**Supplementary Tables**

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| **Supplementary Table 1.** Univariable and multivariable analyses for overall survival. |
|  | **Univariable analysis** | **Multivariable analysis** |
| **Body composition variables**  | **HR** | **95%CI** | ***P*-value** | **HR** | **95%CI** | ***P*-value** |
| Low SMM  | 1.20 | 0.94-1.54 | 0.417 |  |  |  |
| Low muscle density | 0.97 | 0.75-1.24 | 0.782 |  |  |  |
| Low TATI\* | 1.42 | 1.11-1.82 | **0.006** | 1.28 | 0.98-1.66 | 0.072 |
| Low SATI | 1.20 | 0.94-1.53 | 0.154 |  |  |  |
| Low VATI | 1.19 | 0.93-1.52 | 0.172 |  |  |  |
| Low visceral fat percentage | 0.97 | 0.76-1.24 | 0.808 |  |  |  |
| BMI ≥25.0 kg/m2 (Ref: <25.0) | 0.82 | 0.64-1.05 | 0.118 |  |  |  |
| Low SMM + Low TATI\* | 1.77 | 1.33-2.35 | **<0.001** | - | - | **-** |
| **Other baseline variables** |  |  |  |  |  |  |
| Female Sex  | 1.26 | 0.93-1.71 | 0.131 |  |  |  |
| Age >65 years | 0.87 | 0.68-1.12 | 0.277 |  |  |  |
| HBV  | 1.20 | 0.86-1.68 | 0.294 |  |  |  |
| HCV  | 0.97 | 0.68-1.37 | 0.844 |  |  |  |
| Alcohol  | 1.00 | 0.77-1.29 | 0.967 |  |  |  |
| Child-Pugh B (Ref: Child-Pugh A) | 2.38 | 1.62-3.49 | **<0.001** | 2.31 | 1.56-3.42 | **<0.001** |
| ECOG Performance status (Ref: ECOG PS 0) |  |  | **0.002** |  |  | **0.041** |
| ECOG PS 1 | 1.22 | 0.93-1.59 |  | 1.11 | 0.84-1.46 |  |
| ECOG PS 2 | 2.40 | 1.48-3.89 |  | 1.94 | 1.16-3.25 |  |
| BCLC stage C (Ref: B)  | 1.21 | 0.91-1.59 | 0.187 |  |  |  |
| Number of nodes (Ref:1 node)  |  |  | 0.152 |  |  |  |
| 2-3 nodes | 0.87 | 0.61-1.24 |  |  |  |  |
| >3 nodes / diffuse infiltrating | 1.15 | 0.83-1.60 |  |  |  |  |
| Tumor size >70 mm | 1.54 | 1.20-2.00 | **0.001** | 1.35 | 1.03-1.77 | **0.028** |
| Macroscopic vascular invasion | 1.44 | 1.12-1.85 | **0.005** | 1.23 | 0.94-1.61 | 0.127 |
| Presence of extrahepatic metastases (Ref: none) |  |  | 0.792 |  |  |  |
| Lymph nodes | 1.13 | 0.83-1.54 |  |  |  |  |
| Other organ | 1.08 | 0.81-1.45 |  |  |  |  |
| High NLR\*\*  | 1.70 | 1.12-2.58 | **0.012** | - | - | **-** |
| AFP ≥400  | 1.93 | 1.49-2.51 | **<0.001** | 1.77 | 1.34-2.33 | **<0.001** |
| Received previous treatments | 0.66 | 0.51-0.85 | **0.001** | 0.81 | 1.34-2.33 | 0.147 |
| \*Not included in multivariable analysis due to collinearity with Low TATI (model shown in Table 2). \*\*Not included in multivariable analysis due to large numbers of missing values (n=179). Abbreviations: AFP, alpha-fetoprotein; BCLC, Barcelona Clinic Liver Cancer classification; BMI, Body mass Index; ECOG PS, Eastern Cooperative Oncology Group performance status; HBV, hepatitis B virus; HCV, Hepatitis C virus; TATI, Total adipose tissue index;  |

