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RESEARCH ARTICLE

STUDY OF HEMATOLOGICAL PARAMETERS IN PATIENTS WITH NON-HEMATOLOGICAL MALIGNANCIES AND THEIR CORRELATION WITH STAGE OF THE DISEASE

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Abstract

Background: The incidence of various non-hematological malignancies is on the rise due to increasing awareness and effective screening programmes. An abnormal hematological parameters like anemia, leucocytosis, thrombocytosis may be the first manifestation in patients with non-hematological malignancies. The present study was conducted to detect the hematological abnormalities in patients with non-hematological malignancies and correlate these parameters with the stage of the disease.

Materials And Methods: 100 cases of non-hematological malignancies were randomly seleted. Their blood samples were collected and examined.

Observation And Results: Out of 100 patients, most of them were in the age group of 51-70years. among them 53% were males and 47% were females. Anemia was detected in 78%, leucocytosis was detected in 42% and thrombocytosis was found in 26% of patients. The incidence(93.1%) and severity(72.4%) of anemia increases with the advancing stage of the disease. The incidence of leucocytosis(51.7%) and thrombocytosis(44.8%) also increases with the advancing stage of the disease.

Conclusion: The present study showed a definite association of hematological abnormalities like anemia, leucocytosis and thrombocytosis in patients with various non-hematological malignancies. These parameters increases with the advancing stage of the disease. Hence early detection and proper intervention can help in better patient outcome and improvement in quality of life.

Introduction:-

An abnormal hematological parameter may be the first manifestation in many patients with non-hematological malignancies. It includes anemia, leucocytosis, thrombocytosis, monocytosis, neutrophilia, eosinophilia, etc,. These abnormalities are due to Granulocyte Macrophage–Colony Stimulating Factor (GM-CSF), interleukin-1(IL-1), interleukin-6(IL-6) and tumour necrosis factor(TNF) produced by the tumour cells.[1] There is a positive correlation between hemoglobin levels and quality of life in cancer patients. Thus, normalization of hemoglobin improves the quality of life.[2] Leucocytosis is seen in many non-hematological malignancies like lung and colorectal carcinomas.[3] Generally, the degree of leucocytosis is mild, but it becomes severe in patients with metastasis.[2,3] Tumour-associated

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leucocytosis is an additional tumour marker in monitoring patients with non-hematological malignancies.[3] Malignancy also causes secondary or reactive thrombocytosis.[4] It is an independent prognostic factor in ovarian cancer.[2] Thus, when platelet count is combined with other blood parameters, the sensitivity and specificity for predicting malignancy is increased.[4]

Aims And Objectives:-

To study the incidence of hematological parameters like anemia, leucocytosis and thrombocytosis in various non-hematological malignancies in patients above 12 years of age andto compare these hematological parameters with the stage of the disease.

Materials And Methods:-

This is a prospective study carried out in the Department of Pathology on the patients admitted under various departments during the period of November 2016 to October 2018. Newly diagnosed patients with non-hematological malignancies and above 12 years of age were included in this study. Patients with hematological malignancies, under 12 years of age and patients with Systemic illness like cardiac, renal or hepatic disease (severe enough to affect hematopoiesis) were excluded from the study.

This study was conducted on 100 patients with various non-hematological malignancies. Patients were randomly selected from various surgical and gynaecological wards as per the inclusion and exclusion criteria.

A detailed clinical history was obtained from the patient regarding the present illness(malignancy), duration of the disease, bleeding or thrombotic tendency, history of drug intake, any previous medical illness, etc,. Other investigations like CT, MRI, USG scans and Xray films were studied to evaluate the stage of the disease.

After obtaining informed consent from the patient, samples were collected under aseptic precautions. Then samples were transferred to lavender tubes containing K2 ethylene diamine tetraceticacid(EDTA). Complete hemogram was done using fully automated hematologyanalyzer SYSMEX KX-21.

The blood films were made for all cases and stained with leishman stain and examined.

Observation And Results:-

The age of the patients in the present study ranged from 16-76 years, of which the predominant age group involved was 51-70years. Among the 100 patients, 53 were males and 47 were females.

Out of 100 cases, 5% of patients belong to stage I disease, 34% to stage II disease, 32% to stage III disease and 29% to stage IV disease.

