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International Journal of Current Research
Vol. 5, Issue, 12, pp.4259-4261, December, 2013

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

PANCYTOPENIA AMONG CHILDREN IN A TERTIARY CARE HOSPITAL- A RETROSPECTIVE STUDY

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ARTICLE INFO

Article History:
Received 15th September, 2013
Received in revised form
27th September, 2013
Accepted 19th October, 2013
Published online 25th December, 2013

Key words:
Pancytopenia,
Haematological parameters.

ABSTRACT

Pancytopenia is a very common entity among children in today's scenario. The cause of pancytopenia can be varied from drug induced bone marrow depression to leukaemia. So, the objective of this study is to determine the cause of pancytopenia among children by haematological parameters (complete blood count) and bone marrow aspiration in a tertiary health care centre. Material and method- A retrospective study was done patients below 18 years of age, diagnosed with pancytopenia at Patna Medical College and Hospital between May2010 to October 2012. Result-258 children were found to have suffered from pancytopenia during the study period. Age ranged from 4 and ½ months to 18 years. Out of 258 cases 62.4% were male and 37.6% were female. Generalised weakness and pallor were the most common clinical presentation of pancytopenia in children. Haematological parameter and bone marrow aspiration was diagnostic. Megaloblastic anaemia followed by hypoplastic anaemia were the most common forms.

INTRODUCTION

Pancytopenia is very common among children attending the hospital (Kar *et al*., 2002). The cause of pancytopenia is varied so the treatment modality differs (Kar *et al*., 2002). In pancytopenia the RBC, WBC and platelets are decreased in number (Bates *et al.*, 2006). The cause may lie primarily or secondarily in the bone marrow (Guinan *et al.*, 2004). Bone marrow can be hypocellular, normocellular or hypercellular depending upon the disease entity. This study is an attempt to evaluate the cause of pancytopenia among the children referred to the Pathology department of Patna medical college and hospital. Both their peripheral blood smear and bone marrow aspiration were taken into consideration.

MATERIALS AND METHODS

The present study is a retrospective study for a period of 2 and ½ years from May 2010 to October 2012. Children of both the sexes were included in the study. Cases were selected on the basis of their peripheral blood picture of decreased RBC, WBC and platelet. As this study was a retrospective study no ethical issues or consent from patient was needed. Data was retrieved from the records in the haematology unit of the Pathology department. Patient's complete blood count including haemoglobin concentration, RBC and WBC counts, differential count (DC), Platelet, MCV, MCH, MCHC and PCV, estimated by automated haematological counter was considered. Peripheral blood smear stained by leishman stain had also been examined. Bone marrow aspiration was finally done for diagnosis. A total of 258 children qualified for the study Out of this 161 were male and 97 were female. The most common presenting symptom was generalised weakness and pallor. Other symptoms were breathlessness, fever and weight loss. Splenomegaly and or hepatomegaly were present in some children.Haematological parameter for defining pancytopenia were haemoglobin < 9gm%, WBC < 4000/cmm and platelet < 1 lakh/cmm. Following is a chart of 258 children with different signs and symptoms.

Megaloblastic anaemia was noted in 123 cases with 70 male and 53 female. Their peripheral smear showed macrocytes and hypersegmented neutrophils. Pancytopenia in megaloblastic anaemia is due to retarded DNA maturation leading to depression of all the cell series. Bone marrow showed increased erythroid activity with megaloblastic changes. Megaloblastic change is signified by sieved nuclear chromatin, asynchronous nuclear maturation and bluish cytoplasm. Myeloid series showed giant metamyelocytes. Megakaryocytes were depressed. As B12 and folate level could not be estimated in the present setting, patients were treated with folic acid and parental hydroxycobalamine and they showed good response. Hypoplastic bone marrow was noted in 87cases with 55 male and 32 female. Hypoplasia can be congenital or acquired. In acquired it can de due to drugs, virus or as in most cases idiopathic (Alter *et al*., 1998). In all these cases the cause of hypoplasia was not evaluated as no feedback was reported from clinical side. Bone marrow showed fatty and patchy bone marrow fragments with depressed erythroid, myeloid and megakaryocyte series and relative lymphocytosis. Youngest patient with hypoplasia was a 4½ month old boy. Sub leukaemic leukaemia was encountered in 37 cases with 5 cases of Acute myeloid leukaemia (AML) and 32 cases of Acute

