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| Supplementary Table 1. Univariate analysis on overall survival  |
| Characteristic | Crude HR of death (95% CI) | P-value |
| Age, 5-yearly increase | 0.95 (0.89-1.10) | 0.180  |
| Sex |  |  |
| Female | 1.00  |  |
| Male | 1.18 (0.77-1.81)  | 0.438  |
| HBV infection |  |  |
| Non-B, Non-C | 1.00  |  |
| HBV | 1.56 (0.75-3.27)  | 0.234  |
| HCV infection |  |  |
| Non-B, Non-C | 1.00  |  |
| HCV | 1.39 (0.65-2.97)  | 0.392  |
| Viral hepatitis |  |  |
| Non-B, Non-C | 1.00  |  |
| Any of HBV and HCV | 1.48 (0.72-3.05)  | 0.282  |
| ECOG performance status |  |  |
| 0 | 1.00  |  |
| 1 | 1.20 (0.78-1.86)  | 0.412  |
| 2 | 1.62 (0.88-3.01)  | 0.123  |
| Prior surgery |  |  |
| No | 1.00 |  |
| Yes | 0.84 (0.50-1.41) | 0.509 |
| Prior TACE |  |  |
|  No | 1.00 |  |
|  Yes | 1.21 (0.82-1.79) | 0.336 |
| Prior use of sorafenib to SBRT |  |  |
| No | 1.00  |  |
| Yes | 0.91 (0.40-2.08)  | 0.828  |
| Combined use of sorafenib with SBRT |  |
| No | 1.00  |  |
| Yes | 1.15 (0.69-1.90)  | 0.593  |
| Combined TACE |  |  |
| No | 1.00 |  |
| Yes | 1.06 (0.65-1.73) | 0.831 |
| Number of tumor |  |  |
| ≤3 | 1.00  |  |
| >3 | 3.47 (2.05-5.90)  | <0.001 |
| Largest tumor size (cm) |  |  |
| ≤5 | 1.00  |  |
| >5 | 2.13 (1.45-3.12)  | <0.001  |
| Pre-SBRT AFP (ng/ml) |  |  |
| ≤20  | 1.00  |  |
| >20 | 2.07 (1.34-3.22)  | 0.001  |
| Macrovascular invasion |  |  |
| No | 1.00  |  |
| Yes | 3.08 (2.10-4.52)  | <0.001 |
| Child-Turcotte-Pugh class |  |  |
| A | 1.00  |  |
| B | 2.87 (1.83-4.50)  | <0.001 |
| N stage |  |  |
| 0 | 1.00  |  |
| 1 | 1.60 (0.91-2.80)  | 0.103  |
| BED (Gy) |  |  |
| ≤70 | 1.00  |  |
| >70 | 0.63 (0.40-0.99)  | 0.046  |
| BED (10 Gy increase) | 0.98 (0.97-0.99) | 0.002 |
| *Abbreviations:* HBV, hepatitis B virus; HCV, hepatitis C virus; ECOG, Eastern Cooperative Oncology Group; SBRT, stereotactic body radiotherapy; TACE, transarterial chemoembolizatin; AFP, alpha-fetoprotein; BED, biological effective dose; Gy, gray; HR, hazard ratio; CI, confidence interval  |

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| Supplementary Table 2. Treatment outcome of patients with macrovascular invasion. |
| Median survival (95% CI), month |  |
|  All patients | 8.5 (6.3-10.6) |
|  Child-Turcotte-Pugh class A | 10.1 (7.7-12.5) |
|  Child-Turcotte-Pugh class B | 3.7 (2.5-4.9) |
| Median progression-free survival (95% CI), month | 4.6 (3.1-6.1) |
| 1-year in-field failure-free rate (%)  | 71.3 |
| 2-year in-field failure-free rate (%) | 67.9 |
| Out-field intrahepatic progression, patients (%) | 70 (56.4) |
| Extrahepatic progression, patients (%) | 28 (22.6) |
| In-field progression, patients (%) | 26 (20.9) |
| *Abbreviations*: CI, confidence interval  |

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| Supplementary Table 3. Prognostic factors of patients with macrovascular invasion. |
|  | Univariable | Multivariable |
| Characteristic | HR (95% CI) | p | HR (95% CI) | p |
| Age (year) | 1.00 (0.98-1.013) | 0.733 |  |  |
| Sex male vs. female | 0.66 (0.41-1.08) | 0.099 |  |  |
| HBV infection HBV vs. Non-B, Non-C | 1.21 (0.59-2.45) | 0.604 |  |  |
| HCV infection HCV vs. Non-B, Non-C | 1.22 (0.58-2.06) | 0.597 |  |  |
| Viral hepatitis HBV and/or HCV vs. Non-B, Non-C | 1.19 (0.40-3.55) | 0.762 |  |  |
| ECOG performance status 1-2 vs. 0 | 1.62 (1.19-2.20) | 0.002 | 1.97 (1.25-3.10) | 0.003 |
| Prior use of sorafenib to SBRT yes vs no | 0.87 (0.43-1.75) | 0.688 |  |  |
| Combined use of sorafenib with SBRT yes vs. no | 1.04 (0.85-1.27) | 0.708 |  |  |
| Number of tumor >3 vs. ≤3 | 2.74 (1.67-4.52) | < .001 | 2.65 (1.54-4.55) | <.001 |
| Largest tumor size (cm) >5 vs. ≤5 | 1.56 (1.03-2.35) | 0.034 | 1.14 (0.73-1.77) | 0.575 |
| Pre-SBRT AFP (ng/ml) >20 vs. ≤20 | 0.94 (0.57-1.53) | 0.787 |  |  |
| Child-Turcotte-Pugh class B vs A | 2.04 (1.31-3.19) | 0.002 | 1.66 (1.06-2.62) | 0.028 |
| N stage yes vs. no | 1.35 (0.73-2.48) | 0.334 |  |  |
| BED (Gy) >70 vs. ≤70 | 0.75 (0.47-1.21) | 0.237 |  |  |
| *Abbreviations*: HBV, hepatitis B virus; HCV, hepatitis C virus; ECOG, Eastern Cooperative Oncology Group; SBRT, stereotactic body radiotherapy; AFP, alpha-fetoprotein; BED, biological effective dose; Gy, gray; HR, hazard ratio; CI, confidence interval |