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Short Communication

Prognostic Factors in Colorectal Cancer and Survival Analysis

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ABSTRACT

Introduction: All around the world colorectal cancer is one of the third-highest cancer types with 17.3 % morbidity and an 8.3 % mortality rate.

Objectives: The main objective of the study is to find the prognostic factors in colorectal cancer and survival analysis.

Keywords: Colorectal Cancer, Chyme, Microflora, Gastrointestinal Epithelium

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INTRODUCTION

All around the world colorectal cancer is one of the third-highest cancer types with 17.3 % morbidity and an 8.3 % mortality rate. Its ratio is quite high among males as compared to females (Ferlay J *et al.*, 2020). A study of GLOBALCON revealed that in 2018 one third of death arises due to colorectal cancer and it's the fourth most diagnosed disease in the same year. Further statistics revealed that approximately 1 million deaths and 2 million new cases are expected in between 2018-2019 (Ewing I *et al.*, 2014) (Peifer M 2002). This disorder usually arises from glandular, epithelial cells of the large intestine. It emerges as a result of mutation inside the epithelial cells (Kosinski C *et al.*, 2007). The colon is responsible for reabsorbing water, minerals, and nutrients in the chyme. Microflora inside the large intestine helps in the breakdown of protein and starch and on the axis of crypts and villi, the gastrointestinal epithelium facilitates in the absorption process (Vogelstein B *et al.*, 1988). Death cells during the process come out in the form of feces but sometimes abnormal growth of colon cells cause complexities and turn out in form of cancer (Remo A *et al.*, 2012) (Shih IM *et al.*, 2001).

The development of tumors through the traditional pathway where APC and KRAS mutation arises on the left colon takes more than 5-20 years interval (Pancione M *et al.*, 2012). According to the top-down morphological model, APC mutation arises in the upper crypt compartment (Young J *et al.*, 2007). On the other hand, BRAF mutations and epigenomic instability (CIMP-high) occur lower crypt compartment in the right corner and triggers the growth of the tumor (Lund EK *et al.*, 2011) (Prashanth R *et al.*, 2019). CRCs which grow into the wall of the colon or rectum can penetrate blood or lymphatic vessels, allowing metastasis to distant organs via the blood or to nearby lymph nodes11. This disorder is attributed to an individual lifestyle. In 2007, the World cancer research fund found a significant association of colorectal cancer with obesity, lack of exercise, high consumption of meat, and alcohol (SEER 2002).

Objectives

The main objective of the study is to find the prognostic factors in colorectal cancer and survival analysis.

METHODOLOGY

This retrospective study was conducted in the BVH, Bahawalpur during 2019 to 2020. This study was conducted to estimate the survival outcomes in the patients who were diagnosed with colorectal cancer. All the data was extracted from the patient's electrical records. For this study, we include patients who were diagnosed with the international classification of disease oncology, 3rd Edition (ICD-O-3) topographical codes of C18.0-C20.9 (excluding C18.1), and morphology codes of 8000-8152, 8154-8231, 8243-8245, 8247-8248, 8250-8576, 8940-8950, and 8980-8981. Patients who were diagnosed with more than one type of cancer, metastasis to the brain, and very limited survival time e.g fewer than 6 months were excluded from the research.

We collect demographic data in the form of age, sex, body mass index, last date of contact, history of consuming betel nut along with the history of smoking to check the association of cancer with these factors. We include primary site, histological type, grade/differentiation, size of treatment, regional lymph nodes as a general characteristic of tumor.

Furthermore, we analyzed our data by categorizing its stages according to the American Joint Committee on Cancer (AJCC) criteria cancer Further we add site-specific factors included CEA, Circumferential Resection Margin (CRM), tumor regression grade, perineural nerve invasion, KRAS mutation, obstruction, and perforation. Survival rate was noted on the behalf of the last date of contact or death (in some cases).

Statistical analysis

For the statistical analysis, we used SPSS version 23.0 to apply a t-test for the independent groups. All the data were analyzed by using the Chi square test $\chi 2$. A Chi square test was applied to calculate the original ratio with our survival expectancy. At the interval of 12, 36, and 60 months we estimated survival probabilities from the date of diagnosis to the date of death.

