Research Paper

Volume : 5 | Issue : 3 | March 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

Study of Haematological Profile in Patients with Gastrointestinal Malignancies

Medical Science

KEYWORDS : GASTRO INTESTINAL MALIGNANCY, ANEMIA, HEMATOLOGICAL PROFILE.

DR. VASUKI.S. Dept of Pathology Government Tirunelveli Medical College. Tirunelveli. Tamil Nadu.

DR. K. SHANTARAMAN. Dept of Pathology Government Tirunelveli Medical College. Tirunelveli. Tamil Nadu.

ABSTRACT

Background: Gastrointestinal (GI) Malignancy is one of the commonest malignancies encountered in developed and developing countries. In India, gastric cancers and rectal cancers are more prevalent. In this study, analysis of haematological profile in GI malignancies was done to know the cytomorphological changes among the blood cells and to study the variation and changes in coagulation profile.

Objectives:

1. To analyse the haematological profile- Complete Blood Count (CBC), Prothrombin time (PT), activated partial thromboplastin time (aPTT) among patients of gastrointestinal malignancies.

2. To study and to compare cytomorphological changes among blood cells using peripheral blood smear examination.

3. To estimate the prognosis with haematological profile apparently.

Materials and Methods: A total of 25 blood samples of patients who were diagnosed of GI malignancy, were collected and sent to the laboratory with appropriate anticoagulants. Complete Blood Cell Count (CBC), Coagulation Profile (PT and aPTT) and Peripheral Smear were studied.

Results: The commonest age group affected was geriatric age group (above 61 years) and males were outnumbering in this study. Among GI malignancy gastric cancer constitute for the maximum. GI malignancy had negative impact on haemoglobin profile affecting about 68% of cases. In peripheral smear study microcytic hypochromic anaemia leads the way with 68%

Conclusion: Reduced red cell count and haemoglobin, increase in neutrophil count with decreased lymphocyte count, change in coagulation profile are associated with poor prognosis. Hence early screening and diagnosis, close monitoring of haematological and coagulation profile will help in reducing morbidity and mortality.

BACKGROUND:

[1] Gastrointestinal (GI) malignancy is one of the most common malignancies encountered both in developed and developing countries.

Among GI malignancies, stomach cancers (Adenocarcinomas) are the most common type and they are the second leading cancers worldwide. In India, small intestine cancers are rare when compared to large intestine cancers. Among them rectal cancers are common than colonic cancers. Incidence rates of colon cancer in eight population registries vary from 3.7 to 0.7/100,000 among men and from 3 to 0.4/100,000 among women. For rectal cancer the incidence rates are from 5.5 to 1.6/100,000 in men and from 2.8 to 0/100,000 in women. [2, 3] Rural incidence rates for large bowel cancers in India are approximately half of the urban rates. It supports a role for environmental risk factors as well as host risk factor. In this study, analysis of haematological profile in GI malignancies is done to know the cytomorphological changes among the blood cells and to study the variation and changes in coagulation profile. There are no large scale studies on the same from this region.

AIM & OBJECTIVES:

To analyse the haematological profile- Complete Blood Count (CBC), Prothrombin time (PT), activated partial thromboplastin time (aPTT) among patients of gastrointestinal malignancies.

To study and to compare cytomorphological changes among blood cells using peripheral blood smear examination.

To estimate the prognosis with haematological profile apparently.

MATERIALS AND METHODS:

Study group:

The present series deals with the prospective study of haematological profile in 25 inpatients of gastrointestinal malignancy, who attended the Surgery Department of Tirunelveli Government Medical College Hospital, Tirunelveli, during August and September, 2013. The study was started after the approval of the Institutional Ethics Committee and written consent was taken for each patient.

Inclusion criteria:

Patients diagnosed of GI malignancies under adult age group (20-60) and geriatrics (above 60) of both sexes.