In the present study, 78% of patients had anemia, out of which 30.8% had mild anemia, 29.5% had moderate anemia and 39.8% had severe anemia. Among the anemic patients, the peripheral smear examination showed predominance of microcytic hypochromic anemia in 91% of patients and normocytic normochromic anemia in 9% of patients.

Anemia was present in 60% of patients with stage I disease, 55.8% of patients with stage II disease, 90.6% of patients with stage III disease and 93.1% of patients with stage IV disease. This showed the incidence of anemia increases with the advancing stage of the disease.

Table No. 1:- Incidence of anemia with the stage of the disease.

Stage of the disease	Total number of cases	Number of cases with anemia	Percent
Stage I	5	3	60%
Stage II	34	19	55.8%
Stage III	32	29	90.6%
Stage IV	29	27	93.1%

Patients with stage I and stage II disease had predominantly mild anemia (66.7% and 73.7% respectively). Patients with stage III disease had predominantly moderate anemia (48.3%). Patients with stage IV disease had more number of patients with severe anemia (77.8%).

Table No. 2:- Severity of anemia with the stage of the disease.

Stage of the disease	Number of cases with anemia	Mild anemia		Moderate anemia		Severe anemia	
		Number of cases	Percent	Number of cases	Percent	Number of cases	Percent
Stage I	3	2	66.7%	1	33.3%	0	0%
Stage II	19	14	73.7%	4	21.1%	1	5.3%
Stage III	29	6	20.7%	14	48.3%	9	31.0%
Stage IV	27	2	7.4%	4	14.9%	21	77.8%

Leucocytosis was seen in 42% of patients. Among them, 64.3% of patients had neutrophilia, 26.2% of patients had eosinophilia and 9.5% of patients had lymphocytosis.

Leucocytosis was seen in 40% of patients with stage I disease, 35.2% of patients with stage II disease, 40.6% of patients with stage III disease and 51.7% of patients with stage IV disease. This shows that the incidence of leucocytosis increases with the advancing stage of the disease.

Table No. 3:- Incidence of leucocytosis with the stage of the disease.

Stage of the disease	Total number of cases	Number of cases with leucocytosis	Percent
Stage I	5	2	40%
Stage II	34	12	35.2%
Stage III	32	13	40.6%
Stage IV	29	15	51.7%

Neutrophilic leucocytosis was predominant in all the stages of the disease. Neutrophilia was observed in most of the patients with stage I disease.

Table No. 4:- Types of leucocytosis with the stage of the disease.

Stage of the disease	Number of cases with leucocytosis	Neutrophilia		Eosinophilia		Lymphocytosis	
		Number of cases	Percent	Number of cases	Percent	Number of cases	Percent
Stage I	2	2	100%	0	0%	0	0%
Stage II	12	8	66.7%	3	25%	1	8.3%
Stage III	13	9	69.2%	4	30.8%	0	0%
Stage IV	15	8	53.3%	4	26.7%	3	20%

Thrombocytosis was seen in 26% of patients and among them, it was seen in 20% of patients with stage I disease, 8.8% of patients with stage II disease, 28.1% of patients with stage III disease and 44.8% of patients with stage IV disease. This shows that the incidence of thrombocytosis increases with the advancing stage of the disease.

Table No. 5:- Incidence of thrombocytosis with the stage of the disease.

Stage of the disease	Total number of cases	Number of cases with thrombocytosis	Percent
Stage I	5	1	20%
Stage II	34	3	8.8%
Stage III	32	9	28.1%
Stage IV	29	13	44.8%

In the present study, 41% of cases had carcinoma of gastrointestinal tract, 3% of cases had carcinoma of respiratory tract, 10% of cases had carcinoma of solid organs*, 26% of cases had carcinoma of genital tract, 8% of cases had carcinomas of bladder and 12% of cases had carcinoma of breast.

*Solid organs- carcinomas of liver, thyroid, bone.

Anemia was present in 87.8% of patients with gastrointestinal tract malignancies, 33.3% of patients with respiratory tract malignancies, 50% of patients with solid organ malignancies, 73% of patients with genital tract malignancies, 75% of patients with bladder malignancy and 91.7% of patients with breast malignancy. The incidence of anemia is more common in patients with malignancies of breast and gastrointestinal, 91.7% and 87.8% of patients respectively.

Carcinomas of gastrointestinal tract, respiratory tract and genital tract had predominantly severe anemia. Carcinomas of solid organs and bladder had predominantly moderate anemia. Carcinoma of breast had more number of patients with mild anemia.