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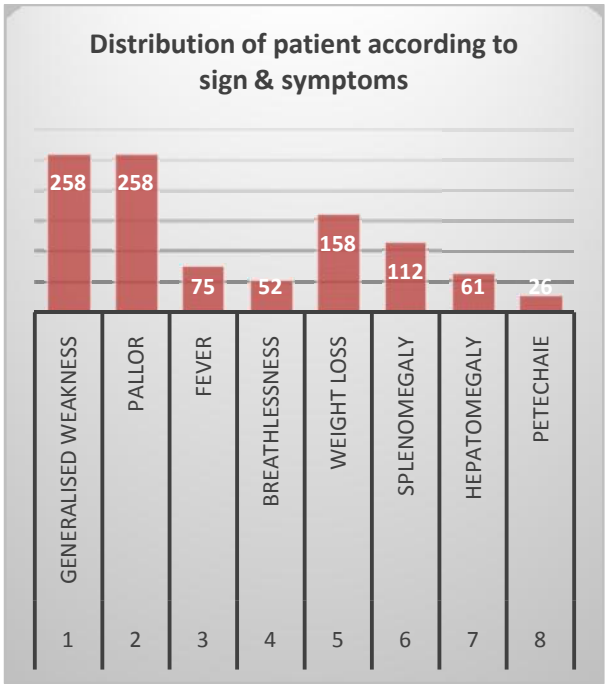
lymphoid leukaemia (ALL). Age ranged between 6 months to 17 years. Bone marrow was hypercellular with most cells of blast type. Erythroid series and megakaryocytes were depressed. 11 cases of kalazar were seen with 6 male and 5 female. The bone marrow showed increase in plasma cells upto 10% and LD (leishman Donovan) bodies both free and in macrophages.

Table 1.

No.	sign/symptom	No. of cases
1	Generalised weakness	258
2	Pallor	258
3	Fever	75
4	Breathlessness	52
5	Weight loss	158
6	Splenomegaly	112
7	Hepatomegaly	61
8	Petechaie	26



Following is the chart of no. of cases with different diseases

Table 2.

S. No.	Causes	No. of cases	Percentage %
1.	Megaloblastic anaemia	123	47.67%
2.	Hypoplastic bone marrow	87	33.72%
3.	Subleukaemic leukaemia	37	14.34%
4.	Kalazar	11	4.2%

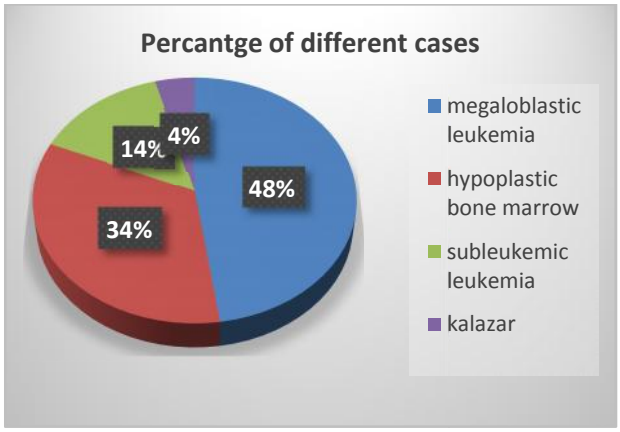


Table 3.

