ORIGINAL ARTICLE

Cytopenias in Various Combinations Found in Routine Complete Blood Counts

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ABSTRACT

Objective: To identify the type and frequency of different cytopenias in our laboratory

Study Design: Retrospective/observational.

Place & Duration: Dr. Ishrat-ul-Ebad Khan Institute of Blood Diseases (DIEKIBD), Dow University of Health Sciences, Karachi, Pakistan, from April 2013 to June 2013.

Material & Methods: Cytopenias either alone or in various combinations were identified on routine complete blood counts from the records of all CBC performed during the said period.

Results: Two thousands samples were analyzed, 313 (15.65 %) had cytopenias either alone or in combination. 232 (74.12 %) had isolated single or mono cytopenia, 60 (19.17 %) had bicytopenia & 21 (6.71 %) had pancytopenia.

Conclusion: There is significant occurrence of cytopenias either alone or in combinations and it needs immediate reporting of peripheral smear morphology. These cases should be immediately communicated to the relevant physician for proper further investigations, so that complications of underlying disease can be prevented

Key words: Complete Blood Counts (CBC), Mono Cytopenia, Bicytopenia, Pancytopenia, Anemia, Thrombocytopenia, Neutropenia

INTRODUCTION:

Complete blood count (CBC) is the primary and one of the most important investigation done for many diseases or for routine medical examination[1]. Its value lies in enormous information supplied through proper interpretation. Few of the important informations gained are the cell counts and haemoglobin values[2] .Cytopenias, either alone or in various combinations are seen more frequently nowadays[3], they represent a spectrum of hematological disorders including congenital & acquired, malignancies, nutritional deficiencies, malabsorption, infections, drug interaction and as a part of other systemic disorders[4]. It May range from asymptomatic condition to severe life threatening situations. Prompt recognition of the disorder, investigations, diagnosis and initiation of timely and appropriate treatment is crucial to avoid further complications and progression of the disorder[5].

Our aim of the study is to highlight the importance of CBC in detecting various cytopenias, their frequency, prompt recognition, timely investigations and treatment of these cases as CBC

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is the first investigation usually done in management of any disease

MATERIAL & METHODS:

It was a retrospective study from 1st April 2013 till 30th June 2013 in Dr.Ishrat-ul-Ebad khan institute of blood diseases, DDRRL, Ojha complex DUHS. A total of 2000 consecutive CBC samples of both females and males were collected in EDTA vials through a vacutainer from clean venous puncture. Patients giving a history of recent blood product transfusion, surgery and bleeding were excluded. The samples were analyzed within 60 minutes after gentle shaking in an automatic rotator in Cell Dyne automatic hematology analyzer, which measures nine parameters. Peripheral smears were stained by Leishman stain and morphology assessed by a qualified and experienced hematologist. CBC with cytopenias were repeated in another hematology analyzer (Ruby.Abott) and confirmed by peripheral morphology of smear especially for platelets clumps while neutropenia and thrombocytopenia cases were counted on "Neubauer Counting Chamber", for confirmation of results. Case selection was based on Haemoglobin (Hb) estimation, RBC, WBC, ANC and platelet counts.

RBC indices and PDW were noted for further evaluation. Results with cytopenias were separated by the senior technician and stained peripheral smear was reviewed by a hematologist. Following was the cut off limit for cytopenias

Hb males < 13 gm. /dl, female < 12 gm. /dl, Absolute neutrophil count < 2 x 10^9/L & platelet count < 150000 x 10^9/L

RESULTS:

Total of 2000 CBCs were analyzed retrospectively. Cytopaenias were n = 313 (15.65 %). Mono cytopenias were most frequent n = 232 (74.1 %) From these single cytopenias, anemia was n = 214 (92.2 %), thrombocytopenia n 16 (6.9 %) and neutropenia was rare n = 2 (0.9 %)(Table 1) (Fig 1). Bicytopenia was n = 60 (19.2 %) with combined A+T was n = 51 (85%), combined T+N was n = 4 (6.7%), while A+N was n = 05 (8.3 %) of all the bicytopenias (Fig 2). Pancytopenia was detected in 21 (6.7 %) cases of all cytopenias and 1.05 % of total sample size.