Exclusion criteria:

- Patients with non-neoplastic lesions of GIT.
- Patients of GI malignancies of paediatric age group.

Methodology:

Patients were first diagnosed using proper histopathological examination using haematoxylin and eosin stained tissue sections that were already fixed in 10% formalin (fixative). Then the histopathological diagnosis was confirmed by means of special stains and immunohistochemistry. The patients of GI malignancies were then categorised accordingly.

Fresh blood samples were collected from the diagnosed patients and sent to haematology department in central laboratory along with appropriate anticoagulant in proper proportion. In central laboratory, complete blood count was done by automated multiparameter counting of red blood cells (RBC) and platelets using electronic resistance detection enhanced by hydrodynamic focusing. Haematocrit was measured utilizing cumulative pulse height detection. Haemoglobin was measured using sodium lauryl sulphate method. WBC count, differential count and nucleated red blood cells were evaluated.

Prothrombin time (PT) and its derived measures of prothrombin ratio (PR) and international normalized ratio (INR) which were the measures of the extrinsic pathway of coagulation were also done. They were used to determine the clotting tendency of blood and vitamin K status. It was used in conjunction with activated partial thromboplastin time (aPTT) which measures the intrinsic pathway. Peripheral blood smear was used as a follow-up test for abnormal results on CBC. All the peripheral smears prepared was stained with Leishman's stain using standard procedures and then examined under light microscope. Then the

cytomorphological variation observed was noted, categorised and compared.

RESULTS:

Among 25 cases of this study, only 3(12%) cases were from urban areas and the remaining 22(88%) cases were from rural areas which strongly imply the environmental risk factor for gastrointestinal malignancy. Out of 25 cases studied, the male: female ratio is 1.5. Therefore males carry the high risk. About 9(36%) cases were above 60 years of age and among them males (88.9%) were outnumbering the females. About 7(28%) patients were in the age group of 51-60 years. About 5(20%) patients were in the age group of 41-50 years. About 4(16%) cases were in the age group of 31-40 years [Table – 1].

Among all cases of gastrointestinal malignancy, stomach cancers constitute for the maximum (52%). Next to stomach cancer, rectal cancers were most common which accounts for 28% [Table-2]. From the total of 25cases, 6(24%) cases had leucocytosis with equal male: female ratio with predominance of gastric cancer. In total RBC count, about 6(24%) cases had 2-3 million/cu.mm, about 5(20%) cases had 3-4 million/cu.mm and about 2(8%) cases had 5-6 million/cu.mm. Gastrointestinal malignancy had negative impact on haemoglobin profile, affecting 68% of cases. Among them 8% of cases constituting only males were severely anaemic requiring blood transfusions [Table-3].

Out of 25 cases, about 17 cases (68%) had normal thrombocyte count. About 3 cases (12%) had thrombocytopenia and 5 cases (20%) had thrombocytosis. From the total of 25 cases, about 11(44%) cases had the normal prothrombin time (reference value 11-16 seconds) and 9(36%) cases had values higher than the reference value (above 16seconds). Regarding activated partial thromboplastin time (aPTT), about 10(40%) cases had normal reports (reference value 21-29 seconds) and about 12(48%) cases had values higher than the reference value (above 29 seconds).

In peripheral smear study, microcytic hypochromic anaemia leads the way with 68% and six cases showed normal study [Table-4].

DISCUSSION:

In this prospective study including 25 patients, there was a higher preponderance of males (60%) and females accounting to remaining 40%. In a similar study conducted in the United States in 2012, also there was a higher preponderance of males.[6] The mean age of the patients in my study was 55.52 with a standard deviation of ± 12.26 (range 31-73years). In a study conducted by Masataka Ikeda et al, [7] the mean age at diagnosis was 63.5± 11.2 years. It ranged from 27 to 87 years. Since this study was conducted in Japan this wide discrepancy in age may be contributed to several factors such as lack of knowledge about cancer among people, diet, untreated peptic ulcers, and tropical climate favouring Helicobacter pylori infection.