Disease	Bhatnager *et al*	Gupta *et al*	Gayathri *et al*	Naseem *et al*	Present
Megaloblastic	28.4%	6.7%	74%	14.91%	47.67%
Hypoplasia	20%	43%	18.26%	33.8%	33.72%
Acute leukemia	21%	25%	3.84%	26.6%	14.34%
Kalazar	21%	8%	-	1.1%	4.26%

RESULTS AND DISSCUSSION

A Total of 258 cases of cytopenic children were studied. Both sexes were taken into consideration. Peripheral blood examination and bone marrow aspiration was done to find the cause of pancytopenia and the observations were compared with other studies. Generalised weakness was the most common symptom followed by weight loss and then fever, then breathlessness. Pallor was the most common sign followed by splenomegaly and then hepatomegaly. Following is the table of a comparison of the present study with other studies. In our study megaloblastic anaemia is 47.67% and hypoplasia is 33.72%, acute leukaemia is 14.34% and kalazar is 4.2%. The figure is similar to study by Bhatnager *et al.* (2005) (megaloblastic anaemia-28.4%), Khunger *et al.* (2002) in Sabderjang, New Delhi, (megaloblastic anaemia-72%) (Khunger *et al.*, 2002), Tilak *et al.* (1992) in Aligarh (megaloblastic anaemia-68%) and Gayathri *et al.* (2011) (megaloblastic anaemia-74%). But the study of Gupta *et al* of 105 children at BHU showed bone marrow hypoplasia as the most common entity followed by acute leukaemia then kalazar and 4th came megaloblastic anaemia (Gupta *et al.*, 2008). Similar study by Naseem *et al*. (2011) of 990 children revealed aplastic anaemia to be the most common cause followed by acute leukaemia. It appears that during progression in terms of duration of megaloblastosis, anaemia is followed by thrombocytopenia and then neutropenia (Sorode *et al*., 1989). So in our study megaloblastic anaemia came out to be the most important cause of pancytopenia.

Different studies have different result which is attributed to difference in methodology and stringency of diagnostic criteria, geographical area, period of observation, genetic difference, nutritional status, prevalence of infection and varying exposure to myelotoxic drug among others (7). Megaloblastic anaemia is a correctable and treatable disease. Bone marrow aspiration to diagnose megaloblastic anaemia is not the most preferred mode. But in places where folate and B12 estimation facility is not available, bone marrow aspiration can be diagnostic. Seeing the high prevalence of megaloblastic anaemia bone marrow aspiration as a diagnostic tool is indicated. Hypoplastic anaemia in our study is 33.72% which is similar to study by Khunger 14%, Tilak7.7% and Gayathri 18.26% and Bhatnager 28.4%. (Khunger *et al.*, 2002; Tilak and Jain 1992; Gayathri and Kadam Satyanarayan 2011; Bhatnager *et al.*, 2005). Subleukaemic leukaemia in our study is 14.34% this corresponds with other studies 3.85% Gayathri *et al.* (2011) study. Our study had 5 AML and 32 ALL. However Gayathri *et al.* (2011) study had 3 AML and 1 ALL. Incidence of kalazar was 4.2% with 6 male and 5 female children. In Gupta and colleague study kalazar was the 3rd commonest cause of pancytopenia. In Naseem *et al.* (2011) study at PGI, Chandigarh kalazar is 1.1%.

Conclusion

Pancytopenia is a very common problem among children attending a health centre. The common presenting features are weakness, fever, breathlessness and pallor. As the cause of pancytopenia can be varied so peripheral blood examination and bone marrow aspiration can help in its diagnosis and treatment. In our study Megaloblastic anaemia came out as the major cause of pancytopenia in the population in and around Patna, Bihar. This may be due to the fact that Bihar is amongst the poorest of the poor northern states (according to UNICEF). So malnutrition is high among the population here. 2004-2005 survey shows 54.4% people in Bihar to be below poverty line. Another cause of folate deficiency is high fertility rate. A 2013 survey shows Bihar to have the highest fertility rate in India. The Crude birth rate of Bihar is 26.3 highest among all the major states. Pregnancy causes increase folate demand resulting in its deficiency. All these factors lead to a high incidence of megaloblastic anaemia in Bihar. Megaloblastic anaemia is a very easily treatable disease so a lot of morbidity can be prevented by its early diagnosis.

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