

## SUPPLEMENTAL DATA

### **HALP score outperforms systemic inflammatory biomarkers for prognosis in locally advanced rectal cancer**

**Peipei Shen<sup>1</sup>, Tiantian Yang<sup>2</sup>, Yawen Cong<sup>2</sup>, Bin Zhang<sup>3</sup>, Yu Xu<sup>1</sup>, Benjie Xu<sup>4</sup>,  
Shengjun Ji<sup>5</sup>, Yutian Zhao<sup>1#\*</sup>, Yong Mao<sup>6#\*</sup>**

<sup>1</sup>Department of Radiotherapy and Oncology, Affiliated Hospital of Jiangnan University, Wuxi, Jiangsu, China;

<sup>2</sup>Wuxi Medical College, Jiangnan University, Wuxi, Jiangsu, China;

<sup>3</sup>Department of Anesthesiology, The Affiliated Hospital of Jiangnan University, Wuxi, Jiangsu, China;

<sup>4</sup>Department of Outpatient Chemotherapy, Harbin Medical University Cancer Hospital, Harbin, Heilongjiang, China;

<sup>5</sup>Department of Radiotherapy and Oncology, Suzhou Municipal Hospital, The affiliated Suzhou Hospital of Nanjing Medical University, Gusu School, Nanjing Medical University, Suzhou, Jiangsu, China;

<sup>6</sup>Department of Oncology, Affiliated Hospital of Jiangnan University, Wuxi, Jiangsu, China.

<sup>#</sup>Equally contributed to this work: Yutian Zhao and Yong Mao.

<sup>\*</sup>Correspondence to Yutian Zhao: [drzhaoyutian@163.com](mailto:drzhaoyutian@163.com) and Yong Mao: [mydoctorwxmy@163.com](mailto:mydoctorwxmy@163.com)

**Full article is available at the following link: [HALP score outperforms systemic inflammatory biomarkers for prognosis in locally advanced rectal cancer](#)**

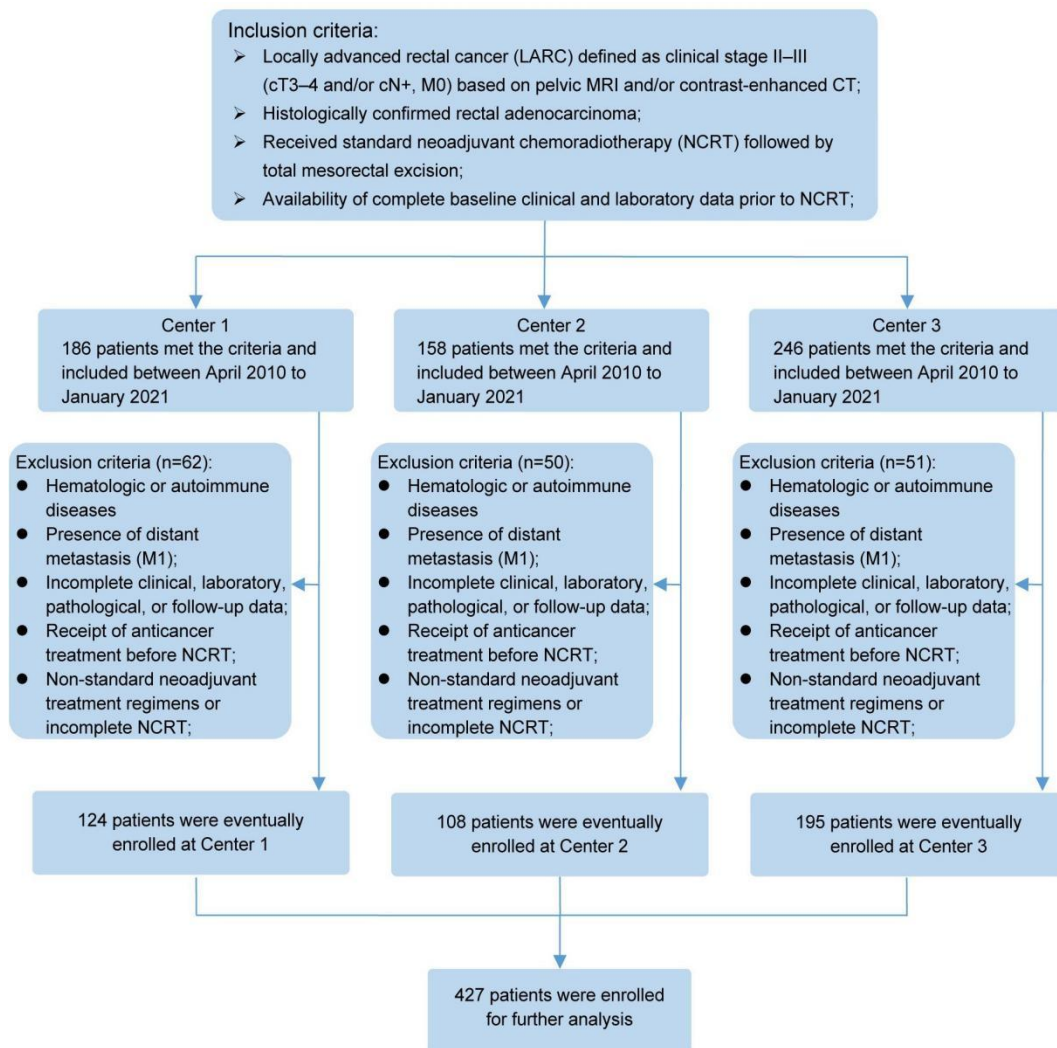
**Table S1. Evaluation of twelve inflammatory biomarkers in this study**