Male and female numbers were 855 (42.75%) and 1145 (57.2%) and the cytopenias were present in 116 (37.06 %) and 197 (62.94 %) respectively (Table 2).

DISCUSSION:

Pakistan is a developing country with about 38% of the population below the poverty line[6]. There is adulteration of food and sale of over the counter drugs for various diseases which can impair and distort the hematological hemostasis. It has been observed that neutropenia either alone or in combinations with other cytopenias carries a very high morbidity and mortality due to infections and may be due to many factors especially drugs and vitamin B12/Folate deficiency[5]. Unnoticed mild to moderate thrombocytopenia may be present with mild or unnoticeable bleeding, which usually requires investigations and most probably is due to immune destruction of platelets[7]. but nowadays Malaria and Dengue fever are also contributing to this menace[8]. Decreased counts may also throw an early sign of chronic liver disease, where splenomegaly may contribute significantly to it.

Anemia alone is significantly more prevalent in females and the reason may be iron deficiency during the reproductive age, while males suffer less from iron deficiency anemia because of no physiological blood loss but may suffer from it during the growth spurt period when iron requirements become more. Older males and females have low prevalence of anemia probably because of decreased blood loss. Iron deficiency anemia is most common cytopenia worldwide and especially in Pakistani females of child bearing age, if recognized earlier, can be treated adequately[9]. Isolated thrombocytopenia was equal in both sexes which is in accordance with international literature[10]. Neutropenia was significantly less and was equal in both sexes. Bicytopenias were equal in percentage in both sexes, A+T was most frequent and have multiple causes but may be linked to each other e.g., moderate to severe thrombocytopenic patient especially female can develop iron deficiency anemia due to excessive blood loss[11].

Table-1: Split up of Isolated Cytopenias and Cytopenias in various combinations (n=313)

Category	Monocytopenia (n = 232)			Bicytopenia (n =60)			Pancytopenia n = 21
Sub-Category	Anemia	Thrombocytopenia	Neutropenia	A + N	A + T	T + N	Pancytopenia
Monocytopenias 74.1% n = 232							
Anemia n=214	92.2 %						
Thrombocytopenia n = 16		6.9 %					
Neutropenia n = 02			0.9 %				
Bicytopenias 19.2 % n = 60							
A + N n = 05				8.3%			
A + T n = 51					85%		
T + N n = 4						6.7%	
Pancytopenias 6.7 % n = 21							100% (21)

A + N: Anemia & Neutropenia, A + T Anemia & thrombocytopenia, T + N: Thrombocytopenia & Neutropenia

Table-2 : Distribution of Cytopenias According to Age and Sex

Category	Monocytopenia (n = 232)			Bicytopenia (n =60)			Pancytopenia n = 21
Sub-Category	Anemia	Thrombocytopenia	Neutropenia	A + N	A + T	T + N	
Male n = 116 (37 %)							
0-1year	2	-	-	-	1	-	-
1—13 years	22	-	1	-	3	-	-
14—40 years	20	3	-	2	9	1	4
41—60 years	14	2	-	1	9	1	6
61—80 years	8	4	-	-	3	-	-
81 years &above	-	-	-	-	-	-	-
Sub-Total	66	09	01	03	25	02	10
Female n = 197 (62.9 %)							
0-1year	2	-	-	-	1	-	-
1—13 years	12	-	-	-	5	-	-
14—40 years	88	2	1	1	14	-	5
41—60 years	35	5	-	1	6	2	4
61—80 years	7	-	-	-	-	-	2
81 years &above	4	-	-	-	-	-	-
Sub-Total	148	07	01	02	26	02	11
Grand Total of both genders	214	16	02	05	51	04	21

