

A STUDY OF HAEMATOLOGICAL PROFILE IN PAEDIATRIC AGE GROUP IN NORTH-WEST, RAJASTHAN

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Abstract

Background: Anaemia a blood condition involving an abnormal reduction in number of red blood cells or in their haemoglobin content. Anemia is defined as decreased concentration of haemoglobin and RBC mass as compared to the values in age-matched controls. These can be due to 1) reduced proliferation of RBC which may result from deficiency of nutrients or hormones or from disease or other conditions 2) excessive destruction of RBC often a hereditary problem 3) excessive blood loss

Methods: Record based retrospective study conducted on at department of pathology.

Results: Out of total 362 cases of anemia in the present study, 275 cases (75.96%) are of iron deficiency anemia followed by 84 cases (23.20%) of megaloblastic anemia. Minimum cases 3 (0.82%) are of haemolytic anemia.

Conclusion: In the present study, Iron deficiency anemia was the most common.

Keywords: Iron deficiency anemia, megaloblastic anemia, haemolytic anemia.

Introduction

Anaemia a blood condition involving an abnormal reduction in number of red blood cells or in their haemoglobin content. Anemia is defined as decreased concentration of haemoglobin and RBC mass as compared to the values in age-matched controls¹. These can be due to 1) reduced proliferation of RBC which may result from deficiency of nutrients or hormones or from disease or other conditions 2) excessive destruction of RBC often a hereditary problem 3) excessive blood loss

Anemia is a leading cause of mortality and morbidity in paediatric age group. In india about 70% million children i.e., 60%-70% of all children below 6 years suffer from varying degree of anemia². The term 'nutritional anemia' encompass all pathological condition in which the blood haemoglobin concentration drops to an abnormally low level, due to deficiency of nutrients like iron, folic acid and vitamin B12. In public health terms, iron deficiency is by far the most common cause of nutritional anemia worldwide. Folic acid deficiency is less widespread and is often observed with iron deficiency. Vit b12 deficiency is far rare³.

IRON DEFICIENCY ANEMIA is a major health problem in children. It occurs from 6 month of age when the child's total body mass is expanding in the face of an inadequate iron intake.

Megaloblastic anemia is used to describe a group of clinical states characterised by a distinct morphological pattern in haematopieitic cells in the form of regenerative

macrocytic anemia with nuclear dysmaturity. It is caused by deficiency of either vit B12 or folic acid or both^{4.}

HAEMOLYTIC ANEMIA result when rate of destruction of RBCs exceed the capacity to produce rbcs⁵. Hereditary haemoglobin disorders are the most commonly encountered single gene disorder in india⁶ Inherited RBC defects of structure and metabolism may result in chronic hemolysis state that include hemoglobinopathies like sickle cell anemia, beta thalessemia, G6PD deficiency, RBC membrane disorders like hereditary spherocytosis⁷.

Leukemia is a malignant neoplasm of the haematopoietic stem cells characterised by diffuse replacement of bone marrow by neoplastic cells⁸. The most prevalent childhood cancer is leukemia, and acute lymphoblastic leukemia (ALL) constitutes 75% of all cases. Leukemia usually presents with nonspecific symptoms such as anorexia, fatigue, and irritability⁹. As the disease progresses, pallor, bleeding tendency, hepatosplenomegaly, and lymphadenopathy may appear. Uncommon initial manifestations are joint pain, proptosis, abdominal pain, melena, diarrhea, and dysphagia among others.

Material and Methods

Study place: S.P. Medical College, Bikaner
Study duration: 2017-2018
Study design: Record based retrospective study
Study population: All Anemias and Leukemias with inclusion criteria
Inclusion: Patients wih haemogram
1) Hb<10gm/dl

2) Total leukocyte count <4*10/l

3) Platelet count<100*10/l

Exclusion: Follow up cases of leukemia

PROCEDURE AND SAMPLE COLLECTION

Cases will be selected based on CBC findings and peripheral smear findings according to inclusion criteria. Relevant clinical history will be collected from the patient. If necessary, details will be collected from hospital records too.

