Study of thrombocytopenia in the University Hospital Center of Batna (Eastern Algeria)

Zidani Abla[1*], Belhadi Kamilia[1] and Laanani Ismahane[1,2]

[1]Department of biology of organisms, Faculty of Nature and Life Sciences, University of Batna 2. Algeria

[2]Laboratory of Acquired and Constitutional Genetic Diseases (MAGECA), Faculty of Medicine, Batna 2 University, Batna 05000, Algeria

*Correspondence author: abla.zidani@univ-batna2.dz

Abstract

Thrombocytopenia refers to a decrease in the number of blood platelets below 150,000 per cubic millimeter of blood. Two mechanisms can explain thrombocytopenia: peripheral causes (by consumption, destruction, or sequestration); central causes (by production defect). The epidemiological, clinical, and biological characteristics of thrombocytopenia are poorly studied in Algeria. The objective of this study is to describe these characteristics at diagnosis. This is a retrospective and descriptive study of patients diagnosed at the Batna University Hospital from 2020 to 2023. There were 54 thrombocytopenic patients, 59% were male and 41% were female (male-to-female sex ratio = 1.45). The median age was 46.88 years. 37% of cases had anemia as a personal pathological history. Vertigo was the major reason for consultation. Clinical signs were mainly represented by the hemorrhagic syndrome (74%). Peripheral origin thrombocytopenia (63%) was more frequent than central origin thrombocytopenia. The distribution of different types of central thrombocytopenia was: acute leukemia (40%), aplastic anemia (30%), and Metastatic cancers (30%). Within peripheral thrombocytopenia, pregnancy was the primary etiology in 41%. Biologically, there was a decrease in platelet count (100%), red blood cells (37%), and hemoglobin (37%). Normal white blood cell count in 81% of cases.

Keywords: Thrombocytopenia, epidemiological, clinical and biological aspects, University Hospital Center (HUC) of Batna.

1. Introduction

The normal platelet count is between 150,000 and 350,000 platelets per microliter. Thrombocytopenia is a disorder in which the individual lacks platelets (Stéphan, 2008). When platelet numbers decrease, the body is no more able to form clots and control bleeding.

Thrombocytopenia can be caused centrally by defective production, peripherally by consumption (disseminated intravascular coagulation [DIC], microangiopathy), abnormal distribution (hypersplenism) or dilution, or by an immunological mechanism combining peripheral platelet destruction and inadequate bone marrow production (Drews and Weinberger, 2000). In central thrombocytopenia, thrombocytopenia is generally associated with abnormalities in other blood lineages, which helps to guide the diagnosis. Treatment of thrombocytopenia depends on its cause and mechanism (central, peripheral). Platelet transfusion is usually reserved for central thrombocytopenia, with platelets falling due to insufficient cell production by the bone marrow, particularly in cases of hematological malignancy.

The aim of this work is to establish an epidemiological study of this disease in the Batna region in order to obtain valuable informations and improve our understanding of its clinical and biological characteristics.

2. Methods

2.1 Patients and methods

This is a descriptive retrospective study on the files of 54 patients (archived from 2020, up to 2023) with thrombocytopenia, treated by hematologists in the hematology department at the Batna University Hospital (Algeria). In this study, we included all adult patients with thrombocytopenia, diagnosed by specialist doctors in the hematology department. Patients are aged between 20 and 90 years, of both genders and coming from different regions of eastern Algeria.

2.2 Data collection

Patient files were used as a data source, and a pre-established form was used to collect the main clinical characteristics of each patient. This form included information such as geographical data (identity, date and place of birth, place of residence and care, date of diagnosis), anthropological data (age and sex), clinical data, reasons for consultation, biological data and evolutionary aspects.

Our data were entered and analyzed using Microsoft Excel, and tables and graphs were also produced using the same software to facilitate analysis and presentation of results.

3. Results

3.1 Distribution of patients by sex

This distribution is shown in figure 1.

