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RESEARCH ARTICLE

FAECAL CALPROTECTIN IN PATIENTS WITH COLORECTAL CANCER: A HOSPITAL BASED CROSS SECTIONAL STUDY

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ABSTRACT

Background: Colorectal cancer is a formidable health problem worldwide. It is the third most common cancer in men (10.6%) worldwide and second most common among females (9.4%) worldwide. ***Aim****:* The aim of the study is to investigate the role of faecal calprotectin in colorectal patients and to compare the sensitivity of faecal calprotectin and Faecal Occult Blood test among colorectal patients. ***Methods:*** It was a descriptive cross-sectional study that was conducted in the department of Surgery, Government Medical college Srinagar from August 2017 to August 2018. The study participants were histologically diagnosed cases of colorectal cancer. A total of 120 patients were included in analysis. ***Results:*** Mean ± S.D. for age was 59.38 ± 11.656. Majority of the participants (52.2%) were predominantly males. The site of lesion for most of the participants (68.3%) was colon followed by rectum (31.7%). A statistically significant association of faecal calprotectin was found among those having adenomatous polyp, ulcerative colitis and crohnsdisease. ***Conclusion:*** Due to the higher sensitivity of calprotectin for colorectal cancer or adenomatous polyps or Inflammatory bowel disease, it has the potential for a greater reduction in mortality caused by colorectal cancer.

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INTRODUCTION

Colorectal cancer is considered as an alarming health problem worldwide. It is ranked as the 3rdmost common cancer among men (10.6%) worldwide and 2ndmost common among females (9.4%) worldwide.[1]The annual incidence rates for colon and rectal cancer in India for men are 4.4 and 4.1 per 100,000 respectively. The annual incidence rates of colon cancer among women is 3.9 per 100,000. The estimated number of colorectal cancer related deaths worldwide is 60,8000 which accounts for about 8% of all the cancer deaths thereby making colorectal cancer the fourth most common cause of death due to cancer. In India, colon cancer ranks 8th among men and 9th among women.[2]In Kashmir region, Colorectal cancer ranks as the the 3rd most common cancer among both males and females.[3]In a study conducted in 2011 in kashmirregion, the incidence rate for colorectal cancer was 3.65 per 100,000; it was 3.78 in males and 3.50 per 100,000 in females.[4]Colorectal cancers have been known to be slow growing tumors and usually grow over a period of 10-20 years.[5]Most of the neoplasms start as a non-cancerous growth usually an polyp which develops on the inner lining of rectum or colon.[6] There is a slow growth course from precancerous polyp to invasive cancer which provides an opportunity for the prevention and early detection of colorectal cancer. Colorectal cancer is also associated with local acute inflammatory reaction. Calprotectin (S100A8/A9) being a stable neutrophil specific marker is resistant to enzymatic degradation and it can be assayed in stool samples with high precision and ease.[7]It has recently emerged as an important pro inflammatory mediator for acute and chronic inflammatory conditions. Increased levels of S100A8 and S100A9 are also seen in various human cancers, presenting its abundant expression in cancer cells as well as infiltrating immune cells. Although there are many possible functions that have been proposed for S100A8/A9 but its actual biological role is still yet to be defined. Altogether, its expression and potential cytokine like function in inflammation and in cancer suggests that S100A8/A9 may have a key role in inflammation associated cancer.[8]Faecal calprotectin levels are increased in patients with colorectal cancer but immunohistochemical examination of specimens suspected for colorectal cancer has shown reactivity that is confined to neutrophilic granulocytes with no reactivity seen in neoplastic cells which suggests that the elevated faecal levels may be due to neutrophil shedding from an ulcerated tumour[9,10],hence the present study was conducted to determine the role of faecal calprotectin in colorectal patients and to compare the sensitivity of faecal calprotectin and Faecal Occult Blood test for colorectal carcinoma among symptomatic patients.

MATERIAL AND METHODS

It was a Descriptive Cross-sectional study that was conducted in the Department of Surgery, Government Medical college Srinagar from August 2017 to August 2018.