Eligible patients shall be selected and the Evaluation of their hematological parameters will be done by collecting 2 ml of sample on EDTA prefilled vial and transporting it to the laboratory immediately and nine haematological parameters will be obtained which includes Hb, RBC count, TLC, DLC, Platelet count, MCV, MCH, MCHC, Haematocrit. Peripheral smears will be studied after staining with the Leishman's stain.

The data will be collected in a specially designed proforma for the study and transformed to a master chart which will then be subjected to analysis

OBSERVATION

Results of the study were as follows:

Table 1: Age wise distribution of anemia in present study

| Age group | No. Of cases | Percentage |
|------------|--------------|------------|
| 0-5 year | 219 | 60.49% |
| 6-10 year | 70 | 19.33% |
| 11-15 year | 73 | 20.16% |
| Total | 362 | 100% |

Out of total 362 cases of anemia,219 cases(60.49%) were present in age group of 0-5 year followed by 70 cases (19.33%) in 6-10 year and 73 cases (20.16%) in 11-15 year age group .

Table 2: Sex wise distribution of anemia

| SEX | NO. Of cases | Percentage |
|--------|--------------|------------|
| Male | 169 | 46.68% |
| Female | 193 | 53.31% |
| Total | 362 | 100% |

Out of 362 cases of anemia, maximum number of cases were female(193 cases, 53.31%) followed by male (169 cases, 46.68%) making female to male ratio 1.2:1

 Table 3: Distribution of different cases of anemia in present study

| ANEMIA | NO. OF CASES | PERCENTAGE |
|------------------------|--------------|------------|
| IRON DEFICIENCY ANEMIA | 275 | 75.96% |
| MEGALOBLASTIC ANEMIA | 84 | 23.20% |
| HAEMOLYTIC ANEMIA | 3 | 0.82% |
| TOTAL | 362 | 100% |

Out of total 362 cases of anemia in the present study, 275 cases (75.96%) are of iron deficiency anemia followed by

84 cases (23.20%) of megaloblastic anemia. Minimum cases 3 (0.82%) are of haemolytic anemia

 Table 4: Age wise distribution of cases with iron deficiency anemia

| AGE(IN YEARS) | NO. OF CASES | PERCENTAGE |
|----------------|--------------|------------|
| 0-5 | 165 | 60% |
| 6-10 | 59 | 21.45% |
| 11-15 | 51 | 18.54% |
| TOTAL | 275 | 100% |

In the present study , total 275 cases were of iron deficiency anemia in which 165 cases (60%) were in the age group of 0-5 years followed by 59 cases (21.45%) were in the age group of 6-10 years. Only 51 cases (18.54%) were in the age group of 11-15 years

Table 5: Sex wise distribution of cases with iron deficiency anemia

| SEX | NO. OF CASES | PERCENTAGE |
|--------|--------------|------------|
| MALE | 125 | 45.45% |
| FEMALE | 150 | 54.54% |
| TOTAL | 275 | 100% |

Out of 275 cases of iron deficiency anemia in the present study, 150 cases (54.54%) were females of which maximum were in the age group of 0-5 years; 125 cases (45.45%) were male

 Table 6: Sex wise distribution of cases with megaloblastic anemia

| SEX | NO. OF CASES | PERCENTAGE |
|--------|--------------|------------|
| MALE | 44 | 52.38% |
| FEMALE | 40 | 47.61% |
| TOTAL | 84 | 100% |

Out of total of 84 cases of megaloblastic anemia,44 were males and 40 were females making male to female ratio 1.1:1

Table 7: Age wise distribution of cases with megaloblastic anemia

| AGE | NO. OF CASES | PRECENTAGE |
|---------|--------------|------------|
| 0-5yr | 51 | 60.71% |
| 6-10yr | 11 | 13.09% |
| 11-15yr | 22 | 26.19% |
| TOTAL | 84 | 100% |

Out of 84 cases of megaloblastic anemia, maximum number of patients (51) were in age group of 0-5 years followed by 22 (26.19%) in 11-15 year age group followed by 11 (13.09%) in 6-10 years of age group