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| **Supplementary Table 2**. Univariable and multivariable analyses for time to progression.  |
|  | **Univariable analysis** | **Multivariable analysis** |
| **Body composition variables**  | **HR** | **95%CI** | ***P*-value** | **HR** | **95%CI** | ***P*-value** |
| Low SMM\*  | 1.33 | 1.02-1.74 | **0.033** | - | - | **-** |
| Low muscle density  | 1.01 | 0.77-1.32 | 0.970 |  |  |  |
| Low TATI | 1.24 | 0.95-1.62 | 0.107 |  |  |  |
| Low SATI | 1.07 | 0.82-1.39 | 0.608 |  |  |  |
| Low VATI | 1.21 | 0.93-1.58 | 0.149 |  |  |  |
| Low visceral fat percentage | 1.14 | 0.87-1.48 | 0.325 |  |  |  |
| BMI ≥25.0 kg/m2 (Ref: <25.0) | 0.92 | 0.70-1.20 | 0.543 |  |  |  |
| Low SMM + low TATI | 1.57 | 1.15-2.14 | **0.005** | 1.36 | 0.95-1.93 | 0.091 |
| **Other baseline variables** |  |  |  |  |  |  |
| Female Sex  | 1.46 | 1.05-2.03 | **0.025** | 1.33 | 0.91-1.92 | 0.137 |
| Age >65 years | 0.82 | 0.63-1.07 | 0.146 |  |  |  |
| HBV  | 1.45 | 1.02-2.05 | **0.037** | 1.31 | 0.91-1.90 | 0.152 |
| HCV  | 0.91 | 0.63-1.32 | 0.621 |  |  |  |
| Alcohol  | 0.84 | 0.64-1.11 | 0.224 |  |  |  |
| Child-Pugh B (Ref= Child-Pugh A) | 1.59 | 1.04-2.43 | **0.031** | 1.52 | 0.98-2.33 | 0.065 |
| ECOG Performance status (Ref = ECOG PS 0) |  |  | **0.027** |  |  | 0.142 |
| ECOG PS 1 | 1.07 | 0.80-1.42 |  | 0.93 | 0.69-1.26 |  |
| ECOG PS 2 | 1.96 | 1.19-3.22 |  | 1.57 | 0.92-2.65 |  |
| BCLC stage C (reference: B)\* | 1.50 | 1.10-2.06 | **0.012** | - | - | - |
| Number of nodes (ref=1 node)  |  |  | 0.408 |  |  |  |
| 2-3 nodes | 1.13 | 0.77-1.66 |  |  |  |  |
| >3 nodes / diffuse infiltrating | 1.27 | 0.88-1.83 |  |  |  |  |
| Tumor size >70 mm | 1.35 | 1.04-1.76 | **0.025** | 1.13 | 0.84-1.52 | 0.437 |
| Macroscopic vascular invasion | 1.46 | 1.12-1.91 | **0.005** | 1.39 | 1.05-1.85 | **0.020** |
| Presence of extrahepatic metastases (Ref = none) |  |  | 0.208 |  |  |  |
| Lymph nodes | 1.28 | 0.93-1.78 |  |  |  |  |
| Other organ | 1.27 | 0.93-1.74 |  |  |  |  |
| Received previous treatments | 0.81 | 0.62-1.05 | 0.114 |  |  |  |
| High NLR\*\*\* | 1.81 | 1.16-2.83 | **0.009** | - | - | **-** |
| AFP ≥400  | 1.74 | 1.32-2.28 | **<0.001** | 1.76 | 1.32-2.34 | **<0.001** |
| \* Not included in multivariable analysis due to collinearity with Low SMM (model shown in Table 3).\*\* Not included in multivariable analysis to reduce overlapping variance (multicollinearity).\*\*\*Not included in multivariable analysis due to large numbers of missing values n=179. Abbreviations: AFP, alpha-fetoprotein; BCLC, Barcelona Clinic Liver Cancer classification; BMI, Body mass Index; ECOG PS, Eastern Cooperative Oncology Group performance status; HBV, hepatitis B virus; HCV, Hepatitis C virus; SATI, Subcutaneous adipose tissue index; SMM, Skeletal muscle mass; TATI, Total adipose tissue index; VATI, Visceral adipose tissue index. |

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| **Supplementary Table 3.** Treatment details of HCC patients treated with sorafenib |
| **Variable**  | **All patients*N*=278**  |
| Duration of treatment – weeks (IQR) | 14 (14-34) |
| Total tolerated daily dose – mg (Range) | 400 (200-1200) |
| Full dose tolerated – no. (%) | 84 (30) |
| No. of treatment interruptions – no. (%) |  |
| None / 1 / 2 / ≥3 | 180/69/19/10 (65/25/7/4) |
| Toxicity and treatment emergent adverse events | **Any grade** | **Grade 3/4** |
| Overall – no. (%) | 221 (80) | 150 (54) |
| Arterial Hypertension – no. (%) | 17 (6) | 6 (2) |
| Asthenia – no. (%) | 86 (31) | 18 (7) |
| Dermatological – no. (%) | 100 (36) | 35 (13) |
| Gastrointestinal – no. (%) | 110 (40) | 33 (12) |
| Hematological – no. (%) | 25 (9) | 8 (3) |
| Liver dysfunction – no. (%) | 93 (34) | 75 (27) |
| Other – no. (%) | 35 (13) | 18 (7) |
| Best radiological response (RECIST 1.1) – no. (%) |  |
| Complete response | 0 (0) |
| Partial response | 27 (10) |
| Stable disease | 102 (37) |
| Progressive disease | 114 (41) |
| Not evaluable | 35 (13) |
| Reason termination – no. (%) |  |
| Ongoing | 5 (2) |
| Progression | 143 (51) |
| Toxicity | 38 (14) |
| Combined Toxicity/Progression | 66 (24) |
| Other/Unknown | 26 (9) |
| Abbreviations: IQR, interquartile range; RECIST, Response Evaluation Criteria in Solid Tumors.  |