The most common cancer was gastric cancer. The same was also reported by Cancer Statistics in Korea [8]. It also concluded that gastric cancer to be the third leading cause of cancer related death in men and the second leading cause of cancer related death in women. In a study by Coussens LM et al [9] on Inflammation and cancer, they showed that the pathogenesis of gastric cancer to be involved as a presentation of inflammation driven malignancy. Then in the present study, the second most common cancer involved was rectal cancer. Berardi et al [10] in their study submitted to the European Society for Medical Oncology in 2006 reported a higher incidence of rectal cancers conducted in 285 patients. In this prospective study, anal cancer was the least reported (4%). Studies by Frost DB et al [4] and Mannucci PM et al [11] had reported an increased incidence of anal cancer with higher incidence among urban population. This difference of finding may be attributed to the rural background of the patients included in my study.

Taking into account, the total blood profile of the patients, 9 (36%) of males and 4 (16%) of females had decreased red blood cell count. It was predominantly (32%) observed in patients with gastric cancer. Green D et al [12] on his study on overview of bleeding in cancer patients, observed a decrease in the total red blood cell count and he attributed that to a loss of blood in cancer patients. In the present study, about 68% of patients had microcytic hypochromic anaemia which was revealed by the peripheral smear report. In a study conducted by James MW et al [13] also, iron deficiency anaemia was common and he supported it by the blood loss from gastrointestinal tumours.

Regarding the haemoglobin levels, about 48% of the patients were anaemic. In a study conducted by M. Ikeda et al [7] the Sakai Municipal Hospital, Japan, about 45.8% of them were found to be anaemic. Obermeier et al [14] confirmed that the haemoglobin level is a prognostic relevant factor predicting the clinical response. Several studies [15, 16, 17, 18 and 19] also revealed that the haemoglobin level is the powerful prognostic factor for locoregional tumour control.

In view of the white blood cell count, there was an increase in the total count in about 24% of the patients. Gastric cancer recorded the highest incidence of about 66.67%. This proves the close relationship between inflammation and cancer. [9,20] On the assessment of the differential count of white blood cells, about 44% of the patients reported high levels of polymorphonuclear neutrophils [PMNs] i.e. above 70%. Joeng JH et al [21] also observed an increased PMNs level in gastric cancer patients. The lymphocyte count was normal in 64% of the patients. The rest of the patients had lymphopenia. Ray-Coquard I et al [22] also observed lymphopenia in his published studies on cancer patients and showed that lymphopenia is an independent prognostic factor for overall survival in several cancers. Using the levels of PMNs and lymphocytes, neutrophil to lymphocyte ratio [NLR] was calculated. About 48% of them had increased NLR values. High NLR reflects an increased neutrophil and a decreased lymphocyte count. Recently there has been increased evidence that high NLR is a poor prognostic marker in colorectal cancer and gastric cancer. [23, 24] There was an increase in platelet count in 20% of patients. M.Ikeda et al [7] observed an increase in platelet count in 11.4% of the cases. The mean platelet count in my study was 3.08±1.36. He observed a mean platelet count of 2.7±1.07. He also observed the one and three year survival expectancies in patients with or without thrombocytosis as 52.4% and 23.4% respectively and identified platelet count as an independent prognostic factor in cancer therapy. About 36% of the patients had an increased prothrombin time. Of which, about 55.56% constitutes gastric cancer. About 48% of the patients had an increased aPTT. Of which, about 50% constituted gastric cancer and rectal cancer constituted about 33.33%.

CONCLUSION:

Gastrointestinal malignancies are one of the most common malignancies that result in significant changes in the status of human wellbeing with stomach cancers being the most common cause. Most of these malignancies occur above sixty years with slight male preponderance. About 68% of these cases are associated with reduced haemoglobin and among which microcytic hypochromic anaemia being the most common type. This change in haemoglobin may be attributed to blood loss and change in coagulation profile associated with gastrointestinal malignancies.

