**Supplementary Table S3. Cox proportional hazards regression models with inverse probability of treatment weighting using propensity score.**

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| --- | --- | --- | --- |
| **PFS** | **HR** | **95% CI** | **P-value** |
| No probiotic CBT (Reference) |  |  |  |
| Probiotic CBT | 0.37 | 0.21-0.68 | P=0.001 |
| **OS** | **HR** | **95% CI** | **P-value** |
| No probiotic CBT (Reference) |  |  |  |
| Probiotic CBT | 0.20 | 0.08-0.50 | P < 0.001 |

Cox proportional hazards regression models with inverse probability of treatment weighting (IPTW) and robust standard errors were used to obtain hazard ratio (HR). The propensity score was calculated using the logistic regression models, in which age, sex, body weight, ECOG performance status, histology, smoking history, initial stage, ICI therapy line, ICI monotherapy/combination therapy, PD-L1 status, and diarrhea during ICI therapy were used as background factors. The diarrhea during ICI therapy includes 5 patients who had endoscopically confirmed immune-related enterocolitis (**Supplementary Table S1**). Each factor was categorized as shown in the **Table 1 and Supplementary Table S1**. Abbreviations: CI, Confidence interval; CBT, *Clostridium butyricum* therapy; ICI, Immune checkpoint inhibitor; PD-L1, Programmed cell death ligand1