RESEARCH ARTICLE

Factors associated with thrombocytosis at the University Hospital of Befelatanana Antananarivo

Zafindrasoa Domoina Rakotovao-Ravahatra[1*], Fidiniaina Mamy Randriatsarafara[2], Andriamiadana Luc Rakotovao[3], Andry Rasamindrakotroka[4]

[1]*Laboratory of Joseph Raseta Befelatanana University Hospital Antananarivo, Madagascar.*

[2]*Public Health Department of the Faculty of Medicine Antananarivo, Madagascar.*

[3]*Laboratory of Joseph Raseta Befelatanana University Hospital Antananarivo, Madagascar.*

[4]*Medical Biology Department of the Faculty of Medicine Antananarivo, Madagascar.*

ABSTRACT

Thrombocytosis are conditions frequently encountered in hospitals. This study aims to describe the factors associated with thrombocytosis in hospital patients and out patients. We undertook a case-control study of thrombocytosis between December 01, 2017, and May 31, 2018 in the laboratory of the University Hospital of Befelatanana. Cases are represented by patients who had thrombocytosis in complete blood count. Controls had no thrombocytosis in complete blood count and were matched with cases each day of laboratory analysis. In this study, thrombocytosis decreases with age. Subjects older than 60 years are the least affected (OR, 0.16, 95% CI, 0.05-0.49). Women are less affected than men (OR = 0.89, 95% CI, 0.05-1.59). Thrombocytosis is often discovered accidentally during a health check (OR = 4.78, 95% CI, 1.76-13.21) and frequently affects outpatients. The cases present more abnormalities of blood cells than the controls. These abnormalities are mainly represented by anemia (OR=8.01, 95%CI, 3.55-18.5) and hyperleucocytosis OR=(3.73, 95% CI, 1.69-8.37). Similarly, severe thrombocytosis is significantly associated with leukocytosis (p = 0.02). The blood count should be prescribed for all patients to identify the thrombocytosis that will be treated simultaneously with the disease. Thus, patients will have a good follow-up and their life expectancy will be improved.

INTRODUCTION

Thrombocytosis is a frequently abnormality of complete blood count. The role of the biologist is then very important to advise the clinician in the etiological approach, as well as to evaluate a possible thrombotic or haemorrhagic risk. In the majority of cases (90%), thrombocytosis is reactive, resulting from an underlying pathology (iron deficiency, inflammatory cause, etc.) [1]. In addition, non-secondary thrombocytosis, corresponds to a chronic myeloproliferative syndrome (essential thrombocythemia, primary polycythemia, primary myelofibrosis, chronic myeloid leukemia) [2]. Next to the etiological assessment, one of the challenges is to evaluate and manage a possible thrombotic or haemorrhagic risk. Knowing the factors associated with thrombocytosis will facilitate the management of patients to improve their life expectancy. Thus, this study aims to describe the factors associated with thrombocytosis in hospital patients and out patients.

MATERIALS AND METHODS

We undertook a case-control study of thrombocytosis between December 01, 2017, and May 31, 2018 in the laboratory of the University Hospital of Befelatanana. Cases are represented by patients who had

thrombocytosis in complete blood count. Controls had no thrombocytosis in complete blood count and were matched with cases each day of laboratory analysis. There were 105 cases and 105 controls. The blood count was performed on the ABX Pentra 60 hematology automaton and the result was registered in the register book. Those containing incomplete information were excluded from the study. The parameters studied were age, gender, department, clinical information, blood count results and the degree of severity of the thrombocytosis. The data entry and processing was performed on the software Epi-info 3.5.2. We calculated odds ratios (OR) for the association of thrombocytosis with risk factors. The comparison of percentages used the Chi square tests. The statistical significance threshold used was p < 0.05. For ethical reasons, the authorization of the director of establishment was obtained before the data were collected in the registers. The seizure was done anonymously to maintain confidentiality.

RESULTS

In this study, thrombocytosis decreases with age. Subjects older than 60 years are the least affected (OR, 0.16, 95% CI, 0.05-0.49). Women are less affected than men (OR = 0.89, 95% CI, 0.05-1.59). Thrombocytosis is often discovered accidentally during a health check (OR = 4.78, 95% CI, 1.76-13.21) and frequently affects outpatients **(Table1).**

Address for Correspondence: Zafindrasoa Domoina Rakotovao-Ravahatra,Laboratory of Joseph Raseta Befelatanana University Hospital Antananarivo, Madagascar.E-mail: ravahatradomoina@yahoo.fr

Table 1: Distribution of cases and controls according to patient characteristics.

