

Study on Clinical Data and Molecular Analysis of Admitted Colorectal Cancer Patients in Chittagong Medical College Hospital

Md. Saiful Hoque^{1*} S. M. Ishtiaque Ali² Syeda Umme Haany³ Paban Dhar³ Naraion Dev⁴

Abstract

Background: Cancer is an emerging socio-economic burden of the world. Colorectal cancer exerts significant morbidities and mortalities all around the globe. In Bangladesh detailed data on the demographic status and clinic-pathological information of CRC patients are not well documented. The aim of our study is to evaluate the different socio-economic details (i.e. Age, sex, income, personal risk factors, etc.) histo-pathological variants of CRC and mutated gene on molecular analysis for better cancer therapeutics in the admitted patients of colorectal cancer in Chittagong Medical College Hospital.

Materials and methods A retrospective, single center, observational study was performed in the Department of General Surgery, Chittagong Medical College Hospital from July 2023 to December 2023. All the patients admitted with colorectal cancer was included (n=120) in the study. A prescribed data collection sheet was applied to gather information. Sixty representative tissues from resected specimen were sent for molecular analysis to detect mutated gene in the Molecular Biology Department of University of Chittagong. Results were compiled at the end of the study.

Results: The age of the patients' ranges from 15 to 75 years with peak age between 36-45 years (45%) and male preponderance (65%). About 52% patients were smoker and 60% were hailing from low socio-economic condition. 55% patients presented with rectal and recto-sigmoid junction cancer and 80% were histopathologically diagnosed as adenocarcinoma. About 42% patients underwent Abdomino-Perineal Excision of Rectum (APER) and 25% patients needed diversion stoma (ileostomy or colostomy). All the patients presented with APC gene mutation and 53% presented with k-ras mutation.

Conclusion: Middle aged males hailing from low socio-economic condition are affected by CRC. Rectum and recto-sigmoid junction tumour are common and molecular analysis of CRC patients established the genetic basis of the cancer biology which can be implementable in the cancer therapeutics.

Key words: CRC (Colorectal Cancer); Gene mutation; Molecular analysis.

Introduction

Colorectal cancer is the second most common malignancy among women and the third most common malignancy in men.¹ In Bangladesh, 5-year prevalence of colon and rectal cancer are 3.28 and 3.1 per 100,000 populations, respectively.¹ The prevalence of colorectal cancer is lower in Asia than in Western countries. But the incidence has been alarmingly increasing in countries of the Asia-Pacific region during the last two decades due to the westernization of lifestyles.² In the South Asian population, CRC patients present at a younger age and in advanced stage.^{3,4} Early detection of colonic cancers is difficult as clinical symptoms develop slowly. Patients with colorectal cancer usually presented with; abdominal pain, alteration of bowel habit, loss of weight, vomiting, anorexia, bleeding per rectum, abdominal lump, intestinal obstruction, etc.⁵ The aim of our study is to evaluate the different socio-economic details (i.e. Age, sex, income, personal risk factors, etc.) histo-pathological variants of CRC and mutated gene on molecular analysis for better cancer therapeutics in the admitted patients of colorectal cancer in Chittagong Medical College Hospital.

Materials and methods

A retrospective, single center, observational study was performed in the general surgical wards of Chittagong medical College Hospital from July 2023 to December 2023. All the patients admitted with colorectal cancer was included (n=120) in the study. A prescribed data collection sheet was applied to gather the demographic and clinical information. Sixty representative tissues from resected specimen were sent for molecular

1. ☐ Professor of Surgery
☐ Chittagong Medical College, Chattogram.
2. ☐ Assistant Professor of Surgery
☐ Chittagong Medical College, Chattogram.
3. ☐ Assistant Registrar of Surgery
☐ Chittagong Medical College Hospital, Chattogram.
4. ☐ Resident of Surgery
☐ Chittagong Medical College Hospital, Chattogram.

***Correspondence: Dr. Md. Saiful Hoque**

☐ Cell : 01730 90 69 61
☐ E-mail: saiful_surgery@yahoo.com

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analysis to detect mutated gene in the Molecular Biology Department of University of Chittagong. Results were compiled accordingly. Necessary permission was taken from the proper authorities before start the study.

