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Pancytopenia among Children in Al-Semawa Teaching Hospital for Maternity and Childhood / Iraq

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Abstract:
Background: *- Pancytopenia is not a rare disease of bleeding tendency among children in Al-Muthanna Governorate.*
Objectives: *- The purpose of this study is to evaluate the clinical features, causes and its complications in addition to the diagnosis and its treatment.*
Methods:- *This study involved 30 patients , presented with decreased all blood elements in peripheral blood we depended on medical history and clinical examination , in addition to complete blood count , blood film for morphology and bone marrow aspiration / biopsy .*
Results *:- Total cases were 30, 16 of them 3were males (53.4%) and the remaining 14 (46.6%) were females ,their ages ranged from 5 months to 16 years , the main causes of pancytopenia in this city were visceral leishmaniasis , toxoplasmosis , brucellosis , hypersplenism , drugs and fanconi anaemia .*
Conclusion: *- Pancytopenia is a common problem in this city .Its causes may be primary or secondary to other diseases. For any patient with bleeding tendency like epistaxis , haematuria , malena or purpuric rash , full investigation should be done to confirm the diagnosis and to avoid its serious complications and treated properly .Frequent blood transfusion were required in most of these cases .*
Keywords: *- Full medical history and clinical examination, in addition to complete blood count, blood film for morphology and bone marrow aspiration / biopsy.*

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I. Introduction

Pancytopenia refers to a reduction in all three blood elements: Erythrocytes (RBCs), Leukocytes (WBCs) and Platelets, it is seen in both peripheral blood and bone marrow in most cases of bone marrow failure. [1,2,3]

Pancytopenia may be due to bone marrow failure or aplastic anemia which can be either inherited or more commonly is acquired (secondary).[1 , 4]
If aplastic anemia is associated with congenital anomalies like microcephaly and /or heart disease, short stature, cafe au lait spots, polydactaly or other bone deformities, renal malformation and other conditions, this called fanconi anemia which may be inherited disease (autosomal recessive disease), this congenital anomalies are usually evident before the bone marrow failure, while the clinical features appear usually at school age group.[2]
The acquired type of fanconi anemia which is not associated with congenital anomalies, is due to many causes: genetically inherited as in cystinosis, tyrosinemia and extra, or due to drugs like chloramphenicol, gold therapy for treatment of arthritis, anti-thyroid drugs and others[1,2] .
Presentation is usually with bruising and purpuric rash from thrombocytopenia with the gradual development of anemia.[2]. Sometimes a plastic anemia is associated with infections like hepatitis and Epstein –barr virus and can occur at any age group, also occurs in cases with chronic hemolytic anemia like Sickle cell anemia and thalassemia or congenital spherocytosis if associated with Parvo virus B_{19} infection .[1] (page:2)

The definitive treatment of aplastic anemia fails, supportive care with frequent blood transfusions and treatment of underlying causes, in addition to bone marrow transplantation and cytotoxic drugs therapy .[2]
A plastic anemia is the most common cause of pancytopenia as mentioned in certain studies [5]. Acute lymphoblastic leukemia (ALL) is one of the causes of plastic anemia especially in children [6]. Bone marrow failure or peripheral sequestration of all blood elements in over active reticulo endothelial system (RES) and / or destruction of cells by the action of antibodies leading to pancytopenia(anemia , leukopenia and thrombocytopenia) with causes serious complications like septicemia , bleeding tendency or even death .[7,8]
The main causes of pancytopenia are: aplastic anemia, hypersplenism, visceral leishmaniasis (kala –azar), brucellosis, Malaria , tuberculosis , in addition to acute lymphoblastic leukemia (ALL) , acute myeloblastic

leukemia (AML) , some drugs ingestion [9], while gaucher disease which is autosomal recessive disease , is rare cause of pancytopenia [10].

The clinical features of pancytopenia include fever, pallor, hepatomegaly, splenomegaly, lymph nodes enlargement, in addition to bleeding tendency or even death [1,11].

II. Material and Methods

Thirty patients involved in this study in Al-Semawa teaching hospital for maternity and childhood, presented with decreases all blood elements (pancytopenia).

Full medical history and clinical examination were done for all cases, in addition to complete blood count: Erythrocytes (RBCs), Leukocytes (WBCs) and Platelets and blood film for morphology, to look for the cells count less than the normal ranges by taking blood samples which were collected in EDTA tubes for CBC and plain tubes for biochemical tests, urine and stool samples were also taken for occult blood analysis.

The criteria for diagnosis of pancytopenia was Hb < 11gm / dl , WBC count < 4000 /cumm, and platelets count <150.000/cumm, bone marrow aspiration / biopsy was done by using jamshidi needles from anterior superior iliac crest .