Table 8: Age wise distribution of cases in leukemia

| Age group | No. Of cases | Percentage |
|------------|--------------|------------|
| 0-5 year | 16 | 42.01% |
| 6-10 year | 9 | 23.68% |
| 11-15 year | 13 | 34.21% |
| Total | 38 | 100% |

Out of total 38 cases of leukemia, maximum number of cases were present in the 0-5 year(16 cases, 42.01%)

followed by 9 cases(23.68%) in 6-10 year and 13 cases (34.21%) in 11-15 year age group

| Table 9: Sex wise distribution of cases with leukemia |
|---|
|---|

| SEX | NO. OF CASES | PERCENTAGE | |
|--------|--------------|------------|--|
| MALE | 24 | 63.15% | |
| FEMALE | 14 | 36.84% | |
| TOTAL | 38 | 100% | |

In the present study, out of total 38 cases of leukemia 24 cases were male (majority were ALL) while only 14 cases were female making male to female ratio 1.7:1

 Table 10: Distribution of different cases of leukemia in present study

| LEUKEMIA | NO. OF CASES | PERCENTAGE |
|----------|--------------|------------|
| ALL | 36 | 94.73% |
| AML | 2 | 5.26% |
| CML | 0 | 0% |
| CLL | 0 | 0% |
| LYMPHOMA | 0 | 0% |
| TOTAL | 38 | 100% |

In our present study, total cases of leukemia were 38 in which majority 36 cases (94.73%) were recognised as morphologically ALL while only 2 cases (5.26%) were categorised in morphologically AML.

Table 11: Age wise distribution of patients with ALL

| AGE | NO. OF CASES |
|---------|--------------|
| 0-5 YR | 16 |
| 6-10 YR | 8 |
| 11-15YR | 12 |
| TOTAL | 36 |

In the present study, out of total 36 cases of ALL , 16 cases (44.44%) were in the age group of 0-5 year followed by 12 cases (33.33%) were in the age group of 11-15 years while 8 cases (22.22%) were in the group of 6-10 years

 Table 12: Sex wise distribution in ALL

| Sex | No. Of cases | Percentage | |
|--------|--------------|------------|--|
| Male | 23 | 63.15% | |
| Female | 13 | 36.84% | |
| Total | 36 | 100% | |

Out of total 36 cases of ALL, 23 cases (63.15%) were males and 13 cases (36.84%) were female making male female ratio 1.7:1

Table 13: Age wise distribution of anemia and leukemia

| Age group | 0-5 year | 6-10 year | 11-15 year |
|----------------------|----------|-----------|------------|
| IDA | 165 | 59 | 51 |
| Megaloblastic anemia | 51 | 11 | 22 |
| Haemolytic anemia | 3 | - | - |
| ALL | 16 | 8 | 12 |
| AML | - | 1 | 1 |
| TOTAL | 235 | 79 | 86 |

In the age group 0-5 years, iron deficiency anemia is the most common (165 cases) followed by megaloblastic anemia (51 cases) and acute lymphoblastic leukemia (16 cases).

In 6-10 year age group, iron deficiency anemia is still the most common (59 cases) followed by megaloblastic anemia (11 cases) and acute lymphoblastic anemia (8 cases).

In 11-15 year age group, iron deficiency anemia is common (51 cases) followed by megaloblasic anemia (22 cases) and acute lymphoblastic leukemia (12 cases).

Table 14: Sex wise distribution of anemia and leukemia

| Sex | IDA | Megaloblastic anemia | HA | ALL | AML | Total |
|--------|-----|----------------------|----|-----|-----|-------|
| Male | 125 | 44 | 0 | | 1 | 170 |
| Female | 150 | 40 | 3 | | 1 | 194 |

In the present study, Iron deficiency anemia was the most common consisting of 275 cases followed by megaloblastic anemia (84cases) and Acute Lymphoblastic Leukemia (36 cases).