Patient's characteristic	Cases (n=105)		Controls (n=105)		Total	OR	95% CI	
	n	%	n	%				
Age (years)								
=19	26	24.8	7	6.7	33	1		
20-39	38	36.2	33	31.4	71	0.31	0.11	0.88
40-59	23	21.9	35	33.3	58	0.18	0.06	0.52
=60	18	17.1	30	28.6	48	0.16	0.05	0.49
Gender								
Male	53	50.5	50	47.6	103	1		
Female	52	49.5	55	52.4	107	0.89	0.5	1.59
Clinical informations								
Other clinical information	18	17.1	43	41.0	61	1		
Health Check	22	21.0	11	10.5	33	4.78	1.76	13.21
Cardiovascular diseases	11	10.5	15	14.3	26	1.75	0.61	5.05
Dermatoses	8	7.6	6	5.7	14	3.19	0.84	12.37
Infection	26	24.8	15	14.3	41	4.14	1.65	10.53
Pneumopathy	20	19.0	15	14.3	35	3.19	1.23	8.34
Departments								
Out-patients	22	21.0	15	14.3	37	1		
Medicine	73	69.5	82	78.1	155	0.61	0.28	1.33
Infectious diseases	10	9.5	8	7.6	18	0.85	0.24	3.08

The cases present more abnormalities of blood cells than the controls. These abnormalities are mainly represented by anemia (OR=8.01, 95%CI, 3.55-18.5) and hyperleucocytosis (OR=3.73, 95% CI, 1.69-8.37)(Table 2).

Table 2: Distribution of cases and controls according to the others associated anomalies in the complete blood count

Associated anomalies	Cases (n=105)		Controls (n=105)		Total	OR	95%CI	
	n	%	n	%				
Red blood cells								
Normal levels	54	51.4	94	89.5	148	1		
Anemia	46	43.8	10	9.5	56	8.01	3.55	18.5
Polycythemia	5	4.8	1	1.0	6	8.7	0.95	202.14
White blood cells								
Normal levels	60	57.1	79	75.2	139	1		
Leucopenia	11	10.5	14	13.3	25	1.03	0.4	2.64
Hyperleucocytosis	34	32.4	12	11.4	46	3.73	1.69	8.37

Similarly, severe thrombocytosis is significantly associated with leukocytosis (p = 0.02). This result is depicts in table 3.

Table 3: Associated anomalies with the thrombocytosis in the complete blood count.

Associated anomalies	Thrombocytosis				Total	p
	Severe (n=48)		Mild (n=57)			
	n	%	n	%		
Red blood cells						
Normal levels	21	38.9	33	61.1	54	
Anemia	23	50.0	23	50.0	46	0.15 (NS)
Polycythemia	4	80.0	1	20.0	5	
White blood cells						
Low or normal levels	27	38.0	44	62.0	71	0.02
Hyperleucocytosis	21	61.8	13	38.2	34	

DISCUSSION

This study has shown that thrombocytosis decreases with age. Indeed, thrombocytosis in our series are often hereditary thrombocytosis affecting young subjects. These hereditary thrombocytosis are due to a genetic alteration that can be transmitted to offspring. For these inherited thrombocytosis, MPL genetic mutations lead to primary thrombocytosis and THPO gene mutations result in secondary thrombocytosis [3]. Familial thrombocytosis was considered to be an autosomal dominant condition with mutations leading to increased thrombopoietin gene function and increased thrombopoietin production. Recently, other genetic abnormalities have been described involving other mechanisms. Currently, the most common mechanism is the lack of transcription inhibition with excess messenger RNA activity. Cases of familial thrombocytosis without elevation of thrombopoietin have also been reported [4]. Similarly, some acquired thrombocytosis is also common in young subjects such as essential thrombocythemia [4-5]. In the elderly, the literature shows that the complications of thrombocytosis are more common in these subjects. For example, according to the authors, age significantly increases the risk of thrombosis which increases from 1.7% patients / year before 40 years to 6.3% patients / year between 40 and 60 years and 15.1% patients / year after 60 years [3]. In brief, thrombocytosis is frequent in young people but the complications of this pathology are very serious in the elderly.

Depending on the gender, the result of this study is different from that of other studies that show that it is mostly women who are affected by thrombocytosis [4]. The predominance of men in our series is due to the toxic habits of Malagasy men (tobacco, alcohol). These toxins are risk factors for thrombocytosis and thrombotic complications [6].

