1       |
| No              | 13                          | 21                          |         | 9                           | 9                           |         |
| Tumor number    |                             |                             |         |                             |                             |         |
| 1               | 10                          | 20                          | 0.017   | 7                           | 7                           | 1       |
| >1              | 8                           | 56                          |         | 7                           | 7                           |         |
| Largest tumor (cm) | 9.6 (2.3–20.0)            | 8.4 (5.5–16.8)             | 0.554   | 8.8 (2.3–16.6)             | 8.15 (5.5–16.8)            | 0.872   |
| Ascites         |                             |                             |         |                             |                             |         |
| Yes             | 3                           | 14                          | 1       | 3                           | 2                           | 1       |
| No              | 15                          | 62                          |         | 11                          | 12                          |         |
| TBIL (μmol/L)   | 12.6 (7.0–25.7)             | 14.85 (4.1–42.3)            | 0.265   | 15.1 (8.0–23.6)             | 13.45 (4.1–42.3)            | 0.765   |
| AFP (μg/L)      | 1,933.5 (10.8–139,031.3)    | 675.5 (5.0–1,277,746.0)     | 0.190   | 2,306.0 (45.2–139,031.3)    | 659 (5–118,900)             | 0.060   |
| ALT (U/L)       | 37.0 (9.0–63.0)             | 28.5 (9.0–157.0)            | 0.453   | 38.5 (32.0–59.0)            | 31.5 (19.0–157.0)           | 0.679   |
| AST (U/L)       | 33.5 (17.0–320.0)           | 25.0 (4.0–218.0)            | 0.016   | 37.0 (17.0–320.0)           | 34.5 (10.0–218.0)           | 0.408   |

HBV, hepatitis B virus; HCC, hepatocellular carcinoma; ALPPS, associating liver partition and portal vein ligation for staged hepatectomy; TACE, transarterial chemoembolization; PSM, propensity score matching; PVTT, portal vein tumor thrombus; TBIL, total bilirubin; AFP, alpha-fetoprotein; ALT, alanine aminotransferase; AST, aspartate aminotransferase.
| Characteristics | Before PSM (original cohort) | After PSM (matched cohort) |
|-----------------|-----------------------------|---------------------------|
|                 | ALPPS (n=12) | TACE (n=74)  | P value | ALPPS (n=10) | TACE (n=10) | P value |
| Age (y)         |             |               |         |             |               |         |
|                  | 38 [32–55] | 50 [19–74]   | 0.002   | 38.5 [32–55] | 43.5 [19–60] | 0.364   |
| PVTT            | Yes          |               |         | Yes          |               |         |
|                  | 5            | 55            | 0.022   | 4            | 4             | 1       |
|                  | No           | 7             | 19      | 6            | 6             | 6       |
| Tumor number    | 1            | 4             | 18      | 3            | 5             | 0.650   |
|                  | >1           | 8             | 56      | 7            | 5             | 5       |
| Largest tumor (cm) | 7.25 (2.3–16.6) | 8.6 (5.5–16.8) | 0.440 | 6.05 (2.3–16.6) | 8.95 (5.6–12.3) | 0.406 |
| Ascites         | Yes          | 3             | 14      | 2            | 5             | 0.350   |
|                  | No           | 9             | 60      | 8            | 5             | 5       |
| TBIL (μmol/L)   | 12.6 (8.0–23.6) | 14.85 (4.1–35.0) | 0.270 | 12.55 (9.2–23.6) | 19.9 (6.5–30.9) | 0.165   |
| AFP (μg/L)      | 1,933.5 (10.8–139,031.3) | 830.0 (2.0–1,277,746.0) | 0.404 | 1,933.5 (10.8–17,069.0) | 13,745.0 (20–999,999.0) | 0.096   |
| ALT (U/L)       | 38.5 (9.0–63.0) | 28.5 (9.0–109.0) | 0.609 | 38.5 (9.0–63.0) | 47.5 (26.0–109.0) | 0.307   |
| AST (U/L)       | 37.5 (17.0–320.0) | 25.0 (4.0–218.0) | 0.032 | 37.5 (17.0–172.0) | 56.0 (10.0–218.0) | 0.345   |

BCLC, Barcelona Clinic Liver Cancer; HBV, hepatitis B virus; HCC, hepatocellular carcinoma; ALPPS, associating liver partition and portal vein ligation for staged hepatectomy; TACE, transarterial chemoembolization; PVTT, portal vein tumor thrombus; TBIL, total bilirubin; AFP, alpha-fetoprotein; ALT, alanine aminotransferase; AST, aspartate aminotransferase.
Table S5 Preoperative patient characteristics and clinical outcomes