Biomarker name	Biomarker components
Pan-immune-inflammation value (PIV)	Neutrophil (/μl) × platelet (/μl) × monocyte (/μl) / lymphocyte (/μl)
Neutrophil-to-lymphocyte ratio (NLR)	Neutrophil (/μl) / lymphocyte (/μl)
Lymphocyte-to-monocyte ratio (LMR)	Lymphocyte (/μl) / monocyte (/μl)
Platelet-to-lymphocyte ratio (PLR)	Platelet (/μl) / lymphocyte (/μl)
Systemic immune-inflammation index (SII)	Platelet (/μl) × neutrophil (/μl) / lymphocyte (/μl)
Systemic inflammation response index (SIRI)	Neutrophil (/μl) × monocyte (/μl) / lymphocyte (/μl)
Neutrophil-albumin ratio (NAR)	Neutrophil (/μl) / albumin (g/dl)
Lymphocyte × albumin (LA)	Lymphocyte (/μl) × albumin (g/dl)
Neutrophil × monocyte (NM)	Neutrophil (/μl) × monocyte (/μl)
Neutrophil × platelet (NP)	Neutrophil (/μl) × platelet (/μl)
Monocyte × platelet (MP)	Monocyte (/μl) × platelet (/μl)
Hemoglobin, albumin, lymphocyte, and platelet (HALP)	Hemoglobin (g/dl) × albumin(g/dl) × lymphocyte count (/μl) / platelet count (/μl)

For a hypothetical patient with hemoglobin = 130 g/L, albumin = 40 g/L, lymphocyte count =  $1.5 \times 10^9/L$ , neutrophil count =  $4.0 \times 10^9/L$ , monocyte count =  $0.5 \times 10^9/L$ , and platelet count =  $250 \times 10^9/L$ :

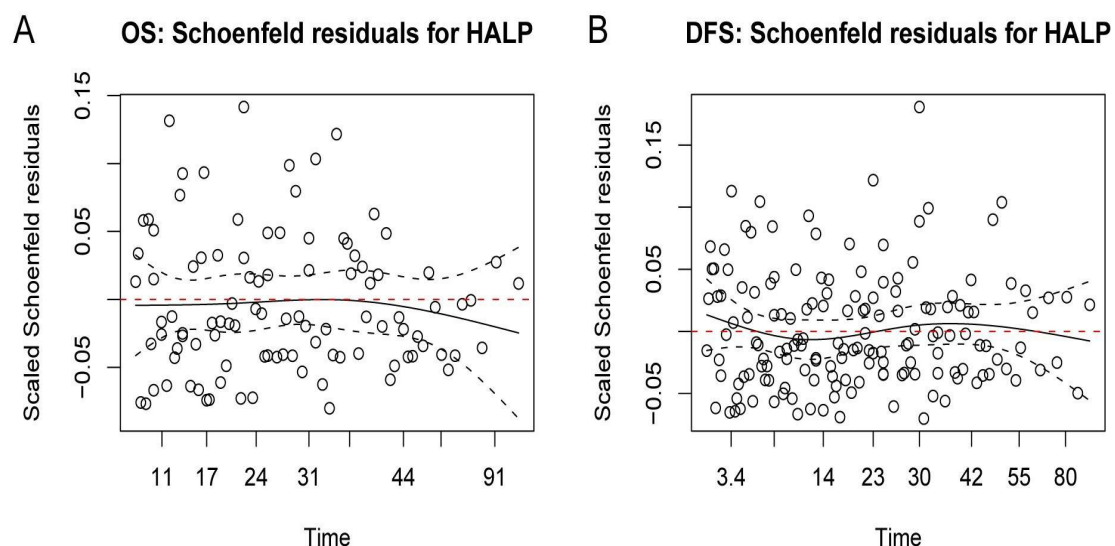
1.  $HALP = (\text{Hemoglobin} \times \text{Albumin} \times \text{Lymphocyte}) / \text{Platelet} = (130 \times 40 \times 1.5) / 250 = 31.2$
2.  $PIV = (\text{Neutrophil} \times \text{Platelet} \times \text{Monocyte}) / \text{Lymphocyte} = (4.0 \times 250 \times 0.5) / 1.5 = 333.3$