Leucocytosis was seen in 48.8% of patients with gastrointestinal malignancies, 33.3% of patients with respiratory tract malignancies, 30% of patients with solid organ malignancies, 38.5% of patients with genital tract malignancies, 50% of patients with bladder malignancy and 33.3% of patients with breast malignancy. The incidence of leucocytosis is more in patients with carcinomas of bladder and gastrointestinal tract in 50% and 48.8% of patients respectively.

Malignancies of all organs had predominance of neutrophilic leucocytosis, except bladder malignancy where there was predominance of eosinophilic leucocytosis in 75% of patients.

Thrombocytosis was seen in 29.3% of patients with gastrointestinal malignancies, 10% of patients with solid organ malignancies, 30.8% of patients with genital tract malignancies, 37.5% of patients with bladder malignancy and 16.7% of patients with breast malignancy. The incidence of thrombocytosis is more in patients with bladder malignancy (37.5%).

Discussion:-

The distribution of malignancies of various organs differ between developed and developing countries. Lung cancer is the most common malignancy in men, followed by prostate cancer and colorectal cancer in developed countries and gastric cancer and liver cancer in developing countries.[5] In the present study, carcinomas of gastrointestinal tract, oral cavity, bladder, penis and skin were common among male patients. Among women, breast cancer is the most common malignancy, followed by cervical cancer in developing countries and carcinomas of colorectum, lung, stomach and endometrium overcome the cervical cancers in developed countries.[5]In the present study, carcinoma of the breast was more common among female patients(17%), followed by carcinomas of cervix, gastrointestinal tract and ovaries. Thus the present study reflects the trend of cancer distribution.

In the present study, the predominant age group involved was 51-70years. Male patients were predominant (53%). This corresponds to the study done by Bhubaneswar et al,.[6]

In the present study, 78% of patients were anemic. This corresponds to the studies done by Anu Gupta et al(74%)[1] and Jamil Kalyani et al(60-75%)[2]. Among the anemic patients, 30.8% had mild anemia, 29.5% had moderate anemia and 39.8% had severe anemia. There is a predominance of severe anemia in the present study, whereas in western population most of the patients had mild anemia.[7,8,9] Among the 78% of patients with anemia, 91% were microcytic hypochromic and 9% were normocytic normochromic. Whereas studies done by various other authors showed the predominance of normocytic normochromic anemia.

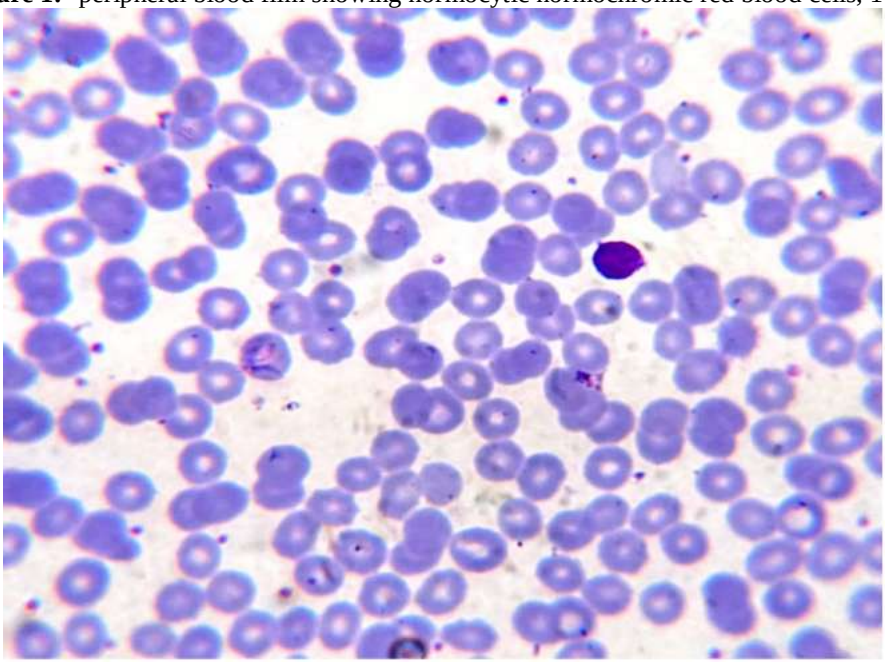
Anemia was present in 60% of patients with stage I disease, 55.8% of patients with stage II disease, 90.6% of patients with stage III disease and 93.1% of patients with stage IV disease. Here the incidence of anemia increases with the stage of the disease. This corresponds to the study done by Anu Gupta et al(90.9%)[1] and Knight et al(80%).[10]

