Exploring the Unique Risk Factors of Colorectal Cancer: A Bayesian Modelling for Survival Prediction

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Background

Right-sided colon cancer (RCC) and left-sided colon cancer (LCC) exhibit distinct features and prognosis due to differences in embryology, epidemiology, pathology, and prognosis. The present study aimed to select and quantify the most important variables that affect patient survival by exploring an optimal Bayesian model and using an appealing effect size measure.

Methods

This study is a retrospective analysis of data from the Cabrini Monash colorectal neoplasia database. It focused on patients who had undergone surgery for colorectal cancer (CRC) between January 2010 and December 2021. The study included patients over 18 years old who were diagnosed with CRC and underwent surgery. The researchers collected patient data, such as demographics, perioperative risks, treatment, mortality, morbidity, and survival. Statistical analyses were conducted to compare patient profiles, determine mortality rates and survival probabilities, and identify factors influencing overall and relapse-free survival.

Results

In this study, 2,475 patients were included, with 58.7% diagnosed with RCC (right-sided colorectal cancer) and 41.3% with LCC (left-sided colorectal cancer). RCC and LCC differed in patient profiles, with RCC having a higher percentage of females and
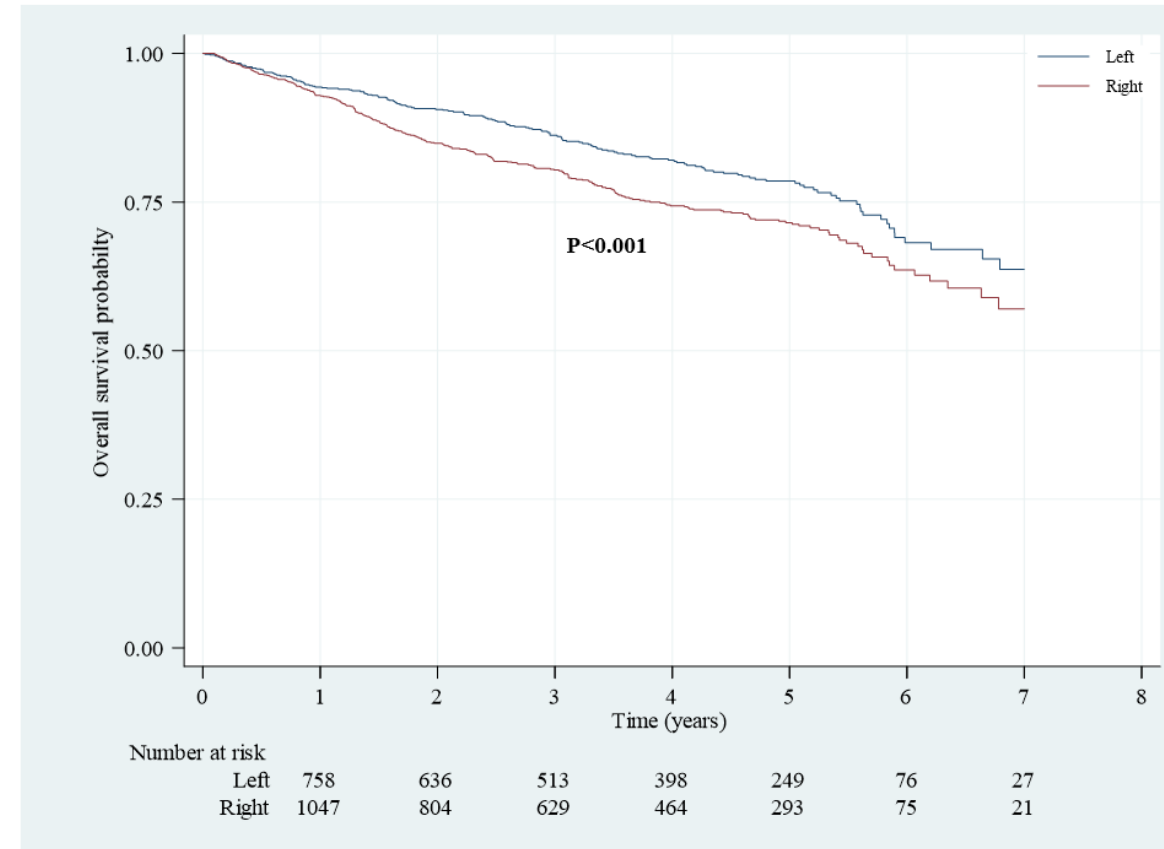

Number at risk							
Left	758	636	513	398	249	76	27
Right	1047	804	629	464	293	75	21