Results

Table I Socio-demographic information

Variables	Range/Component	Number	Percentage
Age Sex	15-25	9	7.5
	26-35	18	15
	36-45	54	45
	46-55	21	17.5
	56-65	15	12.5
	66-75	3	2.5
	Male	78	65
	Female	42	35
Personal habit	Smoker	62	51.7
	Betel nut chewer	21	17.5
	Alcoholics	03	2.5
	Others (Ganja, Yaba, Pethidine)	06	5
Socio-economic condition	Low	72	60
	Middle	45	37.5
	High	03	2.5

The age of the patients' ranges from 15 to 75 years with peak age between 36-45 years (45%) followed by 46-55 years (17.25%). Among 120 cases 78 were male (65%) and 42 were female (35%) with a male female ratio of 1.86. 62 patients (about 52%) were smoker and 21 patients (17.5%) were betel nut chewer. Seventy two patients (60%) were hailing from a low socioeconomic status and only three (2.5%) patients were from high socioeconomic condition.

Table II Location of the tumour

Site	Number	Percentage
Right colon	21	17.5
Left colon	15	12.5
Rectum/Recto-sigmoid	66	55
Anal canal	18	15
Total	120	100

Sixty six patients (55%) were presented with rectal and recto-sigmoid junction cancer and fifteen patients (12.5%) were diagnosed with cancer of descending colon and left 1/3rd of transverse colon.

Table III Preoperative histopathology

Histological type	Number	Percentage
Adenocarcinoma	96	80
Squamous cell carcinoma	15	12.5
Others (Undifferentiated, Melanoma)	09	7.5
Total	120	100

Ninety six patients (80%) were histo-pathologically diagnosed as adenocarcinoma.

Table IV Operative procedures

Name of Operation	Number	Percentage
Right hemi-colectomy	09	12.5
Left hemi-colectomy	09	12.5
Low Anterior Resection	06	8.3
APER	30	41.7
Diversion stoma	18	25
Total	72	100

Thirty patients (About 42%) underwent Abdomino-Perineal Excision of Rectum (APER) and 18 patients (25%) needed diversion stoma in the form of either ileostomy or colostomy.

Table V Molecular analysis

Mutated gene	Number	Percentage
k-ras mutation (Codon 12,13,61)	32	53.3
p53 codon	11	18.3
APC	60	100
pTEN	39	65
Not done	60	-----

32 patients (53%) were presented with k-ras mutation while all the patients had mutated APC gene.

Discussion

CRC is the third leading cause of cancer related deaths in both genders worldwide, with estimated 515,637 deaths among males and 419,536 deaths among females in 2020.⁶ A rising incidence of early-onset colorectal cancer is emerging. In our study 67.5% people were diagnosed with CRC which were under 45 years of age. In our study Male to Female ratio was 1.85. According to Gangi and Venugopal Reddy the age-adjusted incidence of CRC for males is significantly higher than females.⁷ Sufficient evidence has shown that smoking is a strong and established risk factor for CRC. The components of tobacco smoke directly damage the colorectal mucosa and cause further genetic or epigenetic alterations.⁸⁻¹⁰ Almost half

(51.7%) of the colorectal patients were smoker in this study. In our study 72% patients came from low socioeconomic condition. John Carethers and ChykeDoubeni found that low socio-economic status is associated with higher rates of CRC.¹¹ In our study 70% patients were diagnosed in the rectum and anal canal (Distal colon). Syeeda Shiraj-Um-Mahmuda et. al. (2023) in demographic and clinicopathological evaluation of colorectal adenocarcinoma in Bangladesh at a tertiary level hospital found that the tumor was located in the distal colon and proximal colon in 62% and 36% of cases, respectively. 80% patients presented with adenocarcinoma and in their study they found it is the more frequent variety of CRC in Bangladeshi patients.¹² APC mutation was found in all the patients having molecular analysis and 53.3% patients presented with k-ras mutation. Overrepresentation of KRAS gene mutation in CMS3 tumors that are mostly right-sided results in the constitutive activation of MAPK pathway and is associated with worse clinical outcomes.^{13,14}

Limitations

Our single center study had a small sample size of 120. Demographic and clinical data were obtained for only six months. All the patients could not afford the cost of molecular analysis also.

Conclusion

Middle aged males with low socioeconomic condition are most vulnerable to CRC and Adenocarcinoma is more common. Rectum is affected more with cancer.

Recommendations

- Multi-centered study
- Increase number of cases
- Availability of Immuno-histochemistry
- Implementation of multi-modal approach
- Screening methods for high risk groups
- Evaluation of risk factors.

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Contribution of authors

MSH- Conception, design, data interpretation, data analysis, critical revision & final Approval.
SMIA-Data acquisition, data analysis, manuscript drafting & final Approval.

SUH- Data acquisition, drafting & final Approval.
PD- Data acquisition, drafting & final Approval.

DND- Data interpretation, critical revision & final Approval.

Disclosure

All the authors declared no competing interest.

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