| Patient | Age (y) | Gender | Etiology | Cancer diagnosis | Stage-2 ALPPS | Number of lesions | Largest tumor (cm) | PVTT | LNM | MVI | Ascites | ALBI grading | BCLC staging | Recurrence site | Months to recurrence | Months to death |
|---------|---------|--------|----------|------------------|---------------|------------------|-------------------|------|-----|-----|--------|--------------|-------------|----------------|------------------|----------------|
| 1       | 37      | M      | HBV      | HCC              | Yes           | 1                | 13.0              | Yes  | Yes | No  | Yes    | 1            | C           | Liver, lung     | 1                | 6              |
| 2       | 49      | F      | HBV      | HCC              | Yes           | Multiple         | 3.0               | No   | No  | Yes | No     | 2            | B           | Liver          | 6                | 19             |
| 3       | 37      | M      | HBV      | HCC              | Yes           | Multiple         | 5.7               | No   | No  | No  | Yes    | 1            | B           | Lung           | 6                | 8              |
| 4       | 59      | M      | HBV      | HCC              | Yes           | 1                | 15.8              | No   | No  | Yes | No     | 2            | A           | Lung           | 53               | 54             |
| 5       | 55      | M      | HBV      | HCC              | Yes           | 1                | 16.6              | Yes  | No  | No  | No     | 1            | C           | Lung, right atrium | 6                | 26             |
| 6       | 38      | M      | HBV      | HCC              | Yes           | Multiple         | 8.2               | No   | No  | No  | No     | 2            | A           | Liver          | 60               | Alive          |
| 7       | 33      | M      | HBV      | HCC              | Yes           | 1                | 10.3              | No   | No  | No  | No     | 2            | A           | Liver, enterocoelia | 3                | 7              |
| 8       | 51      | M      | HBV      | HCC              | Yes           | 1                | 20.0              | No   | No  | No  | No     | 2            | A           | Liver, lung     | 60               | Alive          |
| 9       | 38      | M      | HBV      | HCC              | Yes           | Multiple         | 6.3               | Yes  | No  | Yes | Yes    | 1            | C           | –              | –                | 5              |
| 10      | 66      | M      | HBV      | HCC              | Yes           | Multiple         | 9.3               | No   | Yes | No  | No     | 2            | C           | Liver, Retroperitoneum | 1                | 2              |
| 11      | 37      | M      | HBV      | HCC              | Yes           | 1                | 13.0              | Yes  | No  | Yes | Yes    | 2            | C           | Liver, enterocoelia, retroperitoneum | 1                | 4              |
| 12      | 32      | M      | HBV      | HCC              | Yes           | Multiple         | 9.9               | Yes  | Yes | No  | No     | 1            | C           | Retroperitoneum | 1                | 8              |
| 13      | 40      | M      | HBV      | HCC              | Yes           | Multiple         | 2.3               | Yes  | No  | No  | No     | 1            | C           | Lung           | 4                | 24             |
| 14      | 51      | M      | HBV      | HCC              | No            | Multiple         | 13.7              | No   | No  | No  | No     | 2            | B           | –              | –                | 3              |
| 15      | 32      | M      | HBV      | HCC              | Yes           | 1                | 10.9              | No   | No  | Yes | No     | 1            | A           | Lung           | 12               | 25             |
| 16      | 44      | M      | HBV      | HCC              | Yes           | 1                | 14.7              | No   | No  | No  | No     | 1            | A           | –              | –                | 2              |
| 17      | 39      | M      | HBV      | HCC              | Yes           | Multiple         | 5.8               | No   | Yes | Yes | No     | 1            | C           | Liver, thorax   | 2                | 7              |
| 18      | 36      | M      | HBV      | HCC              | No            | Multiple         | 26                | No   | No  | No  | No     | 2            | B           | –              | –                | Alive          |
| 19      | 38      | M      | HBV      | HCC              | Yes           | 1                | 13.5              | No   | Yes | No  | No     | 1            | C           | Liver, lung     | 5                | Alive          |
| 20      | 41      | M      | HBV      | HCC              | Yes           | Multiple         | 5.5               | No   | No  | No  | No     | 1            | B           | No recurrence   | Na               | Alive          |
| 21      | 51      | M      | HBV      | HCC              | Yes           | 1                | 8.3               | No   | No  | No  | No     | 1            | A           | No recurrence   | Na               | Alive          |
| 22      | 48      | M      | HBV      | HCC              | No            | 1                | 5.1               | Yes  | No  | No  | No     | 2            | C           | No recurrence   | Na               | Alive          |
| 23      | 50      | M      | HBV      | HCC              | Yes           | 1                | 9.2               | No   | No  | No  | No     | 2            | A           | No recurrence   | Na               | Alive          |

Missing data occurred because family members of patients refused to answer. ALPPS, associating liver partition and portal vein ligation for staged hepatectomy; PVTT, portal vein tumor thrombus; MVI, microvascular invasion; LNM, lymph node metastasis; ALBI, albumin-bilirubin; BCLC, Barcelona Clinic Liver Cancer; M, male; F, female; HBV, hepatitis B virus; HCC, hepatocellular carcinoma.