The study participants were histologically diagnosed cases of colorectal cancer that were admitted in the Department of surgery. A priori sample size was not calculated, all those who were admitted in the hospital during the given time period were included in the study after fulfilling the inclusion and exclusion criteria. The inclusion and exclusion criteria for participants is given as:

Inclusion criteria

- Age >18 years
- Histopathologically diagnosed cases of colorectal cancer
- All those giving consent

Exclusion criteria

- Presence of any comorbidities like diabetes, hypertension
- Presence of any other cancer at other sites

During the study period, a total of 127 patients were assessed for eligibility in the study. 7 did not fulfil the inclusion and exclusion criteria. Hence a total of 120 patients were included in the study.

Data collection procedure: After selection, the study participants were thoroughly informed about the study. A written informed consent to participate in this study was obtained from all the study participants. A face-to-face interview was conducted with each study participant based on a predesigned semi-structured questionnaire that had been tested in a pilot phase on 3 patients. The questionnaire elicited information on socio-demographic characteristics, site of lesion, presenting symptom, presence of adenomatous polyp, ulcerative colitis, crohns disease, and also information was gathered regarding faecal calprotectin levels and faecal occult blood test report. The confidentiality of participants was maintained throughout the research.

Statistical analysis: The data was entered in a Microsoft Excel (2016)spreadsheet and analyzed using SPSS 23 software. Categorical variables were expressed as frequencies and percentages and continuous variables were expressed as mean and standard deviation. Pearsons chi square test/Fischer exact test was used to determine association between categorical variables.

Ethical clearance: The due ethical clearance for the study was obtained from the ethical committee of Government Medical College, Srinagar.

RESULTS

A total of 127 patients were assessed for eligibility in the study. Out of these, 7 did not fulfil the inclusion criteria and hence a total of 120 patients were included in the study. Mean ± S.D. for age was 59.38 ± 11.656. Majority of the participants (52.2%) were predominantly males. The site of lesion for most of the participants (68.3%) was colon followed by rectum (31.7%). The most common presenting symptom was per rectal bleed (57.5%) followed by lump (23.3%), change in bowel habit (15.0%), tenesmus and pallor (1.7%).

In our study, Faecal calprotectin levels for most of the patients (45.0%) was >250 whereas only 12.5% of the patients had a level of <50. Also faecal occult blood tested positive for 63.3% of the patients. Adenomatous polyp was found in 95 patients (79.2%). Ulcerative colitis and Crohn's disease was found in 38 (31.7%) and 29 (24.2%) patients. Table 2 depicts the association of faecal calprotectin levels with other associated factors. A statistically significant association was found among those have adenomatous polyp, ulcerative colitis and crohns disease. Table 3 depicts the sensitivity of faecal calprotectin and faecal occult blood test in diagnosing colorectal patients. The sensitivity of faecal calprotectin and faecal occult blood test is 53.0% and 63.3% respectively.

Table 1. Patient demographics, site of lesion, presenting symptom, faecal calprotectin levels and other associated conditions.

Variable	Frequency (n)	Percentage
Age (Mean ± S.D.)	59.38 ± 11.656	
Gender		
Male	63	52.5
Female	57	47.5
Site of lesion		
Colon	82	68.3
Rectum	38	31.7
Presenting symptom		
Per rectal bleed	69	57.5
Lump	28	23.3
Change in bowel habit	18	15.0
Tenesmus	3	2.5
Pallor	2	1.7
Faecal calprotectin levels		
<50	15	12.5
50-250	51	42.5
>250	54	45.0
Faecal occult blood test		
Positive	76	63.3
Negative	44	36.7
Adenomatous polyp		
Present	95	79.2
Absent	25	20.8
Ulcerative colitis		
Present	38	31.7
Absent	82	68.3
Crohn's disease		
Present	29	24.2
Absent	91	75.8

Table 2. Association between faecal calprotectin levels and other associated variables.