Reduced red cell count and haemoglobin, increase in neutrophil count with decreased lymphocyte count, change in coagulation profile are associated with poor prognosis. Hence early screen-

Volume : 5 | Issue : 3 | March 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

ing and diagnosis, close monitoring of haematological and coagulation profile will help in reducing morbidity and mortality.

ACKNOWLEDGEMENT:
Sincere thanks to Dean, faculties and staff of Tirunelveli Medical College.

Table-1 AGE & SEX COMPARISON:

Age	Number of cases	Number of Males	Number of Females
31-40	4	3	1
41-50	5	1	4
51-60	7	3	4
61 & above	9	8	1

Table-2 ORGAN COMPARISON:

Organ affected	Number of cases
Stomach	13
Oesophagus	3
Colon	1
Rectum	7
Anal canal	1

Table-3 GI MALIGNANCY WITH HAEMOGLOBIN:

Haemoglobin (gm. %)	Males	Females	Total number of cases
3-6	2	0	2
6.1-9	3	3	6
9.1-12	4	5	9
12.1-15	6	2	8
15.1 & above	0	0	0

Table-4 COMPARITIVE STUDIES OF GI MALIGNANCY WITH PERIPHERAL SMEAR WITH RESPECT TO RBC:

Total cases	Normal study	Microcytic hypochromic anaemia	Macrocytic anaemia	Others
25	6	17	0	2

Fig.1. microcytic hypochromic anemia

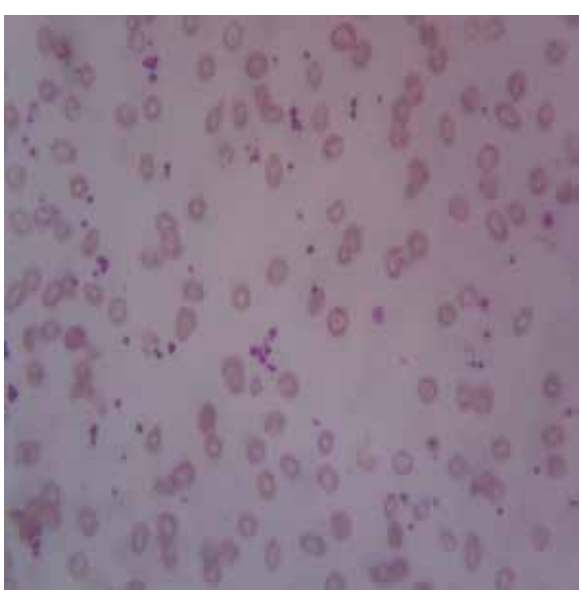
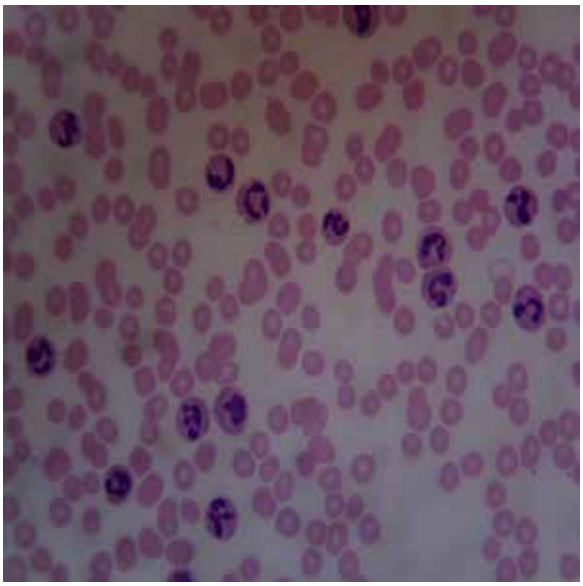


Fig.2. microcytic hypochromic anemia with neutrophilia.