In the present study, leucocytosis was seen in 42% of patients. This corresponds to the study done by Anu Gupta et al(50%)[1] , Shoenfeld et al(30%)[3] and Qui MZ et al(25.6%)[11]. Among the 42% of patients with leucocytosis, 64.3% had neutrophilia, 26.2% had eosinophilia and 9.5% had lymphocytosis. Here the neutrophilia was predominant, which corresponds to the studies done by Anu Gupta et al(60%)[1], Granger et al(96%)[12] and shoenfeld et al(70.2%)[3].

Leucocytosis was seen in 40% of patients with stage I disease, 35.2% of patients with stage II disease, 40.6% of patients with stage III disease and 51.7% of patients with stage IV disease. Here the incidence of leucocytosis increases with the stage of the disease. This corresponds to the study done by Anu Gupta et al.[1]

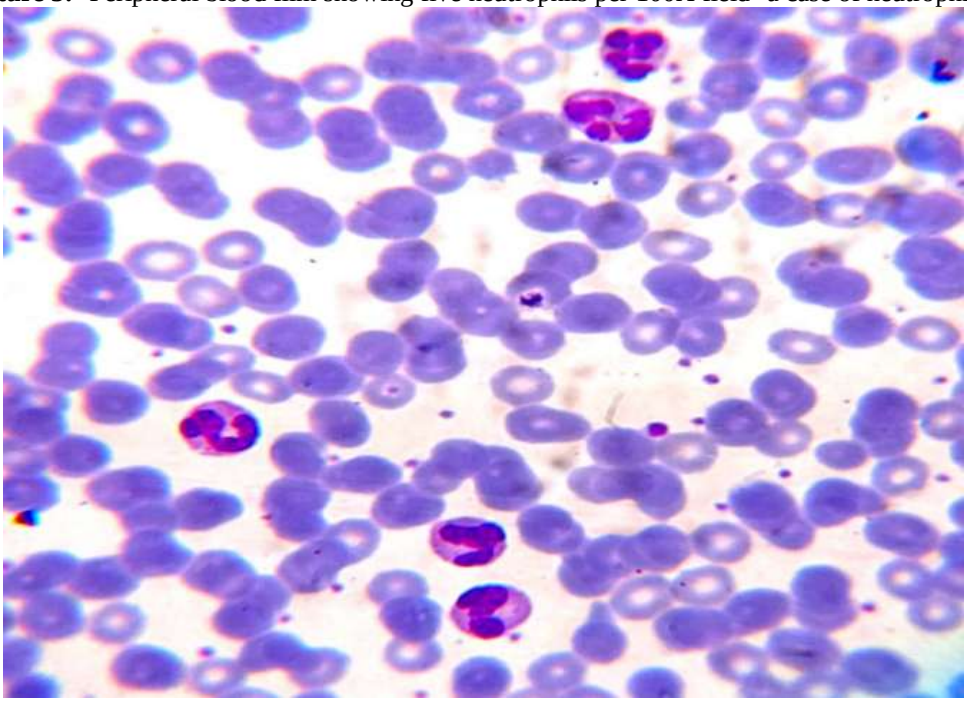
In the present study, thrombocytosis was seen in 26% of patients. This correlates with the findings of various other authors.[1,4] Among these 26% of patients, thrombocytosis was seen in 20% of patients with stage I disease, 8.8% of patients with stage II disease, 28.1% of patients with stage III disease and 44.8% with stage IV disease. Here the incidence of thrombocytosis increases with the stage of the disease. This corresponds to the study done by Anu Gupta et al.[1]

Picture 1:- peripheral blood film showing normocytic normochromic red blood cells, 100X.

