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Hematological manifestations in Non-hematological Malignant Neoplasms

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Abstract

Malignant neoplasm being one of the principal causes of mortality usually presents with diversified symptoms depending upon the site, type of malignancy and its biological behaviour. Sometimes, abnormal hematological picture may be the first presentation manifesting as paraneoplastic syndrome. The present study included 50 cases of various non-hematological malignant tumors, the blood samples were taken and the complete hematological profile was analysed and recorded. The hematological parameter included Hb, TLC, DLC, Platelet Count, Reticulocyte Count, PCV, RBC Count. In the present study, in all the malignant neoplasms reported, the abnormal hematological findings observed in order of frequency were anemia, leucocytosis, neutrophilia, lymphopenia, thrombocytosis, neutropenia and eosinophilia. Anemia of diverse magnitude and type was the most common hematological abnormality seen in the study. A significant statistical correlation was found between the presence of anemia and the stage of the disease. The next common abnormal hematological parameter was that of neutrophilic leucocytosis which was also associated with an advanced disease. In conclusion, the malignant tumors are associated with paraneoplastic hematological abnormalities which can be used both as diagnostic and prognostic markers in the course of the disease and can be helpful as an adjuvant instrument in the management of the disease.

Keywords: Hematological manifestations, Malignant neoplasm

Introduction

Malignant neoplasm being one of the principal causes of mortality usually presents with diversified symptoms depending upon the site, type of malignancy and its biological behaviour. Sometimes, abnormal hematological picture may be the first presentation manifesting as paraneoplastic syndrome. Malignancy may indirectly affect both the cellular elements of blood as well as the coagulation system. The most common presentation is chronic anemia which may be related to blood loss, bone marrow infiltration, effect of chemotherapy/radiotherapy and anaemia of chronic disease but at the same time, interaction of the immune system with the iron metabolism and erythropoiesis along with the role of inhibitory cytokines such as TNF, IL-1, IL-6 which act on the erythroid precursor cells causing iron to be diverted from erythropoiesis and retained within the reticulo-endothelial system. Other abnormal findings can be elevated ESR, leucocytosis, thrombocytosis, thrombocytopenia and eosinophilia, etc.

Aims & Objectives:

1. To study the haematological profile (Hb, TLC, DLC, PBF, Platelet Count, PCV) in non-hematological malignant tumors.
2. To study any specific hematological parameter in specific carcinomas and sarcomas.
3. To evaluate the effect of treatment on the hematological profile wherever follow-up of the patient is possible.
4. To study the hematological profile as a prognostic tool in relation with the stage of the tumor especially metastatic.

Materials and Methods

50 histopathologically proven cases of carcinoma were taken up for the study and were subjected to complete hematological profile which included Hemoglobin (Hb), Total Leucocyte Count (TLC) , Differential Leucocyte Count (DLC), Peripheral Blood Film (PBF), Packed Cell Volume (PCV), Platelet Count, RBC Count and Reticulocyte Count as per the standard methods described in the textbook of Dacie and Lewis.[1]

Observations

40 cases of different malignant neoplasms along with 10 cases of various malignancies undergoing chemotherapy/radiotherapy were taken.

Age/Sex: Out of the total 50 cases, 27 were female patients (54%) and 23 were male patients (46%). Maximum incidence was seen in the 5th decade in both males and females.

33 cases were found to be anemic,the anemia predominantly being microcytic and hypochromic and the rest normocytic, normochromic. Only 1 case presented with macrocytic blood picture. The lowest Hb (7.5gm %) was found in a case of carcinoma tongue.

Neutrophilic leucocytosis was seen in 11 cases (22%) and the majority of the patients were metastatic on presentation.

1 case of metastatic lung carcinoma presented with neutropenia with relative lymphocytosis.

Lymphopenia was seen in 4 patients with relative neutrophilia and 3 cases out of which showed further decrease in absolute lymphocyte count after chemotherapy.

Increased differential eosinophil count was seen in 1 case of carcinoma penis which decreased markedly after amputation.

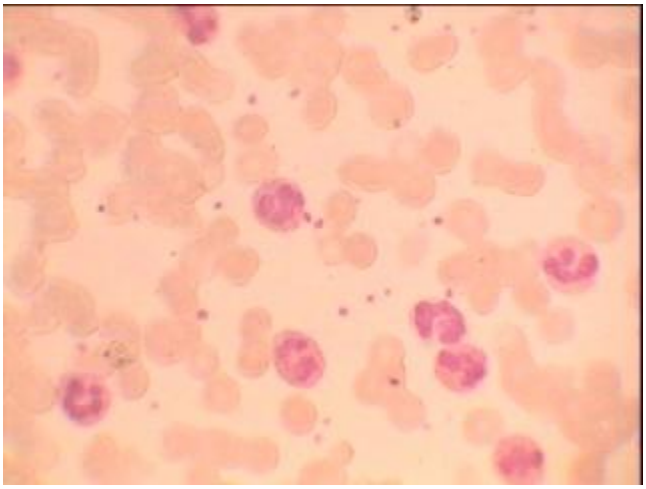
1 case each of thrombocytosis was reported in carcinoma lung and carcinoma cervix.