III. Results

Results of this study were illustrated in the following tables:

Table 1: The distribution of age and gender according to their percentages (%) among patients:

Age(years)	Gender(Sex)	Percentage (%)
< 6	Males Females	35 (equal) 35
6 → 12	Males Females	10 3
12 → 16	Males Females	7 10

Table 2: The distribution of patients according to their ages and numbers and percentages:

Age(years)	Number	Percentage (%)
< 6	20	68.9
6 → 12	4	13.9
12 → 16	6	17.2
Total	30	100

Table 3: The clinical features of patients with pancytopenia and its frequency and percentages:-

Clinical features	Frequency	%
Fever	29	96.6
Splenomegaly	26	86.6
Pallor	25	83.3
Hepatomegaly	18	60
Generalized weakness	17	56.6
Bleeding and purpuric rash	16	53.3
Lymph nodes enlargement	12	40
Poor appetite	10	33.3

Table 4: The main causes of pancytopenia and its numbers and percentages among all patients as diagnosed by bone marrow examination:

Causes	No. of Cases	%
Visceral Leishmaniasis (Kala – azar)	11	36.70
Hypersplinism	5	16.66
Toxoplasmosis	4	13.33
Brucellosis	4	13.33
Drugs	2	6.66
Aplastic Anemia	2	6.66
ALL	1	3.33
Fanconi anemia	1	3.33
Total	30	100

Table 5: The results of all blood elements (Hb, WBSCs, and platelets) among the age groups of cases with pancytopenia:

Age (years)	Hb (gm/dl)	WBC ($X\ 10^9$/L)	Platelets ($X\ 10^9$/L)
< 6	< 9	< 3.5	< 120 In all ages
6 → <12	< 10	< 4	
12 → 16	< 11	< 4	

Table 6: Normal blood count values:

Age (yeas)	Hb (gm/dl)	WBC ($X\ 10^9$/L)	Platelets ($X\ 10^9$/L)
< 6	11.5 → 13.5	5 → 17	150 → 450 at all ages
6 → <12	11.5 → 15.5	4.5 → 14.5	
12 → 16 Males = Females =	13 → 16 12 → 16	4.5 → 13 4.5 → 13	

IV. Discussion

This study involved thirty cases with pancytopenia, their ages ranged between 6 months and 16 years with `males to female's ratio of (1.1:1).

From table 1 , which showed the distribution of gender and out of those 30 cases , 16 (51.7%) were males and 14 (48.3%) were females , the maximum number of cases were found in the age group < 6 years and equal in both sex , while in other studies showed males were affected > females .[10,11]

Table 2 showed the distribution of patients according to their ages, numbers and its percentages and we found that the youngest patients in this study < 6 years, while the oldest patients were 16 years old, and about 20 patients (68.9%) their ages were < 6 years and about 4 cases (13.9%) their ages ranged between 12 → 16years, while the remaining 6 cases (17.2%) were ranged between 12 → 16 years.

From table 3 which showed the signs and symptoms of this disease , we found most of those patients presented with fever 29 cases (96.6%) ,Splenomegaly 26 cases (86.6%) , pallor 25 cases (83.3%) , hepatomegaly 18 cases (60) , generalized weakness 17 cases (56.6%) , bleeding and purpuric rash 16 case (53.3%) , lymph nodes enlargement 12 cases (40%) and poor appetite 10 cases (33.3%) .

Table 4 showed the diagnosis of pancytopenia by bone marrow examination with number of patients and its percentage for each disease .Visceral leismaniasis (Kala-azar) was very common and accounts 11 cases (36.70%) followed by Hypersplinism 5 cases (16.66%) , toxoplasmosis 14 cases (13.33%) , brucellosis 4 cases (13.33%) , drug induced pancytopenia 2 cases (6.66%) , ALL 1 case (3.33%) and fanconi anemia 1 case (3.33%) , while other studies showed a plastic anemia was the common cause of pancytopenia [5].

From table 5, the results of all peripheral blood elements (Hb, WBCs, Platelets) in this study were decreased when compared with normal blood values in table 6 ,[2] and this is the main criteria for the diagnosis of this disease .

V. Conclusion

Pancytopenia is a common disease in Al-Muthanna governorate and usually patients presented with fever, pallor, epistaxis and purpuric rash. Any patient with bleeding tendency should be investigated and treated properly to avoid serious complications and even death, and better referring to specialized center.

Most patients need frequent blood transfusions to correct anemia and thrombocytopenia, some cases of aplastic anemia need steroid or cytotoxic drugs therapy and others need bone marrow transplantation. The commonest causes of pancytopenia in this city are infectious disease like visceral leismaniasis (Kala- azar), toxoplasmosis, brucellosis, hypersplinism or suppression of bone marrow by malignant cells or drugs.

The maximum age group affected was below 6 years .The criteria of diagnosis of this disease include CBC, blood film for morphology, in addition to bone marrow examination. Improvement of quality of health care in developing countries and mostly in endemic area with VL (Kala- azar), toxoplasmosis and other diseases, is an important part for reduction of the incidence of this disease.

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