



**Supplementary figure 1**: (A) Correlation between LMR and NLR, (B) LMR and PLR, (C) LMR and PNI.

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| **Supplementary table 1**. Univariate and multivariate analysis in 165 patients with resected pancreatic head carcinoma (NLR). |
|  |  | No. of patients | Survival (%) | *p* | Multivariate |
| Variable | 1-year | 2-year | (Log-rank test) | Hazard ratio (95% CI) | *p* |
| NLR |  |  |  | *0.046*  |  | *0.020* |
|  | < 3.2 | 117 | 66.1 | 39.8 |  | *1.00* |  |
|  | ≥ 3.2 | 48 | 51.5 | 32.3 |  | *1.64 (1.08-2.49)* |  |
| CEA (ng/dl) |  |  |  | *0.120*  |  |  |
|  | ≤ 5.0 | 121 | 58.6 | 34.3 |  |  |  |
|  | > 5.0 | 40 | 71.1 | 43.3 |  |  |  |
| CA19-9 (U/ml) |  |  |  | *0.057*  |  |  |
|  | < 37 | 40 | 74.7 | 46.1 |  |  |  |
|  | ≥ 37 | 120 | 56.7 | 32.7 |  |  |  |
| Portal vein resection |  |  |  | *<0.001* |  |  |
|  | None | 61 | 80.4 | 56.7 |  |  |  |
|  | Resected | 104 | 51.3 | 26.0 |  |  |  |
| Size (cm) |  |  |  | *0.069*  |  |  |
|  | ≤ 2.0 | 19 | 94.4 | 63.8 |  |  |  |
|  | > 2.0 | 146 | 57.6 | 33.9 |  |  |  |
| Lymphatic invasion |  |  |  | *0.001* |  | *0.015* |
|  | Absent | 14 | 92.3 | 92.3 |  | *1.00* |  |
|  | Present | 151 | 59.1 | 31.9 |  | *3.23 (1.25-8.32)* |  |
| Venous invasion |  |  |  | *<0.001* |  | *0.011* |
|  | Absent | 69 | 76.1 | 54.6 |  | *1.00* |  |
|  | Present | 96 | 51.0  | 23.3 |  | *1.78 (1.14-2.79)* |  |
| Perineural invasion |  |  |  | *0.001* |  |  |
|  | Absent | 14 | 100.0 | 90.0 |  |  |  |
|  | Present | 151 | 58.4 | 32.9 |  |  |  |
| Anterior serosal infiltration |  |  |  | *0.003* |  |  |
|  | Absent | 85 | 70.7 | 45.1 |  |  |  |
|  | Present | 80 | 52.0 | 28.3 |  |  |  |
| Retroperitoneal invasion |  |  |  | *<0.001* |  |  |
|  | Absent | 52 | 78.4 | 61.3 |  |  |  |
|  | Present | 113 | 54.6 | 26.5 |  |  |  |
| Bile duct invasion |  |  |  | *0.135* |  |  |
|  | Absent | 60 | 68.6 | 44.7 |  |  |  |
|  | Present | 105 | 58.2 | 33.2 |  |  |  |
| Duodenal invasion |  |  |  | *0.428* |  |  |
|  | Absent | 80 | 63.5 | 42.6 |  |  |  |
|  | Present | 85 | 60.4 | 32.2 |  |  |  |
| Plexus invasion |  |  |  | *<0.001* |  |  |
|  | Absent | 104 | 70.4 | 47.5 |  |  |  |
|  | Present | 61 | 48.4 | 20.5 |  |  |  |
| PV/SMV invasion |  |  |  | *<0.001* |  |  |
|  | Absent | 106 | 72.2 | 45.6 |  |  |  |
|  | Present | 59 | 44.3 | 23.2 |  |  |  |
| Lymph node metastasis |  |  |  | *0.002*  |  |  |
|  | Absent | 54 | 72.5 | 53.9 |  |  |  |
|  | Present | 111 | 56.8 | 29.4 |  |  |  |
| Surgical margin |  |  |  | *<0.001* |  | *<0.001* |
|  | Negative | 130 | 73.5  | 45.5 |  | *1.00* |  |
| 　 | Positive | 35 | 19.5 | 7.8 |  | *3.01 (1.90-4.77)* |  |
