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Study on Clinico-Aetiological Profile of Bicytopenia / Pancytopenia among Pediatric Patients.

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ABSTRACT

Background: The common causes of bicytopenia or pancytopenia include either marrow suppression or marrow infiltration. It may be due to aplastic anemia, megaloblastic anemia or hematological malignancies. The present study was done to find the clinico-aetiological profile of bicytopenia & pancytopenia among pediatric patients. **Methods:** The present hospital based cross-sectional study was done on children suffering from bicytopenia or pancytopenia. Detailed clinical history, thorough physical examination and hematological tests were done. Appropriate statistical calculations for summarization of data were done. **Results:** Bicytopenia was seen in 58.2% and pancytopenia in 41.8% patients. Megaloblastic anemia (43.6%), infection (23.6%), aplastic anemia (14.5%) and leukemia (10.9%) were the aetiological factors. Patients presented with pallor (85.5%), fever (76.4%), petechial haemorrhage (43.6%), hepatomegaly (38.2%), splenomegaly (23.6%), anorexia (21.8%) and lymphadenopathy (18.2%). **Conclusion:** Non-malignant causes were responsible in majority of cases (89.9%) and can be treated.

Keywords: Bicytopenia, Pancytopenia, Paediatrics.

INTRODUCTION

The reduction in cellular elements of blood is known as peripheral cytopenia. It may affect any of the cell lines i.e. RBCs, WBCs or platelets. The reduction in two cell lines is known as bicytopenia and that in all the cell lines is known as pancytopenia. The aetiologies of bicytopenia and pancytopenia are similar in nature and are often described together.[1]

The common causes include either marrow suppression or marrow infiltration. It may range from transient marrow failure due to viral infection to acute hematological malignancies. It may also be caused by idiosyncrasy to drugs, megaloblastic anemia or chemotherapy.[2]

It usually results in anemia, fever, infections and death. The prognosis of the patient depends upon the severity of pancytopenia and the underlying pathology.[3]

The main diagnostic approach has been bone marrow biopsy which shows a picture with marrow being normocellular with non-specific changes to hypercellular and totally replaced by malignant cells.[4]

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Publications regarding bone marrow profile are available in plenty but the details regarding clinico-aetiological profile has not been probed much. The present study was undertaken to find the clinico-aetiological profile of bicytopenia & pancytopenia among pediatric patients admitted at VIMS, Pawapuri.

MATERIALS AND METHODS

The present study was hospital based cross-sectional in nature conducted at the department of Pathology, VIMS, Pawapuri between March 2016 to February 2018. Patients admitted in the department of Pediatrics, VIMS, Pawapuri who were suffering from bicytopenia or pancytopenia and whose parents gave consent were included in the present study. Known cases of hematological malignancy and patients receiving myelosuppressive drugs were excluded. A total of 50 patients were included.

Detailed clinical history and thorough physical examination was done for each patient. Laboratory investigations included complete blood count, reticulocyte count, bleeding profile, peripheral smear examination, liver function tests and bone marrow examination to ascertain the cause. Pancytopenia was defined as hemoglobin (Hb) ≤ 10 g/dL, absolute neutrophil count ≤ 1500/µl, platelet count ≤ 100000/µl. Bicytopenia was defined as any two of these cytopenias.

Pretested proforma was used for data collection. Data was entered in Microsoft Excel 2007 and analyzed using SPSS v 16.0. Appropriate statistical tests were done. p value of ≤ 0.05 was considered to be statistically significant. Informed consent was taken from parents of children. All the records were kept confidentially.

RESULTS

A total of 50 pediatric patients suffering from bicytopenia or pancytopenia were included. [Table 1] shows that 43.6% patients were above five years of age. 52.7% of the patients were males and 47.3% females. 85.5% were Hindus. Two-third (67.3%) of them belonged to rural area and 61.8% suffered from malnutrition.

Table 1: Background profile of study subjects

Characteristics	Values	Number (n=55)	%	95% CI
Age	2-12 months	9	16.4	8.9-28.3%
	1-5 years	22	40	28.1-53.2%
	>5 years	24	43.6	31.4-56.7%
Sex	Male	29	52.7	39.8-65.3%
	Female	26	47.3	34.7-60.2%
Religion	Hindu	47	85.5	73.8-92.4%
	Muslim	8	14.5	7.6-26.2%
Residence	Rural	37	67.3	54.1-78.2%
	Urban	18	32.7	21.8-45.9%
Nutritional status	Well nourished	21	38.2	26.5-51.4%
	Malnutrition	34	61.8	48.6-73.5%

[Table 2] shows the type of peripheral cytopenia. 58.2% patients suffered from bicytopenia and 41.8% from pancytopenia.

Table 2: Type of peripheral cytopenia

Cytopenia types	Number (n=55)	%	95% CI
Bicytopenia	32	58.2	45-70.3%
Pancytopenia	23	41.8	29.7-55%

Table 3: Aetiology

Aetiology	Number (n=55)	%	95% CI
Megaloblastic anemia	24	43.6	31.4-56.7%
Aplastic anemia	8	14.5	7.6-26.2%
Infection	13	23.6	14.4-36.3%
Leukemia	6	10.9	5.1-21.8%
Others	4	7.3	2.9-17.3%

[Table 3] shows the aetiology of peripheral cytopenia. In majority of the cases, the cause was megaloblastic anemia (43.6%). In the remaining cases, it was due to infection (23.6%), aplastic anemia (14.5%), leukemia (10.9%) and other causes (7.3%).