RESULTS

A total of 869 patients were diagnosed in this period. Out of 869, 454 (52.24 %) were male and the rest were from the female group. Mostly the patients were from the 57 to 75 years of age group with a median age of 64 years. A total of 63.75 % of patients was diagnosed with colon cancer and one-third of them belong to stage III with a high percentage of adenocarcinoma (91.71 %) (Tables 1-2).

Table 1: Pathological findings of parameters

Variable	Category	Wald	HR	95% CI	P-value
Age	> 65 yrs. old	19.85	1.87	1.42-2.47	<0.001
	<65 yrs. old				
Tumor status	T4	68.61	8.74	5.23-14.60	<0.001
	T3	25.03	3.54	2.16-5.82	<0.001
	T1/2				
Regional lymph node involvement	Yes	58.54	3.05	2.29-4.05	<0.001
	No				
Stage	Stage IV	88.83	18.96	10.28-34.96	<0.001
	Stage III	27.19	5.01	2.73-9.18	<0.001
	Stage II	8.14	2.55	1.34-4.86	0.004
	Stage I				
Distant metastasis	Yes	133.49	5.57	4.16-7.45	<0.001
	No				
Histology Type	Signet ring-cell carcinoma	4.15	2.80	1.04-7.55	0.042
	Adenocarcinoma				
	Mucinous carcinoma	6.96	1.77	1.16-2.71	0.008
Pathological differentiation	High grade	20.25	2.20	1.56-3.10	<0.001
	Low grade				
Tumor size	<50mm				
	> 50 mm	8.75	1.53	1.15-2.03	0.003
CRM	Positive	13.29	2.18	1.43-3.31	<0.001
	Negative				
	19.85	19.85	19.85	19.85	19.85
KRAS mutation	19.85	19.85	19.85	19.85	19.85
	Yes	7.22	3.90	1.45-10.51	0.007
	No				
Perineural invasion	Yes	83.05	4.43	3.22-6.10	<0.001
	No				
Perforation	Yes	4.58	2.28	1.07-4.84	0.032
	No				
Obstruction	Yes	21	1.87	1.43-2.44	<0.001
	No				

Table 2: Univariate regression analysis

Variable	Category	Wald	HR	95% CI	P-value
Age	> 65 yr old	32.68	2.36	1.76-3.17	<0.001
	<65 yr old				
Regional lymph node metastasis	Yes	11.22	1.81	1.28-2.57	0.001
	No				
Distant metastasis	Yes	36.48	2.78	2.00-3.87	<0.001
	No				
Pathological differentiation	High grade	10.54	1.84	1.27-2.66	0.001
	Low grade				
Perineural invasion	Yes	34.26	2.90	2.03-4.14	<0.001
	No				
Obstruction	Yes	4.94	1.38	1.04-1.84	0.026
	No				

DISCUSSION

In this cohort study, we observed different factors that are correlated with disease and have a huge impact on the survival rate. In this study, we specifically focus on the five-year survival in order to demonstrate the severity of disease in our region. In our selected population expected survival duration mean of I to IV tumor stage lies within 71.27±1.27 with a significant lifestyle. Factors like age greater than 65, high grade of pathological differentiation, distant metastasis were highly associated with a 5-year risk of death among the colorectal cancer patients. We also evaluate that the independent variables like obstruction, perineural nerve invasion, and multiple regional lymph node metastases raised the chance of death from 1.38 to almost 3. While comparing elements like body mass index, smoking, and consumption of betel nut we didn't find any significant relationship of these with the survival ratio of patients.

In our study, we demonstrate that men had high exposure to CRC as compared to females. This result is in correspondence to many previous studies. The age group with 64 median ages was at high risk of CRC. These results are slightly different from the previously conducted study in Taiwan city 2013 where they found high threats among the above 66 year age group (De Rosa M *et al.*, 2015).

CONCLUSION

There are a lot of prognosis factors that may affect the survival rate among CCR patients. Some independent variables perineural nerve invasion, distant metastasis, age, pathological differentiation grade, obstruction, and regional lymph node metastasis are independent predictors that highly influence the ratio. But some like perineural nerve invasion and distant metastasis are considered as important in early detection. Early detection of these parameters will surely increase the survival rate.

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