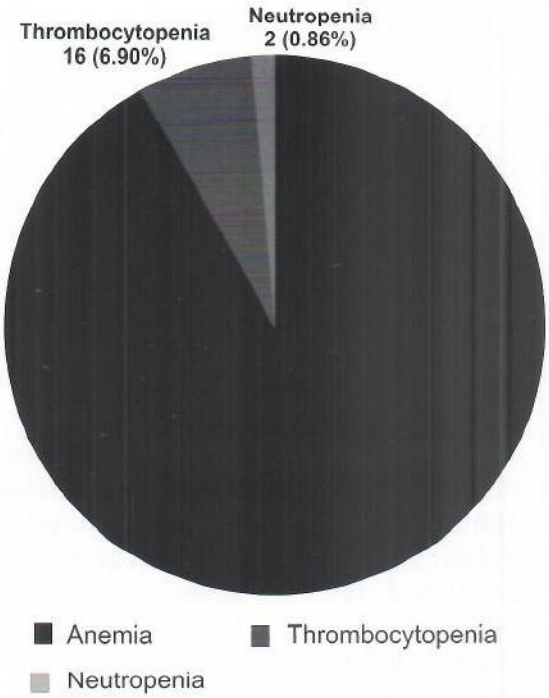

Fig-1: Split up of Monocytopenia (n=232)

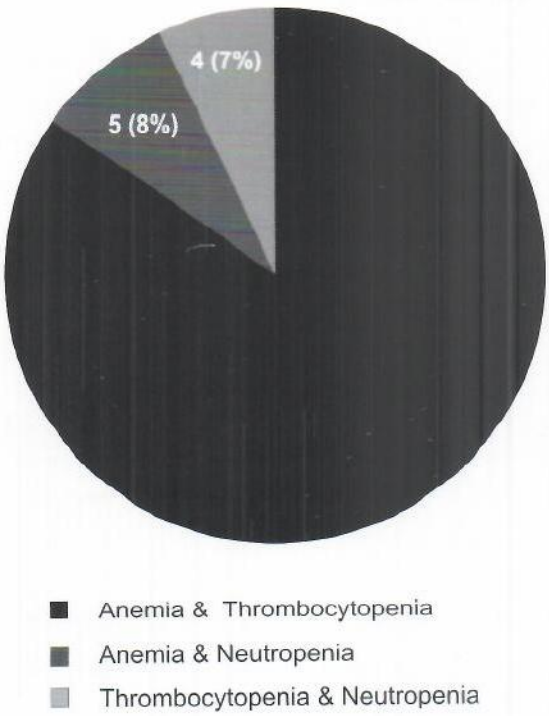

Fig-1: Split up of Bicytopenias (n=60)

Isolated thrombocytopenia signifies a proper etiology in children[12], and adults especially females. In children it may be sequelae of viral infection while in adults it may point towards an autoimmune process (ITP). There is existence of ethnic and congenital thrombocytopenia which usually represents early in life and many have somatic abnormalities and some of them can be confirmed on peripheral smear morphology[3]. Pancytopenia can occur due to many causes but moderate to severe may be due to bone marrow failures either due to an acquired, hereditary or congenital defect[14]. While quite a significant number of pancytopenia occurs either due to misuse of drugs or vitamin B12 deficiency. An excellent example is the pancytopenia associated either with, misuse of drugs or vitamin B12 or Folate deficiency, which if detected early and treated can prevent the complications and benefit the conditions.

CONCLUSION:

Complete blood count and it's adequate interpretation with proper peripheral smear morphology is of utmost importance in the management and monitoring of people health and if done routinely and periodically may be able to point to an emerging problem unaware to the patient. In our study there was significant presence of cytopenias either alone or in combination with other cell lines and it is recommended that routine CBC should be done periodically for health monitoring.

It is worth mentioning that due to its crucial importance, interpretation of CBC should be meticulously taught to all medical practitioners and there should be frequent CMEs regarding this aspect.

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