[Table 4] shows the clinical presentation of these cases. Pallor was the most common presentation (85.5%). Other clinical features were fever (76.4%), petechial haemorrhage (43.6%), hepatomegaly (38.2%), splenomegaly (23.6%), anorexia (21.8%) and lymphadenopathy (18.2%).

Table 4: Clinical features

Clinical features	Number (n=55)	%	95% CI
Pallor	47	85.5	73.8-92.4%
Fever	42	76.4	63.7-85.6%
Petechial haemorrhage	24	43.6	31.4-56.7%
Anorexia	12	21.8	12.9-34.4%
Hepatomegaly	21	38.2	26.5-51.4%
Splenomegaly	13	23.6	14.4-36.3%
Lymphadenopathy	10	18.2	10.2-30.3%

DISCUSSION

Among the 50 patients included in the present study, 43.6% were above five years of age. Singh et al,[5] observed that most of patients belonged to age group of 1-5 years (51.6%). Bhatnagar et al,[6] found median age to be 6 years while Dubey et al observed that maximum patients were in the age group of 13-15 years (30.5%), followed by more than 10 years (28.1%). 52.7% of the patients were males and 47.3% females. Dubey et al found that there were 47% males and 53% females, with male: female ratio of 0.88:1. However, Chhabra et al found that 60.4% patients were males.

85.5% were Hindus. This is in accordance with the population profile of this area. Two-third (67.3%) of them belonged to rural area. Similar pattern was also seen by Dubey et al. 61.8% suffered from malnutrition. Singh et al found that the prevalence of severe undernutrition in the study subjects was 27.3%.

The present study assessed all cases of peripheral cytopenia in the pediatric age group. It was seen that 58.2% patients suffered from bicytopenia and 41.8% from pancytopenia. Naseem et al found that 69.4% children had bicytopenia and 30.6% had pancytopenia. In the study done by Bhatnagar et al, it was seen that 54.5% patients had pancytopenia and 45.5% had bicytopenia. Thus, the cell line deficiency varies from place to place.

In majority of the cases, the cause was megaloblastic anemia (43.6%). In the remaining cases, it was due to infection (23.6%), aplastic anemia (14.5%), leukemia (10.9%) and other causes (7.3%). Singh et al observed that in 81.8% cases, the cause was non-malignant in nature. Chhabra et al found that megaloblastic anaemia was responsible in 31.8% cases. Malignancies were seen in 25.2% cases which included acute lymphoblastic leukaemia, acute

myeloid leukaemia, non-Hodgkin's lymphoma, Langerhans cell histiocytosis and myelodysplastic syndrome. Aplastic anaemia (18.68%) and infections (19.7%) such as kala azar, malaria, enteric fever, bacterial septicaemia were other causes of pancytopenia. Similar observations were made by Bhatnagar et al with megaloblastic anemia in 28.4% cases, acute leukemia in 21% cases, infections in 21% cases and aplastic anemia in 20% cases. However, Naseem et al found that acute leukemia was most common etiology (66.9%) in bicytopenic children and aplastic anemia (33.8%) in pancytopenic children.

In the present study, most of the children presented with pallor (85.5%). Other clinical features were fever (76.4%), petechial haemorrhage (43.6%), hepatomegaly (38.2%), splenomegaly (23.6%), anorexia (21.8%) and lymphadenopathy (18.2%). Chhabra et al found that the commonest clinical feature was bleeding manifestations in the form of petechiae, bruises, and ecchymosis seen in malignancies and aplastic anaemia. Mucosal bleeds like epistaxis, gum bleeds, and malena were commonly associated with megaloblastic anaemia. 51.7% cases of megaloblastic anaemia had hepatomegaly and 44.8% had splenomegaly. They reported significant association between lymphadenopathy and malignancies ($p < 0.05$). Similar observations were made by Naseem et al who found that the main presenting features in children with bicytopenia and pancytopenia were fever and pallor, other common ones being petechial rash, bleeding manifestations and bone pains. Bhatnagar et al observed that skin bleeds in the form of petechiae, bruises and eccymosis were the commonest bleeding manifestations. Dubey et al have reported that more than half of the cases had pallor, fever and petechial hemorrhages at presentation. Other features included hepatomegaly, splenomegaly, lymphadenopathy and bony tenderness.

It is seen that many patients had illness due to causes which can be either treated easily or can be manages if detected in early stages. Thorough investigation and timely investigation is essential in children suffering from bleeding tendencies or prolonged fever.

CONCLUSION

It is concluded that megaloblastic anemia (43.6%) and infection (23.6%) were major causes of pancytopenia or bicytopenia. Leukemia was responsible in 10.9% cases. Pallor (85.5%), fever (76.4%) and petechial haemorrhage (43.6%) were major clinical features.

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