Variable	Faecal calprotectin levels			*p-value
	>50	50-250	>250	
Gender				0.374
Male	9	23	31	
Female	6	28	23	
Site of lesion				0.256
Colon	13	33	36	
Rectum	2	18	18	
Presenting symptom				0.102**
Per rectal bleed	4	30	35	
Change in bowel habit	3	9	6	
Lump	7	11	10	
Pallor	0	0	2	
Tenesmus	1	1	1	
Adenomatous polyp				<0.001
Present	5	45	45	
Absent	10	6	9	
Ulcerative colitis				0.006
Present	2	11	25	
Absent	13	40	29	
Crohns disease				0.003
Present	1	7	21	
Absent	14	44	33	

*chi square test used **fischer exact test used

Table 3. Association between histopathology and other diagnostic tests

Variable		Histopathology		Sensitivity
		Positive	Negative	
Faecal occult blood test	Positive	76(63.3%)	0	63.3%
	Negative	44(36.7%)	0	
Faecal calprotectin	Positive	54(45.0%)	0	54.0%
	Negative	66(55.0%)	0	

DISCUSSION

The present study was conducted at Government medical college Srinagar. The aim of this study was to determine the role of faecal calprotectin in patients with colorectal carcinoma and also to compare the sensitivity of two tests for colorectal cancer- faecal calprotectin and Faecal Occult Blood test for among symptomatic patients. A total of 120 patients were included in the study. In our study, most common site of lesion was colon which was seen in 68.3% of the participants. Colon was also reported as a common site in other studies.[11] However, in a study conducted by Mabel Bohorquez et al most of the tumours in the study were located in the rectum (42.7%).[12]The most common presenting symptom in our study was per rectal bleed (57.5%) and the least common presenting symptom was pallor (1.7%). These results are in concordance with a study conducted by D smith et al where bleeding Per Rectal was reported by 89.0% of the participants.[13] There is certain unreliability regarding how to interpret a patient with an elevated Faecal calprotectin test in clinical practice. In our study, only 12.5% of the colorectal patients had normal faecal calprotectin levels whereas 87.5% of the colorectal patients have raised faecal calprotectin levels. Raised faecal calprotectin levels have been found associated with colorectal carcinoma in some studies.[14]In our study, we investigated the relationship between faecal calprotectin levels and other associated conditions. Presence of adenomatous polp, crohns disease and ulcerative colitis was significantly associated with higher levels of faecal calprotectin in colorectal patients. Some studies have investigated the relationship between elevated Faecal Calprotectin levels and Gastrointestinal diseases. A study found that patients with Faecal Calprotectin levels greater than225 µg/g(14 out of 25patients) developed significant Gastrointestinal disease. Nine of the patients in that study developed Inflammatory Bowel Disease.[15]However, in our study, 45 patients of adenomatous polp, 25 ulcerative colitis and 21 Crohn's disease patient had faecal calprotectin levels >250. There was no significant difference between faecal calprotectin levels among males and females. Also, no significant association was found with site of lesion and presenting symptom. In our study, we have made a comparison of Faecal occult Blood test and faecal calprotectin in detecting colorectal cancer. The sensitivity for colorectal carcinoma using calprotectin was 54.0% in comparison with 63.3% for faecal occult blood test. However, these finding are in contradictory to the findings of study conducted by J Tibble et al who reported a sensitivity of 90.0% for colorectal cancer using faecal calprotectin.[16] The 63.0 % sensitivity of Faecal Occult Blood test in our study is similar to that seen in another study.[17]

Limitations of the study:

- Small sample size of the study
- Our study mainly included elderly population hence our results are applicable mainly to this group of population and we cannot generalize it to the general population.
- We did not have any control group which would have increased the accuracy of the study.

CONCLUSION

Faecal calprotectin is a simple non-invasive marker for colorectal cancer and inflammatory bowel disease. It is also a sensitive marker for colorectal cancer and inflammatory bowel disease.

Thus, with the higher sensitivity of calprotectin for colorectal cancer or adenomatous polyps or Inflammatory bowel disease, it has the potential for a greater reduction in mortality caused by colorectal cancer.

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