During the study period, none of the case was diagnosed as sarcoma.

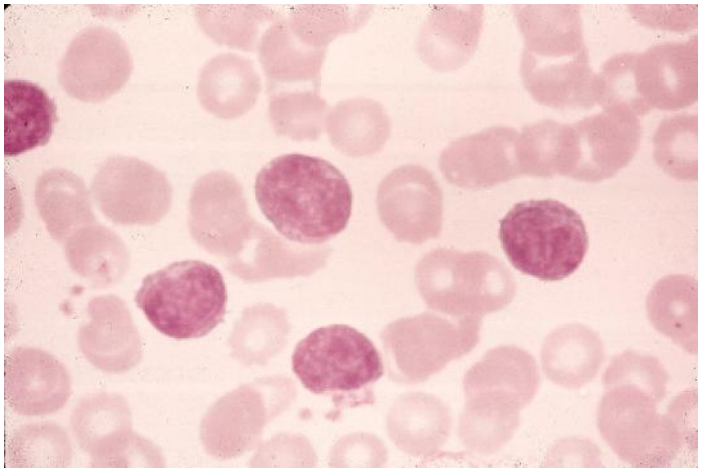
Hematological profile in various non-hematological malignancies

	Hb		**TLC**		**N**		**L**		**M**		**E**		**B**		**RC**		**PLC**	
Tumor	N	A	N	A	N	A	N	A	N	A	N	A	N	A	N	A	N	A
Breast (16)	5	11	13	3	13	3	11	5	16	0	16	0	16	0	9	7	16	0
GIT (11)	1	10	7	4	6	5	4	7	11	0	11	0	11	0	4	7	11	0
Cervix (5)	4	1	5	0	5	0	3	2	5	0	5	0	5	0	4	1	4	1
Penis (4)	1	3	2	2	3	1	1	3	4	0	3	1	4	0	3	1	4	0
Thyroid (4)	4	0	2	2	2	2	1	3	4	0	4	0	4	0	4	0	4	0
Larynx (3)	0	3	2	1	1	2	0	3	3	0	3	0	3	0	0	3	3	0
Lung (3)	1	2	2	1	1	2	1	2	3	0	3	0	3	0	2	1	2	1
Bladder (2)	0	2	1	1	1	1	1	1	2	0	2	0	2	0	1	1	2	0
GB (1)	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
HCC (1)	0	1	1	0	0	1	0	1	1	0	1	0	1	0	1	0	1	0
Total (50)	17	33	36	14	33	17	23	27	50	0	49	1	50	0	29	21	48	2

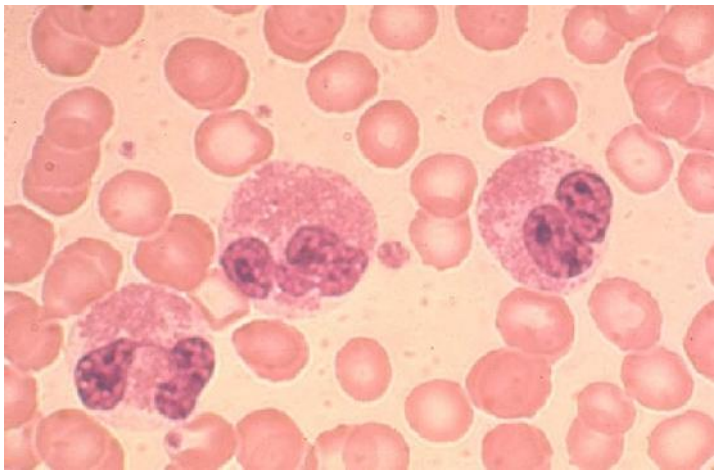
Hb:Hemoglobin, TLC:Total Leucocyte count, N:Neutrophil, L:Lymphocyte, M:Monocyte, E:Eosinophil, B:Basophil, RC:Reticulocyte count, PLC:Platelet count, N:Normal, A:Abnormal



Neutrophilic Leucocytosis in a case of Carcinoma Bladder



Lymphocytosis in a case of Carcinoma Lung



Eosinophilia in a case of Carcinoma Penis

Discussion

Cancer may present as lump or mass, pain, unexplained anaemia, loss of weight, loss of appetite. There may be local manifestations due to pressure or obstruction or due to tissue destruction caused by ulceration and bleeding. Cancer when disseminated may present with systemic manifestations such as pleural/peritoneal effusions, pathological fractures, bone pain and fever. An abnormal haematological picture may be the first presentation of cancer. In the present study, 50 cases of various non-hematological malignant tumors were included, their blood samples were taken and the hematological profile was studied and recorded.