| *Expressed as N (%) or median (range), NLR: neutrophil-to-lymphocyte ratio, PV: portal vein, SMV: superior mesenteric vein* |

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| **Supplementary table 2**. Univariate and multivariate analysis in 165 patients with resected pancreatic head carcinoma (PLR). |
|  |  | No. of patients | Survival (%) | *p* | Multivariate |
| Variable | 1-year | 2-year | (Log-rank test) | Hazard ratio (95% CI) | *p* |
| PLR |  |  |  | *0.014*  |  | *<0.001* |
|  | < 250 | 132 | 65.1 | 39.1 |  | *1.00* |  |
|  | ≥ 250 | 33 | 49.0 | 30.8 |  | *2.33 (1.48-3.66)* |  |
| CEA (ng/dl) |  |  |  | *0.120*  |  |  |
|  | ≤ 5.0 | 121 | 58.6 | 34.3 |  |  |  |
|  | > 5.0 | 40 | 71.1 | 43.3 |  |  |  |
| CA19-9 (U/ml) |  |  |  | *0.057*  |  |  |
|  | < 37 | 40 | 74.7 | 46.1 |  |  |  |
|  | ≥ 37 | 120 | 56.7 | 32.7 |  |  |  |
| Portal vein resection |  |  |  | *<0.001* |  |  |
|  | None | 61 | 80.4 | 56.7 |  |  |  |
|  | Resected | 104 | 51.3 | 26.0 |  |  |  |
| Size (cm) |  |  |  | *0.069*  |  |  |
|  | ≤ 2.0 | 19 | 94.4 | 63.8 |  |  |  |
|  | > 2.0 | 146 | 57.6 | 33.9 |  |  |  |
| Lymphatic invasion |  |  |  | *0.001* |  | *0.019* |
|  | Absent | 14 | 92.3 | 92.3 |  | *1.00* |  |
|  | Present | 151 | 59.1 | 31.9 |  | *3.08 (1.21-7.85)* |  |
| Venous invasion |  |  |  | *<0.001* |  | *0.008* |
|  | Absent | 69 | 76.1 | 54.6 |  | *1.00* |  |
|  | Present | 96 | 51.0  | 23.3 |  | *1.82 (1.17-2.84)* |  |
| Perineural invasion |  |  |  | *0.001* |  |  |
|  | Absent | 14 | 100.0 | 90.0 |  |  |  |
|  | Present | 151 | 58.4 | 32.9 |  |  |  |
| Anterior serosal infiltration |  |  |  | *0.003* |  |  |
|  | Absent | 85 | 70.7 | 45.1 |  |  |  |
|  | Present | 80 | 52.0 | 28.3 |  |  |  |
| Retroperitoneal invasion |  |  |  | *<0.001* |  |  |
|  | Absent | 52 | 78.4 | 61.3 |  |  |  |
|  | Present | 113 | 54.6 | 26.5 |  |  |  |
| Bile duct invasion |  |  |  | *0.135* |  |  |
|  | Absent | 60 | 68.6 | 44.7 |  |  |  |
|  | Present | 105 | 58.2 | 33.2 |  |  |  |
| Duodenal invasion |  |  |  | *0.428* |  |  |
|  | Absent | 80 | 63.5 | 42.6 |  |  |  |
|  | Present | 85 | 60.4 | 32.2 |  |  |  |
| Plexus invasion |  |  |  | *<0.001* |  |  |
|  | Absent | 104 | 70.4 | 47.5 |  |  |  |
|  | Present | 61 | 48.4 | 20.5 |  |  |  |
| PV/SMV invasion |  |  |  | *<0.001* |  |  |
|  | Absent | 106 | 72.2 | 45.6 |  |  |  |
|  | Present | 59 | 44.3 | 23.2 |  |  |  |
| Lymph node metastasis |  |  |  | *0.002*  |  |  |
|  | Absent | 54 | 72.5 | 53.9 |  |  |  |
|  | Present | 111 | 56.8 | 29.4 |  |  |  |
| Surgical margin |  |  |  | *<0.001* |  | *<0.001* |
|  | Negative | 130 | 73.5  | 45.5 |  | *1.00* |  |
| 　 | Positive | 35 | 19.5 | 7.8 |  | *3.53 (2.21-5.64)* |  |
| *Expressed as N (%) or median (range), PLR: platelet-to-lymphocyte ratio, PV: portal vein, SMV: superior mesenteric vein* |