REFERENCES:

1. Robbins and Cotran- Pathologic Basis of Disease
2. Pisani P, Parkin DM. Screening for gastric cancer. Cancer Treat Res 1996; 86: 113-19
3. Indian Journal of Gastroenterology : Official Journal of the Indian Society of Gastroenterology[1999, 18 (3): 118-121]
4. Frost DB, Richards PC, Monague ED,Giacco GG, Martin RG. Cancer of the anorectum. Cancer 1984;53(6):1285-1293.
5. PubMed- PMID 12361812, Am J Med. 2002 Sep;113 (4):276-80
6. Johnson LG, Madeleine MM, Newcomer LM, Schwartz SM, Daling JR. Anal cancer incidence and survival; the surveillance, epidemiology and end results experience, 1973-2000. Cancer. 2004;101(2):281-288.
7. Masataka Ikeda, Hiroshi Imamura, Seizo Masutani et al, Annals of Surgical Oncology, Cancer, 2002:9(3);287-291
8. Jung KW, Park S, Kong HJ, Won YJ, et al. Cancer statistics in Korea: incidence, mortality, survival and prevalence in 2009. Cancer Res Treat.2012;44:11-24
9. Coussens LM,Werb Z. Inflammation and cancer. Nature .2002;420:860-867.
10. R. Berardi, C.Braconi, G.Mantello, G. Luppi et al, Italy. Cancer , Annals of Oncology 17:1661-1664,2006
11. Mannucci PM- Bartolo DC, Management of Anal Canal Cancer. Dis Colon Rectum 2005, 48(6):1301-1315
12. Green D. Management of bleeding complications of haematologic malignancies. Semin Thromb Hemost. 2007;33:427
13. James MW, et al, risk factors for gastrointestinal malignancy in patients with iron deficiency anaemia. European Journal Gastroenterol hepatol. 2005 Nov 17(11):1197-1203.
14. Obermeier A, Cheuk R, Horwood K et al. Cancer 2001;92:903-908.
15. Warde P, O'Sullivan B, Bristow RG et al: the influence of pretreatment haemoglobin on local control. Int J Radiat Oncol Biol Phys 1998; 41:347-353.
16. Dubray B, Mosseri V, Brunin F et al. Anaemia is associated with lower regional control and survival after radiation therapy: a prospective study. Cancer 1996; 201: 553-558.
17. Fein DA, Lee WR, Hanin AR et al. pretreatment haemoglobin level influences local control and survival of squamous cell carcinoma. J Clin Oncol 1995;13:2077-2083.
18. Lutterbach J, Guttenberger R. Anaemia is associated with decreased local control of surgically treated squamous cell carcinoma. Int J Radiat Oncol Biol Phys 2000; 48:1345-1350.
19. Shen JG, Cheong JH, Hyung WJ et al. pretreatment anaemia is associated with poorer survival in patients with stage I and stage II gastric cancer. J Surg Oncol 2005;91:126-130.
20. Kuper H, Adami HO, Trichopoulos D. infections as a major preventable cause of human cancer. J Intern Med.2000;248:171-183.
21. Jeong JH,Lim SM, Yun JY, Rhee GW, Lim JY, et al. comparison of two inflammation based prognostic scores in patients with unresectable advanced gastric cancer. Oncology. 2012;83:292-299.

22. Ray-Coquard I, Cropet C, Van Glabbeke M, et al. European Organization Tfor Research and Treatment of Cancer Soft tissue and Bone Sarcoma Group. Cancer Res 2009;69:5383-5391.
23. Harrison LB, Chadha M, Hill RJ et al. impact of tumour hypoxia and anaemia on radiation therapy outcomes. Oncologist 2002;7:492-508.
24. Wagner W, Hermann R, Hartlapp J et al. prognostic value of haemoglobin concentrations in patients with gastric cancer treated with combined radio-chemotherapy and surgery. Strahlenther Onkol 2000;176:73-80.