The age varied from 23-94 years. Maximum incidence was seen in the 5th decade in both males and females.

In females, the maximum cases were those of Carcinoma Breast followed closely by Carcinoma Cervix (77.78% combined). According to the latest ICMR report, Carcinoma Breast is also the leading site of cancer in majority of the HBCRs (Hospital Based Cancer Registry) and PBCRs (Population Based Cancer Registry) in India.[5]

In India, the trend of malignancy in males is different and could be due to the environmental factors and occupational hazards and dietary habits. According to the ICMR report, Carcinoma Lung and GIT cancers were the leading sites as also noted in the present study. [6]

In the present study, various hematological parameters were taken viz, Hb, TLC, DLC, Platelet count, Reticulocyte count, PCV, RBC count. Of all these parameters, the abnormalities were seen in Hb, TLC, DLC and Platelet count.

Anemia of diverse magnitude and type was the most common hematological abnormality seen in the study. Microcytic type of anemia was the most common and it was the most common in female patients. Normocytic, normochromic blood picture was mostly seen in the male patients. This finding may be attributed to the nutritional type microcytic anemia seen more commonly in female patients in the Indian settings. [7]

In cancer patients, functional iron deficiency is the predominant mechanism, in which iron availability is reduced due to disease or the therapy-related inflammatory process. Furthermore, solid tumors have a higher rate of absolute and functional iron deficiency anemia, compared to hematologic malignancies. [8,9]

Our study also observed a statistical correlation between the presence of anemia and nodal metastasis and P value was found to be significant (P value < 0.016) as in the metastatic malignant tumors (24 cases), anemia (of any type) was present in 19 cases.

In a systematic review of the literature, it was found that prevalence of anemia varied by cancer type and the stage of the cancer. Nearly 40% of patients with early stage cancer have anemia and the percentage increases to 80% in advanced or metastatic cases.

The patients with anemia have poor survival and local tumour control than their non-anemic counterparts.[10]

Leucocytosis was observed in 14 different tumors (out of total 50 cases) in the present study. Out of these 14 cases, neutrophilic leucocytosis was seen in 11 cases (22%). Jensen and colleagues have found that abnormal blood counts comprising of leucocytosis and neutrophilia are associated with high comorbidity scores and possibly with larger tumours. Some other studies have also shown that leucocytosis and neutrophilia before treatment and treatment related lymphocytopenia have predictive value in some cancers. [11,12,13]

In our study, 10 patients out of the total 14 patients (71%) with neutrophilia were metastatic on presentation and having advanced stage of the disease. The neutrophilia in these patients could be due to the disseminated disease and thus persistent neutrophilia is a useful prognostic parameter carrying a poor prognosis.

In the present study, in all the malignant neoplasms reported, the abnormal hematological findings observed in order of frequency were anemia, leucocytosis, neutrophilia, lymphopenia, thrombocytosis, neutropenia and eosinophilia. Among these, neutropenia in carcinoma lung, lymphopenia in Carcinoma larynx and eosinophilia in carcinoma penis were original documentations never reported before.

Conclusion

Cancer may present as lump or mass, pain, unexplained anaemia, loss of weight, loss of appetite. When disseminated, it may present with systemic manifestations such as pleural/peritoneal effusions, pathological fractures, bone pain and fever. An abnormal haematological picture may be the first presentation of cancer. Of all the hematological parameters so recorded, anemia was the most common abnormality seen in 33 cases (66%) and a significant statistical correlation was observed between pre-treatment and post-treatment Hemoglobin values (P value < 0.022). Furthermore, the decreasing level of Hemoglobin is an indirect parameter which tells that the disease is in a progressive stage as 24 patients out of the total were having metastasis and 19 of them were anemic (79.16%). So, definite correlation was seen between anemia and metastasis (P value < 0.016). 10 out 14 patients (71%) with neutrophilic leucocytosis were having metastasis on presentation and it can be useful prognostic parameter which may be helpful to see the course of the disease and the effect of treatment.

Thus, it is concluded that malignant tumors are associated with paraneoplastic hematological abnormalities which can be used both as diagnostic and prognostic markers in the course of the disease and can be helpful as an adjuvant instrument in the management of the disease.

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