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| **Supplementary table 3**. Univariate and multivariate analysis in 165 patients with resected pancreatic head carcinoma (PNI). |
|  |  | No. of patients | Survival (%) | *p* | Multivariate |
| Variable | 1-year | 2-year | (Log-rank test) | Hazard ratio (95% CI) | *p* |
| PNI |  |  |  | *0.008*  |  | *0.047* |
|  | < 38 | 18 | 48.5 | 8.3 |  | *1.80 (1.01-3.22)* |  |
|  | ≥ 38 | 147 | 63.7 | 40.8 |  | *1.00* |  |
| CEA (ng/dl) |  |  |  | *0.120*  |  |  |
|  | ≤ 5.0 | 121 | 58.6 | 34.3 |  |  |  |
|  | > 5.0 | 40 | 71.1 | 43.3 |  |  |  |
| CA19-9 (U/ml) |  |  |  | *0.057*  |  |  |
|  | < 37 | 40 | 74.7 | 46.1 |  |  |  |
|  | ≥ 37 | 120 | 56.7 | 32.7 |  |  |  |
| Portal vein resection |  |  |  | *<0.001* |  |  |
|  | None | 61 | 80.4 | 56.7 |  |  |  |
|  | Resected | 104 | 51.3 | 26.0 |  |  |  |
| Size (cm) |  |  |  | *0.069*  |  |  |
|  | ≤ 2.0 | 19 | 94.4 | 63.8 |  |  |  |
|  | > 2.0 | 146 | 57.6 | 33.9 |  |  |  |
| Lymphatic invasion |  |  |  | *0.001* |  | *0.024* |
|  | Absent | 14 | 92.3 | 92.3 |  | *1.00* |  |
|  | Present | 151 | 59.1 | 31.9 |  | *2.94 (1.15-7.49)* |  |
| Venous invasion |  |  |  | *<0.001* |  | *0.019* |
|  | Absent | 69 | 76.1 | 54.6 |  | *1.00* |  |
|  | Present | 96 | 51.0  | 23.3 |  | *1.73 (1.10-2.72)* |  |
| Perineural invasion |  |  |  | *0.001* |  |  |
|  | Absent | 14 | 100.0 | 90.0 |  |  |  |
|  | Present | 151 | 58.4 | 32.9 |  |  |  |
| Anterior serosal infiltration |  |  |  | *0.003* |  |  |
|  | Absent | 85 | 70.7 | 45.1 |  |  |  |
|  | Present | 80 | 52.0 | 28.3 |  |  |  |
| Retroperitoneal invasion |  |  |  | *<0.001* |  |  |
|  | Absent | 52 | 78.4 | 61.3 |  |  |  |
|  | Present | 113 | 54.6 | 26.5 |  |  |  |
| Bile duct invasion |  |  |  | *0.135* |  |  |
|  | Absent | 60 | 68.6 | 44.7 |  |  |  |
|  | Present | 105 | 58.2 | 33.2 |  |  |  |
| Duodenal invasion |  |  |  | *0.428* |  |  |
|  | Absent | 80 | 63.5 | 42.6 |  |  |  |
|  | Present | 85 | 60.4 | 32.2 |  |  |  |
| Plexus invasion |  |  |  | *<0.001* |  |  |
|  | Absent | 104 | 70.4 | 47.5 |  |  |  |
|  | Present | 61 | 48.4 | 20.5 |  |  |  |
| PV/SMV invasion |  |  |  | *<0.001* |  |  |
|  | Absent | 106 | 72.2 | 45.6 |  |  |  |
|  | Present | 59 | 44.3 | 23.2 |  |  |  |
| Lymph node metastasis |  |  |  | *0.002*  |  |  |
|  | Absent | 54 | 72.5 | 53.9 |  |  |  |
|  | Present | 111 | 56.8 | 29.4 |  |  |  |
| Surgical margin |  |  |  | *<0.001* |  | *<0.001* |
|  | Negative | 130 | 73.5  | 45.5 |  | *1.00* |  |
| 　 | Positive | 35 | 19.5 | 7.8 |  | *2.98 (1.89-4.71)* |  |
| *Expressed as N (%) or median (range), PNI: prognostic nutritional index, PV: portal vein, SMV: superior mesenteric vein* |