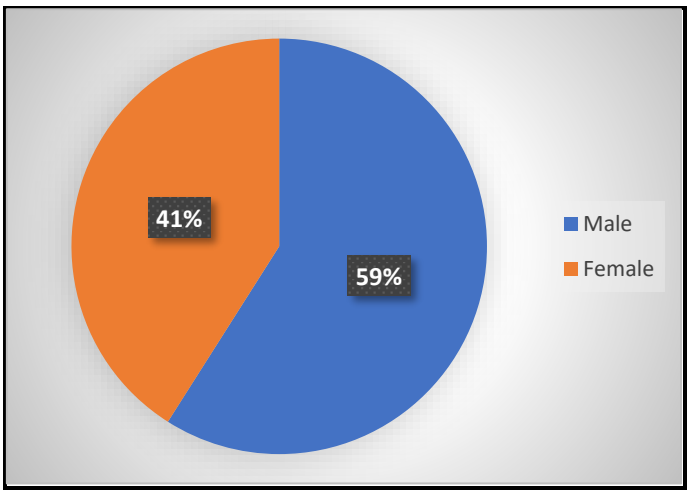

Figure 1. Distribution of patients by sex.

According to figure 1, the masculine gender was predominant with 59%. In fact, out of 22 women (41%), we had 32 men (59%) (M/F ratio 1.45).

3.2 Distribution of patients by age of disease discovery

Our patient numbers ranged from 20 to 90 years, with a total of 54 patients and an average age of 46.88 years. For the distribution of patients by age group, our results show a frequency peak in the population aged [30; 39] years, (22%) with 12 cases and an average age of 33.83 years.

3.3 Distribution of patients by type of personal antecedents

This distribution is shown in table 1.

Table 1. Distribution of patients by type of personal antecedents

Personal antecedents	Number	Percentage %
Smoking	4	7%
Anemia	20	37%
Allergy	4	7%
Diabete	6	11%
Neurological problem	4	7%
Cardiopathy	4	7%
Arthritis	4	7%
Stomach germ	6	11%
Hypertension	18	33%

According to table 1, the pathological antecedents were distributed as follows: 20 anemics (37%), 18 cases with hypertension (33%), 6 patients with stomach gerd (11%), 6 diabetics (11%) and 4 cases for allergy, neurological problems, smoking, cardiopathy and arthritis (7%).

3.4 Distribution of patients according to discovery circumstances

The distribution of this result is indicated in table 2.

Table 2. Distribution of patients according to discovery circumstances

Discovery circumstances	Number	Percentage %
Vertigo	54	100
Bone pain	10	18
Mucous skin pallor	36	67
Weight loss	4	7
High temperature	2	4
Unusual menstrual bleeding	8	15
Blood in urine	10	18
Purpura	36	67

Concerning the circumstances in which thrombocytopenia was diagnosed in the patients in this study, all 54 patients (100%) were discovered to have vertigo. 67% had mucous skin pallor (36 cases), bone pain and the appearance of blood in the urine were found in 10 cases (18%). 8 cases had unusual menstrual flow (15%). 7% were affected by weight loss (4 cases). 4% had an elevated temperature (2 cases).

3.5 Distribution of patients by clinical signs

The clinical signs are illustrated in table 3.

Table 3. Distribution of patients by clinical signs

Clinical signs	Number	Percentage %
Anaemic syndrome	20	37
Hemorrhagic syndrome	40	74
Infectious syndrome	8	15

The distribution of patients according to clinical signs, shown in table 3, shows that the haemorrhagic syndrome was present in the majority of cases studied (74%, 40 cases), the anemic syndrome observed in 20 patients (37%) and the infectious syndrome in 8 patients (15%).

3.6 Distribution of patients by origin of thrombocytopenia

This distribution is presented in figure 2.

