World Journal of Engineering Research and Technology
WJERT
www.wjert.org
Impact Factor Value: 5.924

DEMOGRAPHIC PROFILE OF COLORECTAL CARCINOMA IN KASHMIR BASED ON TNM STAGING STATUS

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Article Received on 04/08/2021 **Article Revised on 24/08/2021** **Article Accepted on 12/09/2021**

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ABSTRACT

The most prevalent cancer in the gastrointestinal system (GIS) is bowel carcinoma. Data on the incidence of cancer are important for several reasons. Cancer affects all nations and is, therefore, an infectious illness of considerable frequency variability based on the prevalence of the location. Several factors affect the prognosis of colorectal cancer, the tumor stage is the most important prognostic factor, as it describes the degree of penetration of the intestinal wall; metastasis of the lymph node, the distant metastasis adversely affects the cancer phase Prognosis. During the investigation, the radiologists use the Tumor-Node-Metastasis staging system, which allows the treatment to be feasible depending on the stage of the tumor. In this study, the main aim is to determine the outcome and stage of the tumor to each other where outcome groups are Disease-free, Partial response and Disease progression. This whole research includes descriptive analysis to make it a success where the data set comprises of patients who reported histopathologically in 2018. In most cases, the symptoms of colorectal cancer are invisible and people are not aware of the detective procedures resulting from the last stage of cancer, which makes it very difficult for doctors to treat. However, the treatment plan is given according to the stage of presentation assessed by clinical examination and radiological findings. Our findings suggest that the majority of victims are leading to high-level disease progression. Therefore social awareness of this terrible disease is needed at most. Also, early detection can help to reduce the morbidity rate.

KEYWORDS: Colorectal Cancer (CRC), Tumor-Node-Metastasis (TNM) Staging, Prognostic Factors.

1. INTRODUCTION

Colon carcinoma is one of the most prevalent gastrointestinal (GI) cancers. Colorectal cancer is a tremendous global health issue and it affects all nations and is, therefore, an infectious illness of considerable frequency variability based on the prevalence of the location. Colon cancer is the fourth most prevalent cancer in the world, while rectal cancer is the eighth most incident, according to data from GLOBOCAN 2020. Together, CRCs are the world's third most prevalent form of cancer, representing 11% of all diagnoses of cancer. It is estimated that approximately 1.9 million new cases of colon cancer will be diagnosed in 2020, while around 0.7 million new cases of rectal cancer are expected. Overall, it represents 1.9 million additional CRC cases. Across 10 of the 191 countries around the world, CRC is the most identified cancer among men.No country has CRC as women's most diagnosed cancer.[1,2] Colon and rectum epithelial tumors are common pathological entities and deserve to be expressed with accuracy and completeness histologically.[3]

In a broad geographical region, CRC is detected. It's heard more often in developed countries like North America, Western Europe, Australia, and New Zealand. The frequency in countries often varies according to the area. In the USA, for example, the highest concentration is in the northeast metropolitan regions and the lowest in the southeast rural regions. If the people from low-risk regions such as Japan, Poland moved to high-risk regions such as the USA, Australia, the colon cancer levels grow exponentially.[4,5]

CRC typically arises from adenomatous dysplastic polyps. Those seated right columns are a large section of CRC and are frequently seen more in the low-risk community compared to high-risk populations. Genetic and environmental effects are involved at various points in the development of neoplastic. A few well-defined disorder of colon cancer has shown that genetic predisposition plays a major role in colon cancer pathogenesis.[4,6]

How high it is and whether it has spread is the level of cancer. Several tests and scans are available to diagnose CRC at an early stage, which will help doctors more clearly in the cancer stage. This is important because the care decisions can be dependent on the point.[7] In addition, many subsequent studies exposed that age at the level of tumor diagnosis, tumor grade, and tumor size had a strong association with colon cancer prognosis. However, most

of them focus on the prognostic consequence of a single factor and no study attempts to combine the three factors to improve forecasting.[8,9] Several factors affect CRC's prognosis. The tumor stage is the most important prognostic factor. The degree of penetration of the intestinal wall, metastasis of the lymph node, the distant metastasis adversely affect the cancer phase prognosis.

