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Epidemiological and Cytological Profile of Pancytopenia in Hematology Laboratory of JRA University Hospital Antananarivo

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Abstract
Introduction: Pancytopenia is defined as simultaneous decrease of three myeloid lineages below normal values for age and sex. In Madagascar, few studies have analyzed profiles of patients with pancytopenia. Ours aims were to determine epidemiological, clinical, cytological and etiological profile of pancytopenia.
Methods: We collected all data from patients with pancytopenia over a period of 12 months (March 2013-March 2014) at hematology laboratory of CHU-JRA Antananarivo.
Results: 11843 hemograms were performed, pancytopenia accounted for 0.91% (108/11843). Eighty-three patients met the inclusion criteria of our study. The average age was 29.48 years old with extremes of 29 days and 83 years. There was a male predominance with a ratio of 1.18. Anemic syndrome is the most common clinical sign (Table 1). Hemogram study showed anemia to varying degrees. Twenty-six patients (31.32%) had a platelet count below 20G /L. Blood smear study revealed presence of blasts in 19.27% (16/83).
Conclusion: Pancytopenia is fairly common circumstance in practice. Abnormalities in hemogram must involve further investigations.

Key Words - Pancytopenia, Anemia, Leukopenia, Thrombopenia, Hemogram, Myelogram.

I. INTRODUCTION

Pancytopenia is defined as simultaneous decrease of three myeloid lineages below normal values for age and sex. It's clinically characterized by the simultaneous, variable association of anemia, neutropenia and thrombocytopenia [1] [2]. Severity depends on depth and etiology of each cytopenia. It can be of central origin by medullary production disorder (medullary insufficiency qualitative or quantitative) or peripheral origin (destruction or extra-medullary sequestration of the blood elements)

In Madagascar, few studies have analyzed profiles of patients with pancytopenia. Ours aims were to determine epidemiological, clinical, cytological and etiological profile of pancytopenia.

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II. METHODS

This is a descriptive retroprospective study over a period of 12 months (March 2013-March 2014) at hematology laboratory of CHU-JRA Antananarivo. We collected all data from patients with pancytopenia. To determine origin of pancytopenia, we performed a myelogram study. Incomplete files, post-chemotherapy or radiotherapy medullary aplasia, as well as patients who have not undergone spinal exploration have been excluded.

Following parameters were analyzed: frequency, age, sex, clinical signs, blood count and myelogram.

Hemogram was performed on Mindray BC-5300 semi-automaton. Blood smears were performed for each sample. The criterion of positivity of pancytopenia was defined by the association of the following criteria:

• hemoglobin (Hb) <12 g / dL;
• white blood cell (WBC) level <4.0 × 109 / L with neutrophils (PNN) <1.5 10^9 / L;
• platelets <150 × 109 / L.

Myelogram was performed on a bone marrow sample taken either from the sternum or from the posterior superior iliac spine. We used the FAB criteria to classify cytological types of acute leukemias where appropriate.

III. RESULTS

During this period, 11843 hemograms were performed in our unit, pancytopenia accounted for 0.91% (108/11843). Eighty-three patients met the inclusion criteria of our study. The average age was 29.48 years old with extremes of 29 days and 83 years. There was a male predominance with a ratio of 1.18. Anemic syndrome is the most common clinical sign (Table 1). Hemogram study showed anemia to varying degrees: 57.8% severe anemia, 30.5% moderate and 11.5% unobtrusive. Almost all (96, 38%) patients had normochromic normocytic anemia

Normochrome macrocytic anemia accounted for 3.61% of cases (3/83); in all cases, anemia was non-regenerative. Table 2 shows the distribution of leukopenia. Twenty-six patients (31.32%) had a platelet count below 20G /L, 34 patients (40.96) had a rate between 20 and 75G / L; the platelet count was between 75 to 100G / L in 20.48% of cases (17/83) and between 100 and 150G / L in 7.22% of cases (6/83). Blood smear study revealed presence of blasts in 19.27% (16/83). Etiologies of pancytopenia are shown in Table 3.

Table 1. Clinical signs

Medullary insufficiency syndrome	%
Anemic syndrome	100%
Infectious syndrom	6,02%
Hemorragic syndrom	8,43%
Tumor syndrome	
Splenomegaly	13,25%
Lymphadenopathy and hepatomegaly	19,27%
Bone pain	2,40%

Table 2. Characteristics of neutropenia

	N	**%**
Agranulocytosis	12	14,46
Severe neutropenia	32	38,55
Moderate neutropenia	27	32,53
Discreet neutropenia	11	13,25

Table 3: etiologies of pancytopenia

Etiologies	N	%
Reactional marrow	12	14,46
Normal marrow	10	12,05
Myelosuppression	9	10,84
Acute leukemias (AL)	33	39,76
Acute myeloid leukemia (AML)	20	24,1
Acute lymphoblastic leukemia (ALL)	13	15,66
Multiple myeloma	5	6,02
Spinal dysplasia	12	14,46
Medullary metastasis	2	2,41