In male, Iron deficiency anemia was still most common (125 cases) followed by megaloblastc anemia (44 cases) and acute lymphoblastic leukemia (23 cases).

In female, Iron deficiency anemia was common (150cases) followed by megaloblastic anemia (40 cases) and acute lymphoblastic leukemia (13 cases).



Figure 1: Microcytic hypochromic anemia showing tear drop cells and pencil cells (Leishman's Stain 100x)



Figure 2: Macrocytic anemia showing macroovalocytes (Leishman's Stain 100x)



Figure 3: Macrocytic anemia showing hypersegmented neutrophils (Leishman's Stain 100x)



Figure 4: Macrocytic anemia showing basophilic stippling (Leishman's Stain 100x)



Figure 5: Acute Lymphoblastic Leukemia showing lymphoblast (Leishman's Stain 40x)



Figure 6: Acute lymphoblastic leukemiashowing lymphoblast (Leishman's Stain 100x)



Figure 7: Acute myeloid leukemia showing myeloblast (Leishman's Stain 40 X)



Figure 8: Acute myeloid leukemia showing myeloblast (Leishman's Stain 100x)

Discussion

The present study was conducted in the department of pathology, sardar patel medical college, Bikaner from January 2017 to December 2018. In the present study, 400 cases were included and the following observations and inferences were made.

In the present study, maximum number of cases were of iron deficiency anemia(275) followed by megaloblastic anemia (85 cases) .These observations were comparable to the study done by Dr. Srinivas Madoori et al¹⁰ and Dr. CPV Ramana Sastry¹¹et al

In the present study, in iron deficiency anemia 150 cases were female and 125 cases were male making male female ratio 1.2:1. The observation is comparable to the study done by Dr. CPV Ramana Sastry et al^{11} in which male female ratio was 2.4:1

In the present study, in iron deficiency anemia maximum cases were in the age group of 0-5 years (165, 60%) followed by 6-10 years (59, 21.45%) and 11-15 years (51, 18.54%)

Table 15: Comparative study of male female ratio in megaloblastic anemia in the present study

| Studies | Year | M:F |
|---|------|-------|
| Amieleena chhabra et al ¹² | 2012 | 1.6:1 |
| Ramana Sastry C.P.V et al ¹¹ | 2017 | 1:3 |
| Present study | 2019 | 1.1:1 |

In the present study, the maximium number of cases in megaloblastic anemia was in the age group 0-5 years (51 cases, 67.71%). The observation is comparable to the study done by sudhir Mehta et al¹³ in which 57 cases were in the age group of 0-5 years

In the present study the incidence of ALL and AML is 94.73% and 5.26% respectively. This is comparable to the study done by young et al^{14} , PT harpani et al^{15} and surabh kumar et al^{16}

Table 16: Comparative study of incidence of ALL and AML

 in the present study

| Study | Year | Incidence of ALL among leukemia | Incidence of AML among leukemia |
|-----------------------------------|------|------------------------------------|------------------------------------|
| Pt harpani et al ¹⁵ | 2016 | 73.3% | 20% |
| Saurabh kumar et al ¹⁶ | 2012 | 84.5% | 15.5% |
| Present study | 2019 | 94.73% | 5.26% |

In our study, out of 38 patients with leukemia, 24 were males and 14 were females making Male to female ratio (M:F) is 1.71:1, showing male preponderance. The ratio is comparable to that of the study of jussawalla et al^{17} , saurabh kumar et al^{16}

Table 17: Comparative study of male female ratio in the present study

| Study | Year | M:F |
|-----------------------------------|------|--------|
| Jussawalla et al ¹⁷ | 1988 | 1.7:1 |
| Saurabh kumar et al ¹⁶ | 2016 | 2.2:1 |
| Present study | 2019 | 1.71:1 |

The male predominance in our country could be due to extra attention which is given to male child as a result of cultural factors.

In the present study, incidence of ALL is highest in the age group 0-5 years (16 cases, 44.44%). This is comparable to the study done by zankhana prajapati et al^{18}

Conclusion

In the present study, Iron deficiency anemia was the most common.

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