Abbreviations: HALP: Hemoglobin, albumin, lymphocyte, and platelet; PIV: Pan-immune-inflammation value; NLR: Neutrophil-to-lymphocyte ratio; LMR: Lymphocyte-to-monocyte ratio; PLR: Platelet-to-lymphocyte ratio; SII: Systemic immune-inflammation index; SIRI: Systemic inflammation response index; NAR: Neutrophil-to-albumin ratio; LA: Lymphocyte × albumin; NM: Neutrophil × monocyte; NP: Neutrophil × platelet; MP: Monocyte × platelet; SIS: Systemic inflammation score.



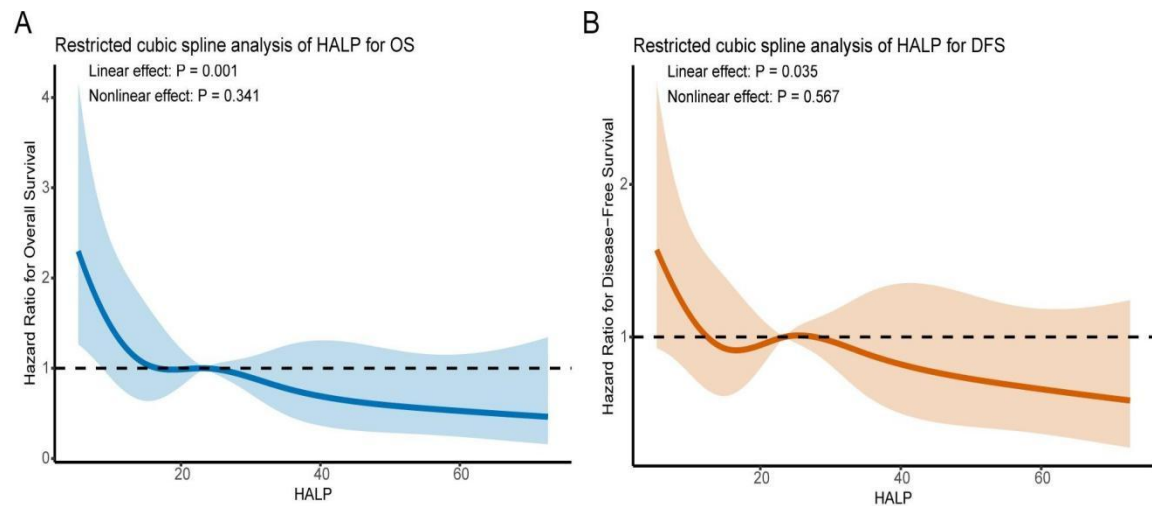
**Figure S1. Flowchart illustrating the patient selection process in this study.**

Center 1, The Affiliated Hospital of Jiangnan University; Center 2, The Affiliated Suzhou Hospital of Nanjing Medical University; Center 3, Harbin Medical University Cancer Hospital.



**Figure S2. Schoenfeld residual diagnostics for the proportional hazards assumption of the HALP score. (A) OS Cox model. (B) DFS Cox model.** Plots show scaled Schoenfeld residuals for HALP over follow-up time; the solid red line represents the smoothed trend and dashed lines indicate the approximate 95% confidence bands. The absence of an apparent time-dependent pattern supports that the proportional hazards assumption for HALP is not violated in either model.

**Abbreviations:** DFS: Disease-free survival; HALP: Hemoglobin–albumin–lymphocyte–platelet score; OS: Overall survival.



**Figure S3. Restricted cubic spline modeling of the association between HALP and survival outcomes. (A) OS and (B) DFS** Cox models with HALP entered as a continuous variable using restricted cubic splines. The solid line depicts the estimated log-hazard ratio across the range of HALP values, and the shaded area indicates the 95% confidence interval. The global association between HALP and each endpoint is statistically significant, whereas the test for nonlinearity is not significant, supporting an approximately linear relationship between HALP and prognosis on the log-hazard scale. **Abbreviations:** DFS: Disease-free survival; HALP: Hemoglobin–albumin–lymphocyte–platelet score; OS: Overall survival.