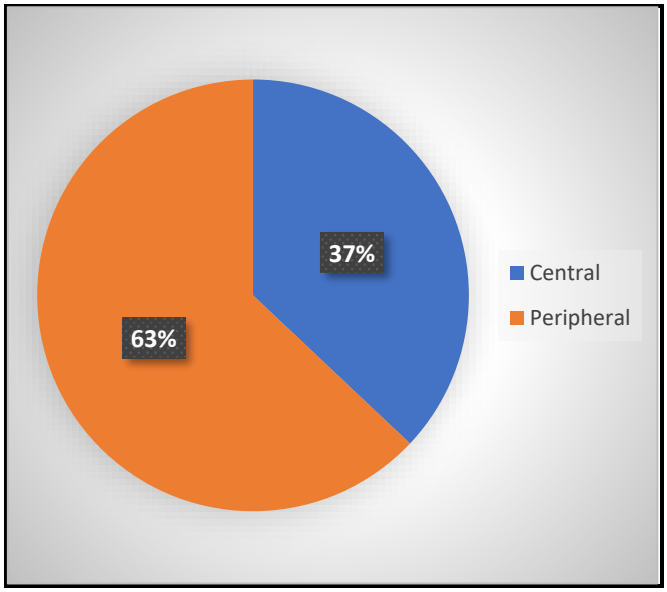

Figure 2. Distribution of patients by origin of thrombocytopenia

The results in figure 2 indicate that there were 2 types of thrombocytopenia, the most frequent being thrombocytopenia of peripheral origin (63%) 34 cases, followed by thrombocytopenia of central origin (37%) 20 cases.

3.7 Distribution of patients by type of central thrombocytopenia

This distribution is summarized in table 4.

Table 4. Distribution of patients by type of central thrombocytopenia

Type of central thrombocytopenia	Number	Percentage%
Acute leukemia	8	40
Medullar aplasia	6	30
Metastatic cancers	6	30
Total	20	100

Among central thrombocytopenia (20 cases), acute leukemia was the cause of thrombocytopenia in 8 patients (40%), followed by medullar aplasia and Metastatic cancers in 6 patients (30%) for each etiology.

3.8 Distribution of patients by type of peripheral thrombocytopenia

The results are detailed in table 5.

Table 5. Distribution of patients by type of peripheral thrombocytopenia

Type of peripheral thrombocytopenia	Number	Percentage %
Sequestration	6	18
Hypertension	8	23
Pregnancy	14	41
Immunological destruction	6	18
Total	34	100

Among the 34 cases of thrombocytopenia of peripheral origin, pregnancy was the primary etiology in 41% (14 cases) followed by hypertension 23% (8 cases) then 18% (6 cases) for sequestration and immunological destruction.

3.9 Serology

All patients were tested for hepatitis B and C, and human immunodeficiency virus (HIV). 100% were negative.

3.10 Distribution of patients to most remarkable biological test results

Biological results are reported in table 6.

Table 6. Distribution of patients according to most remarkable biological test results

Biological test results	Percentage %
Platelet (< normal values)	100
Red blood cell (RBC) (< normal values)	37
Hemoglobin (< normal values)	37
White blood cells (WBC) (normal values)	81

We note from the results in table 6, there was a decrease in platelet count (100%), red blood cells (37%), and hemoglobin (37%). Normal white blood cell count in 81% of cases.

4. Discussion

In this study we investigated the epidemiological, clinical and biological aspects of thrombocytopenia in the hematology department of Batna Hospital University Center (HUC).

Studies have shown that thrombocytopenia affects men more than women (Aissaoui et al., 2007; Lim et al., 2012; Elmouhri, 2013). Our results confirm these studies. Concerning age, our results are almost like those found in the study of Mbanya and colleagues in 2002 and Rahanitriniaina and colleagues in 2019, a frequency peak in the population aged [30; 39] years. Age is not a risk factor for the development of thrombocytopenia (Bonfiglio et al., 1995; Stéphan et al., 1999; Shalansky et al., 2002; Masrouki et al., 2004; Aissaoui et al., 2007; Kaikat et al., 2015). The existence of moderate thrombocytopenia is a frequent situation in people over 60 years of age (Gruson, 2014). Biino and colleagues in 2013 showed that platelet counts were similar in men and women up to the age of 14, but thereafter, women consistently had more platelets than men. Platelet counts decline rapidly during childhood, stabilize in adulthood and decline further in old age. The end result of this phenomenon is that platelet counts in the elderly were reduced by 35% in men and 25% in women, compared with early childhood. Female gender confers a survival advantage after severe injury in trauma-induced coagulopathy, with female platelets having increased reactivity probably due to estrogen (Biino et al., 2013).