Figure 1: Overall survival probability across left and right colons

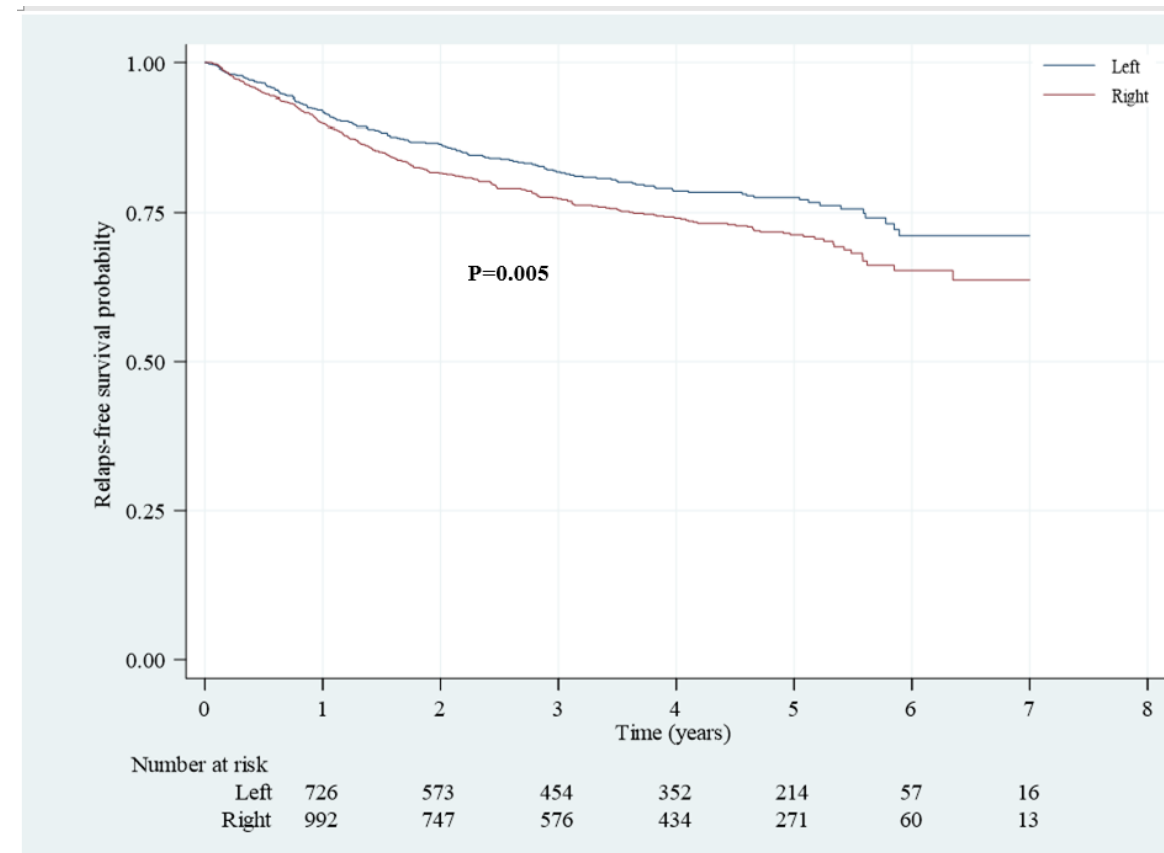| Number at risk							
Left	726	573	454	352	214	57	16
Right	992	747	576	434	271	60	13

Figure 2: Relapse-free survival probability across left and right colons

Results cont.

a higher prevalence of ASA 3-4. The mortality rate was significantly higher in RCC patients, and their overall survival rates were slightly lower compared to LCC patients. Subgroup analysis by stage consistently showed differences between RCC and LCC for stages I-IV. LCC patients had significantly higher overall and relapse-free survival rates than RCC patients based on the Bayesian log-logistic model. Other factors like age, BMI, ASA score, cancer stage, and comorbidities were also found to have significant relationships with overall and relapse-free survival. Factors associated with lower survival included poor and moderate differentiation, higher lymph node yield, and organ resection. In comparison, factors associated with higher survival included receiving chemotherapy, higher BMI levels, and elective operation.

Conclusions

The findings indicate that patients with LCC have a significantly higher overall and relapse-free survival rate than those with RCC. Moreover, our results demonstrate that age, BMI, ASA score, cancer stage, and comorbidities are important predictors of overall and relapse-free survival. These findings have important implications for personalised treatment planning and managing CRC patients.