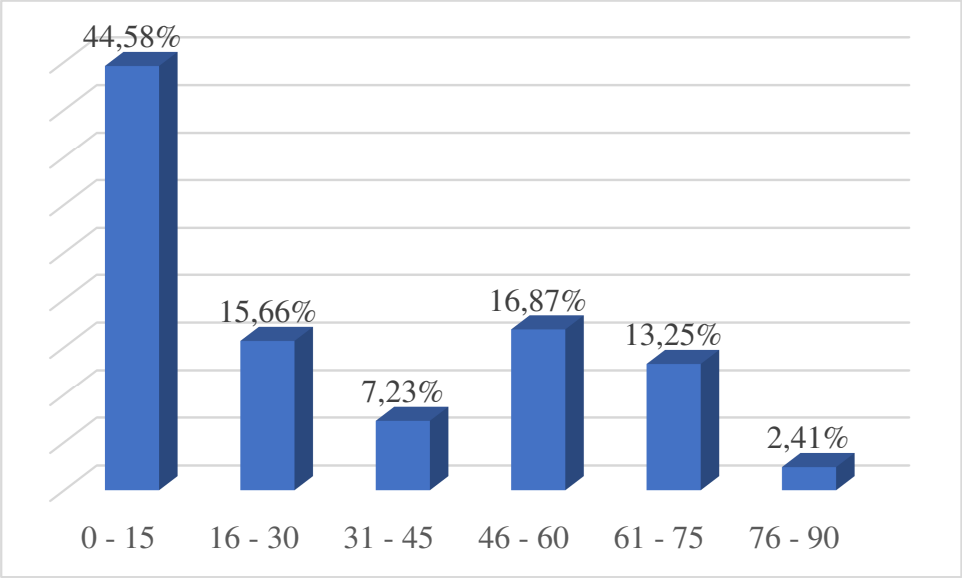

Figure 1. Age distribution

IV. Discussion

A. *Epidemiology*

During our study period; 83 cases of pancytopenia were observed; other studies showed a total of 50 cases of pancytopenia over a period of 2 years [3]. In daily practice, pancytopenia is one of main indications of myelogram [2]. In our series: compared to the total number of pancytopenia, 76.85% of pancytopenia patients had bone marrow exploration.

The average age is 29.48 years with an extreme of 29 days and 83 years. Similar results have been reported in other studies [4] Children admitted to pediatrics account for 44.57% of patients

Our patients were predominantly men with a percentage of 54.21% 45 (sex ratio male / female: 1.18). Other studies have also reported this male preponderance [1] [5] [6].

B. *Complete blood count*

Diagnosis of pancytopenia is mainly based on hemogram, which allows us to objectify pancytopenia and its depth. After analyzing clinical and hemogram data, we found that the depth of cytopenia is severe in more than half of the cases we believe that the symptoms in patients with pancytopenia are usually due to anemia or thrombocytopenia, leucopenia we found that anemia was severe in more than half of the cases or 57.8%. In the majority of cases (96, 38%), patients had normochromic

normocytic anemia and reticulocytes were <150 G / L in 100% of cases. Pakistani and morocco studies, showed that normochromic macrocytic anemia was the most frequently observed anemia type[1] [3] [7]. Neutropenia was severe in 38.55% with major infectious risk especially in the 14.46% of agranulocytosis cases. Deep thrombocytopenia in 31.32% and severe in 40.96% may be at the origin of hemorrhagic syndrome.

C. Myelogram

Despite development of new technologies for characterization of different acute leukemia (AL) entities in clinical applications, morphological and cytochemical studies are still used for diagnosis and remain the only diagnostic tool in many low-income countries [4]. Diagnosis of AL is made in front of a percentage of blasts greater than 20%. In our series, cytological and cytochemical examination of bone marrow allowed us to classify the ALs in AML (24.10%) and ALL (15.66%).

D. Etiology

12, 05% of myelograms presented normal cytological appearance, which proves that hemogram alone, does not allow to carry central origin of pancytopenia.

V. CONCLUSION

Pancytopenia is fairly common circumstance in practice. Abnormalities in hemogram must involve further investigations.

REFERENCES

[1] H. Nafil, I. Tazi, M. Sifsalam, M. Bouchtia and L. Mahmal. Etiological profile of pancytopenia in adults in Marrakech (Morocco). EMHJ. 2012.18 No. 5 • 532-536

[2] Gupta V, Tripathi S, Tilak V, Bhatia BD. A study of clinico-haematological profiles of pancytopenia in children. Trop Doct. 2008 Oct;38(4):241-3.

[3] Mobina Ahsan Dodhy, Nusrat Bokhari, Abbas Hayat. Aetiology of Pancytopenia, A five-year experience. Ann Pak Inst Med Sci Apr - Jun 2005;1(2):92-5.

[4] Jha A, Sayami G, Adhikari RC, Panta AD, Jha R.Bone marrow examination in cases of pancytopenia.JNMA J Nepal Med Assoc. 2008 Jan-Mar; 47(169):12-7.

[5] Gayathri BN, Rao KS. Pancytopenia: a clinico hematological study. J Lab Physicians. 2011 Jan; 3(1):15-20.

[6] Shano Naseem[1], Neelam Varma[2], Reena Das[2], Jasmina Ahluwalia[2], Man Updesh Singh Sachdeva[2], Ram Kumar Marwaha . Pediatric patients with bicytopenia/pancytopenia: Review of etiologies and clinico-hematological profile at a tertiary center. Indian journal of pathology and microbiology ; 2011: 54 (1): 75-80

[7] Savage DG[1], Allen RH, Gangaidzo IT, Levy LM, Gwanzura C, Moyo A, Mudenge B, Kiire C, Mukiibi J, Stabler SP, Lindenbaum J. Pancytopenia in Zimbabwe. Am J Med Sci. 1999 Jan;317(1):22-32.