According to clinical information, it is mostly patients who have had a health check who are most affected by thrombocytosis. Indeed, the majority of thrombocytosis is fortuitous discovery during a blood count [7]. The signs of thrombocytosis appear only at the stage of complications. A patient in apparent good health may have thrombocytosis. Thus, it is always necessary to prescribe a blood count to a patient regardless of the diseases that affect him. Even if there are no apparent diseases, the blood count should always be prescribed during a checkup. Similarly, this study also showed that patients in external consultation are more likely to have thrombocytosis compared to hospitalized patients.

Regarding other abnormalities of the blood count, cases have more abnormalities than controls. Among these abnormalities, polycythemia and hyperleucocytosis were the most frequent. Indeed, thrombocytosis is often reactive in 90% of cases, following an underlying pathology (iron deficiency, inflammatory cause, infection …) [1]. Hence the frequent association of thrombocytosis with hyperleucocytosis. The literature confirms that leukocytes increase when the subject has an infection or inflammatory reaction [8]. Similarly, anemia is a common condition in a hospital setting. It is related to the diet, the mode of life, in the physiological state of the individual [9]. Much pathology may be responsible for the association of anemia with thrombocytosis, such as iron deficiency, which can lead to reactive thrombocytosis [10].

With regard to the severity of thrombocytosis, leukocytosis is frequently associated with severe thrombocytosis with a significant difference. This situation is frequent in severe reactive thrombocytosis as in severe infections. Similarly, some authors have reported the case of severe thrombocytosis and hyperleukocytosis secondary to deep iron deficiency. Thrombocytosis and hyperleukocytosis regressed very rapidly during martial supplementation [10].

CONCLUSION

This study has highlighted the importance of thrombocytosis, which has been observed frequently in young people and men, and has been incidental found in the blood count during a check-up. Similarly, subjects with thrombocytosis frequently have other abnormalities of the figured elements of the blood compared to controls. This association with other abnormalities may indicate the presence of other underlying pathologies such as infections.This association may also be reactive to other situations such as deep martial deficiency.In brief, the blood count is an essential biological analysis to prescrib for all patients. The discovery of thrombocytosis and other associated abnormalities reveal the severity and prognosis of the associated diseases. The knowledge of this the thrombocytosis can strengthen, adjust or modify the patient's drug treatments. Thus, patients will have a good follow-up and their life expectancy will be improved.

ACKNOWLEDGEMENTS

REFERENCES

[1]. Bruge-Debreu J, Charpentier A. Thrombocytosis : action to be taken in laboratory. EMC – Medical Biology 2013;8(2):1-8.

[2]. Schafer AI. Thrombocytosis. N Engl J Med 2004; 350: 1211-9.Viallard J-F, Parrens M. Recent advances in essential thrombocythemia. Mt 2009 ; 15(1) : 35-46.

[3]. Viallard J-F, Parrens M. Recent advances in essential thrombocythemia. Mt 2009 ; 15(1) : 35-46.

[4]. Serraj K, Mecili M, Azzouzi H, Ghiura CF, Andres E. Thrombocytosis: physiopathology, diagnosis and treatment. Mt 2012 ; 18 (1) :11-20.

[5]. Yaméogo NV, Kagambèga LJ, Yaméogo AA, Kologo KJ, Millogo GRC, Toguyéni BJY, and al. Myocardial infarction indicative of essential thrombocythemia in a young black African patient: report of a case. Pan Afr Med 2014;18 : 347.

[6]. Bellucci S.Essential thrombocythemia: advances in the estimation of vascular risk and prognostic factors. STV 2007 ; 19(6) : 305-310.

[7]. Roos-Weil D, Imbert M. A diagnostic trap to avoid: about a case of accidental discovery thrombocytosis. RFL 2009 ; N°415 : 85-88.

[8]. Deibener- Kaminsky J, Lesesve JF, Grosset S, Pruna L, SchmallLaurain MC, Benetos A, and al.Significance of Marked Leukocytosis and Blood Cells in Emergency Situations. Rev Med Int 2011 ; 32(7) :406-410.

[9]. Zerah L, Boddaert J. Anemia in emergency medicine. Les cahiers de l'année gérontologique. 2011; 3 (2): 90-97.

[10]. Bernard F, Baccini V, Bagneres D, Rossi P, Demoux AL, Bonin-Guillaume S, and al. Severe thrombocytosis and leukocytosis associated with iron deficiency anaemia: A case-report. La revue de medecine interne ; 29(8) : 662-665.