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Identifying prognostic factors and independent risk factors in colorectal cancer; a comprehensive analysis of survival outcomes

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Introduction and objectives: Establishing factors influencing the overall survival is crucial for improving prognostication and treatment in colorectal cancer (CRC). This study aims to identify key prognostic factors and independent risk factors in CRC by analysing survival outcomes.

Methodology: CRC patients undergoing surgical resection from January 2013 to May 2019 and followed up until May 2024 were studied. Details of age, sex, tumor differentiation (TD), T stage, N stage, LN positivity (LNP), lymphovascular invasion and time since surgery to last follow-up/death were collected. Survival rates were estimated using Kaplan-Meier curves and the Log-rank test (LRT), the level of significance being $p < 0.05$. Cox proportional-hazard models identified survival-associated features, with forward variable selection determined by the log-likelihood ratio test.

Results: Of the 137 participants, 54 (39.42%) were males. Median age was 61 (IQR: 52-68). Thirty four of 58 deaths were caused by CRC. The overall 5-year-survival (OS) rate was 60.4% (95%CI, 52.5%-69.5%), and the corresponding disease-specific survival (DSS) rate was 72.2% (95%CI, 64.5%-80.8%). LRT showed that LVI ($p < 0.0001$), N0-N1-N2 stage ($p=0.022$, $p=0.051$), LNP ($p = 0.0026$, TD ($p=0.0003$), T4 Stage ($p=0.047$) indicated a difference in OS. Results of forward selection showed that a model with LVI, age, and N stage was the best to explain OS. The hazard ratios were: LVI = 3.094 (95% CI, 1.782-5.372, $p < 0.0001$), age = 1.029 (95% CI, 1.005-1.054, $p=0.0173$), and N stage = 1.545 (95% CI, 1.062-2.247, $p=0.0229$).

Discussion and conclusions: For survival, age, tumor differentiation, T stage, N stage, and LVI were significant factors. LVI, age, and N stage were independent prognostic factors, with LVI being the strongest predictor. This aligns with international literature, emphasizing the importance of reporting LVI in histopathology.

Keywords: colorectal cancer, lymphovascular invasion, overall survival, disease-specific survival, survival analysis

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