Staging cancer plays a key role in the cancer battle. This provides the basis for recognizing changes in the prevalence of population cancer, the severity of illness at the initial presentation, and the overall impact of cancer treatment developments. Staging is the basis for identifying clinical trial participation categories. Most importantly, staging provides the critical benchmark for those with cancer and their doctors to define prognosis and the likelihood of overcoming cancer and to determine the best approach to treatment for their cases.[10]

To find out the stage of cancer, the radiologists use the Dukes method. The original Dukes diagnosis of 1932, formulated for rectal cancer, was based on the severity of the disorder as measured by the extent of tumor penetration into the intestinal wall as well as the presence or lack of activity of the lymph node. Such a staging method underwent a variety of subsequent changes by Dukes itself and other experts, but issues included a lack of regard for the degree of association of the lymph node, tumor size, and other tumor pathology.[11,13] Later with the advancement of technology and the reduction of complications, the biologists added the existence of the tumor expansion front (push or invasion) as well as the prevalence of lymphocytic invasion at the forward edge and in this way the TNM staging system has come into existence.

Most healthcare institutions have used the TNM staging system as their primary cancer monitoring process. When the T, N, and M are established, the prognosis could be made for the clinical stage of the tumor and patients are given a stage of I, II, III or IV, with I as the initial stage and IV as the progressive stage disease. I and II Stages are cancer stages limited to tissues, while III and IV Stages are extra-prognostic. TNM staging systems have undergone many improvements to "improve medical assessment uniformity and ensure a clinically valid assessment.[14,15]

The TNM staging system will be used for all purposes for the staging of CRC. Tumors are staged according to the TNM staging system (Appendix C) of the Union for International

Cancer Control (UICC).[4] According to the American Joint Committee on Cancer (AJCC), the summary of the TNM staging system is given in Table 1.

Table 1: TNM staging for Colorectal Cancer.

AJCC Stage	TNM Stage	TNM Stage criteria for Colorectal Cancer
Stage 0	Tis N0M0	Tis: Tumor restrained to the mucosa, tumor in-situ
Stage I	T1N0M0	T1: Tumor conquers submucosa,
	T2N0M0	T2: Tumor conquers muscularis propria
Stage IIA	T3N0M0	T3: Tumor conquers subserosa or beyond (without other organs involved).
Stage IIB	T4N0M0	T4: Tumor conquers nearby organs or pierces the visceral peritoneum.
Stage IIIA	T12N1M0	N1: Metastasis to 1-3 regional lymph nodes T1 or T2.
Stage IIIB	T34N1M0	N1: Metastasis to 1-3 regional lymph nodes T3 or T4.
Stage IIIC	Any T, N2M0	N2: Metastasis to 4 or more regional lymph nodes, any T
Stage IV	Any T, any N, M1	M1: Distant metastasis present, any T, any N.

In this paper, the main aim is to check out the outcome (DF, PR, and DP) group differences in stages of the tumor encountered in the Kashmir Valley, in order to get the dominant stage of the colorectal carcinoma.

2. METHOD AND MATERIAL

This research includes a detailed analysis of patients who reported histopathologically in 2018. Data has been collected from both Shri Maharaja Hari Singh (SMHS) Hospital and Sher-i-Kashmir Institute of Medical Sciences (SKIMS) cancer institute's in the Kashmir Valley located in the Srinagar district. Records registered in the files have been properly researched from January 2018 to December 2018. The data 0f 2019 and 2020 was not available there due to the COVID-19 pandemic situation. This entire study is being studied under the supervision of the Head of the Radiation Oncology Department. Data are categorized based on TNM staging to the outcomes (DF, PR, and DP) where DF stands for disease-free, PR stands for partial response, and DP stands for disease progression.

Table 2: Stage wise distribution.

Stages	DF	PR	DP	Total	%age
S0	3	0	0	3	**01.3**
SI	6	9	0	15	**06.7**
SIIA	27	18	6	51	**23.0**
SIIB	6	15	3	24	**10.8**
SIIIA	0	9	6	15	**06.8**
SIIIB	0	21	36	57	**25.7**
SIIIC	0	9	21	30	**13.5**

SIV	3	3	21	27	**12.2**
Total	**45**	**84**	**93**	**222**	**100**

Table 3: Combined stage Distribution.

Stage	**DF (%)**	**PR (%)**	**DP (%)**	**Total (%)**
SI(I+0)	9(4.1)	9(4.1)	0(0)	**18(8.2)**
SII(IIA+IIB)	33(14.7)	33(14.7)	9(4.1)	**75(33.5)**
SIII(IIIA+IIIB+IIIC)	0(0)	39(17.6)	63(28.4)	**102(46.0)**
SIV(IV)	3(1.4)	3(1.4)	21(9.5)	**27(12.3)**
Total	**45(20.2)**	**84(37.8)**	**93(42.0)**	**222(100)**

3. RESULT

A total of 222 colorectal patients reported based on the TNM staging system distribution of patients with stage outcomes are shown above in Table 2 and Table 3. In table 2 distribution of outcome groups to each tumor, the stage is given, whereas Table 3 shows combined stages. Our finding shows that 20.2% of the sample population is disease free, 37.8% is partial response and 42.0% falls in disease progression. Furthermore, the majority of patients in stage II and III (33.5% and 46.0%) and 12.3% in stage IV, followed by stage II and III, respectively.