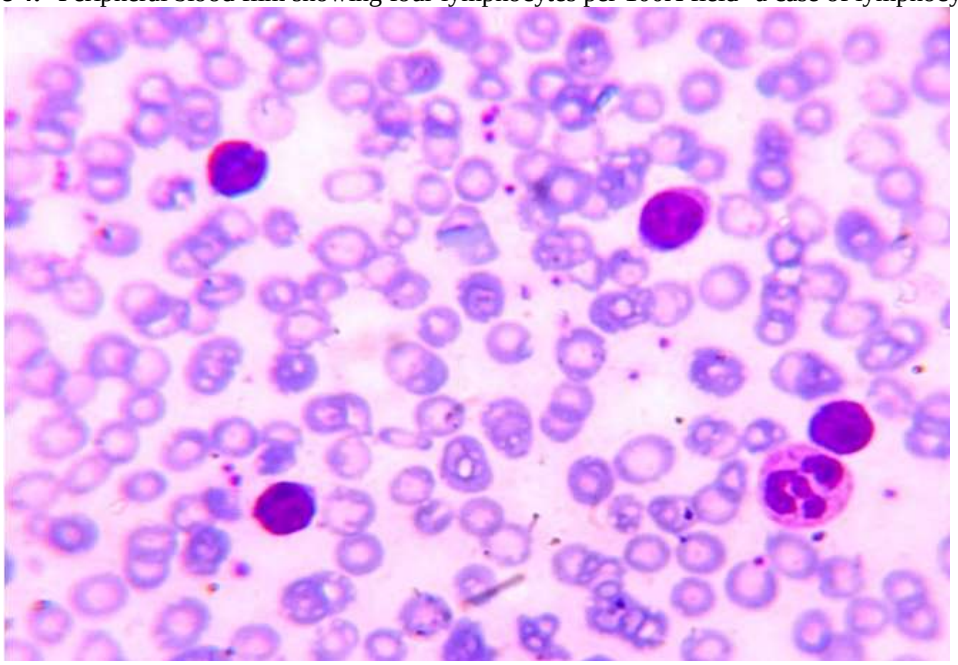


Picture 2:- Peripheral blood film showing microcytic(compared with the nucleus of small lymphocyte) hypochromic red blood cells, 100X.

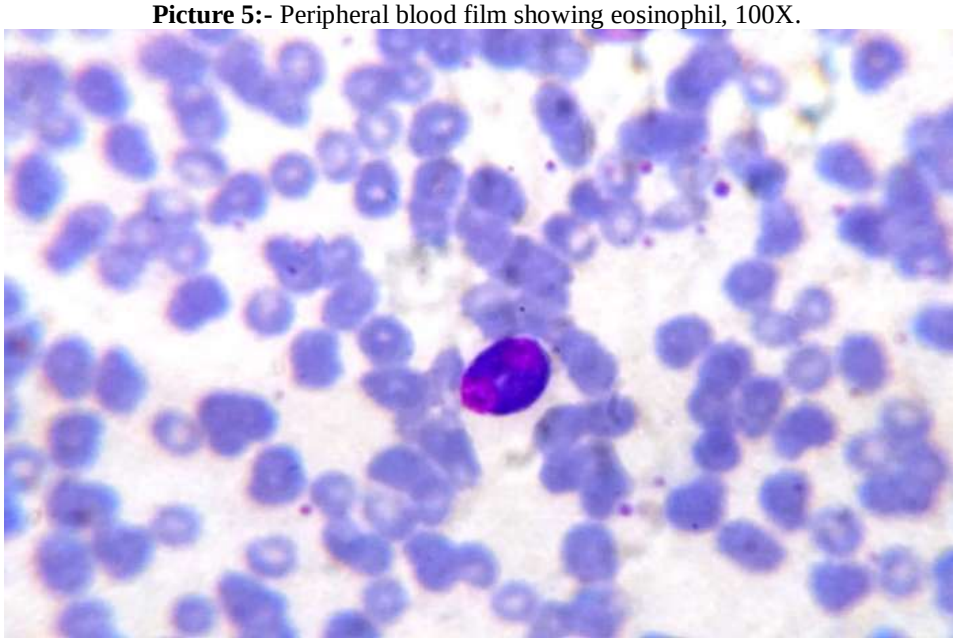
Picture 3:- Peripheral blood film showing five neutrophils per 100X field- a case of neutrophilia.



Picture 4:- Peripheral blood film showing four lymphocytes per 100X field- a case of lymphocytosis.



Picture 5:- Peripheral blood film showing eosinophil, 100X.



Conclusion:-

This study proves that the patients with non-hematological malignancies had definite association with hematological parameters like anemia, leucocytosis and thrombocytosis. These parameters increases with the advancing stage of the disease. Various growth factors released from the activated white blood cells and platelets cause rapid tumour progression and result in distant metastasis. Hence early detection and proper intervention can help in better patient outcome and improvement in quality of life.

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