4. CONCLUSION

Our results show that stage III is dominant that means the majority of patients suffering from colorectal carcinoma are at a high stage leading to disease progression. In most cases, the symptoms of colorectal cancer are invisible and people are not aware of the detective procedures resulting from the last stage of cancer, which makes it very difficult for doctors to treat. However, the treatment plan is given according to the stage of presentation assessed by clinical examination and radiological findings. Therefore, social awareness of this terrible disease is needed at most and also early detection can help to reduce the morbidity rate.

ABBREVIATIONS

CRC - Colorectal cancer

TNM - Tumor-Node-Metastasis

DP - Disease progression

PR - Partial response

DF - Disease free

REFERENCES

1. Rawla, P., Sunkara, T., & Barsouk, A. Epidemiology of colorectal cancer: Incidence, mortality, survival, and risk factors. Przegląd Gastroenterologiczny, 2019; 14(2): 89.
2. Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*, 2021; *71*(3): 209-249.
3. Lanza, G., Messerini, L., Gafà, R., & Risio, M. Colorectal tumors: the histology report. Digestive and Liver Disease, 2011; 43: S344-S355.
4. Akkoca, A. N., Yanık, S., Özdemir, Z. T., Cihan, F. G., Sayar, S., Cincin, T. G., ... & Özer, C. TNM and Modified Dukes staging along with the demographic characteristics of patients with colorectal carcinoma. International journal of clinical and experimental medicine, 2014; 7(9): 2828.
5. Fenoglio-Preiser, C. M., Noffsinger, A. E., Stemmermann, G. N., Lantz, P. E., Listrom, M. B., & Rilke, F. O. Carcinomas and other epithelial and neuroendocrine tumors of the large intestine. Gastrointestinal pathology an atlas and text. 2nd ed. Philadelphia: Lippincott-Raven Publishers, 1999; 909-1068.
6. Christine, A., Lacobuzio, D., & Elizabeth, M. Epithelial neoplasms of the colorectum. Gastrointestinal and Liver Pathology. Churchill Livingstone Elsevier, 2005; 367-394.
7. Liu, Q., Luo, D., Cai, S., Li, Q., & Li, X. P–TNM staging system for colon cancer: combination of P-stage and AJCC TNM staging system for improving prognostic prediction and clinical management. Cancer management and research, 2018; 10: 2303.
8. Weiser, M. R., Gönen, M., Chou, J. F., Kattan, M. W., & Schrag, D. Predicting survival after curative colectomy for cancer: individualizing colon cancer staging. Journal of Clinical Oncology, 2011; 29(36): 4796.
9. Byrd, D. R., Carducci, M. A., Compton, C. C., Fritz, A. G., & Greene, F. L. AJCC cancer staging manual S. B. Edge (Ed.). New York: Springer, 2010; 7: 97-100.
10. Bhawna, S. Consensus document for Management of Colorectal Cancer. Retrieved November, 2014; 10: 2017.
11. Puppa, G., Sonzogni, A., Colombari, R., & Pelosi, G. TNM staging system of colorectal carcinoma: a critical appraisal of challenging issues. Archives of pathology & laboratory medicine, 2010; 134(6): 837-852.
12. Kirklin, J. W., Dockerty, M. B., & Waugh, J. M. The role of the peritoneal reflection in

the prognosis of carcinoma of the rectum and sigmoid colon. Surgery, gynecology & obstetrics, 1949; 88(3): 326-331.

13. Dukes, C. E., & Bussey, H. J. R. The spread of rectal cancer and its effect on prognosis. British journal of cancer, 1958; 12(3): 309.
14. Cosma, G., Acampora, G., Brown, D., Rees, R. C., Khan, M., & Pockley, A. G. Prediction of pathological stage in patients with prostate cancer: a neuro-fuzzy model. PLoS One, 2016; 11(6).
15. Falzarano, S. M., & Magi-Galluzzi, C. Staging prostate cancer and its relationship to prognosis. Diagnostic Histopathology, 2010; 16(9): 432-438.