In the study published by Rahanitriniaina and colleagues in 2019, thrombocytopenic patients' histories were recorded and classified according to their medical or surgical nature. They noted a predominance of diabetes, hypertension and toxic habits, followed by the presence of hepatopathy and previous surgery, then heart disease, a stay in a tropical zone, renal and respiratory pathologies. British researchers have reported that 31% of hospitalized thrombocytopenic patients had a history of drug use (Crowther et al., 2005; Kelly et al., 1996).

Our data indicate that vertigo was the major reason for consultation. In a study, the most frequent reason for consultation was haemorrhagic syndrome in 46.1% of cases (Rahanitriniaina et al., 2019). However, in another study, 70% of cases were discovered systematically during a blood test and 30% on the occasion of a haemorrhagic syndrome (Arabi, 2019).

As for clinical signs, the haemorrhagic syndrome was present in the majority of cases (74%). In a study, haemorrhagic syndrome occurred in 20% of cases (Kaikat et al., 2015). Some authors report that hemorrhage risk increases linearly with the severity of thrombocytopenia

(Strauss et al., 2002; Moreau et al., 2007), while others suggest that risk is increased but stable below 100 G/L (Vanderschueren et al., 2000; Moreau et al., 2007). In addition, other factors contribute to the risk of bleeding, such as the presence of thrombopathy (haemopathy, renal failure, etc.) or coagulopathy (intravascular coagulation, liver failure, etc.). Hemorrhagic complications in thrombocytopenic patients may affect several territories, either simultaneously or over time, and may pose a threat to vital prognosis due to their intensity (Moreau et al., 2007). In the study of Vanderschueren and colleagues, 26% of deaths in thrombocytopenic patients were directly consecutive to hemorrhage.

In this cohort, thrombocytopenia of peripheral origin (63%) was more frequent than thrombocytopenia of central origin (37%). The results of the study by Abbassi et al., 2018 revealed that the central mechanism slightly predominates over the peripheral mechanism. In contrast, in another study, peripheral thrombocytopenia was found in 84.1% (Rahanitriniaina et al., 2019). Thrombocytopenia can be due to insufficient platelet production, and is called "central thrombocytopenia". When it is linked to platelet consumption or destruction, it is called peripheral thrombocytopenia. Insufficient megakaryopoiesis may be quantitative or qualitative (inefficient thrombopoiesis). Peripheral thrombocytopenia can be due to peripheral destruction by an immunological phenomenon (anti-platelet antibodies or immune complexes), abnormal activation of coagulation inducing platelet consumption or splenic sequestration falling within the hypersplenism context (Abbassi et al., 2018). 90% of central thrombocytopenia in the Abbassi et al. 2018 study was caused by cancer chemotherapy, hepatocellular failure and leukemias. Thrombocytopenia of central origin was mainly due to toxicants and haemopathies in the study by Rahanitriniaina et al., 2019. 43% of peripheral thrombocytopenia in the study of Abbassi et al., 2018 was due to platelet hyper-destruction. Sepsis, trauma and postoperative admissions from major surgery were the most incriminating causes of thrombocytopenia in the study of Kaikat et al., 2015. In another study, peripheral thrombocytopenia was secondary to hemorrhagic syndrome and hypersplenism (Rahanitriniaina et al., 2019).

In this study, serology for hepatitis B, C and HIV was negative in 100% of cases. Determining serology in patients with thrombocytopenia is carried out at the moment of a diagnostic management for two reasons. Firstly, because of the risk of staff contamination associated with certain procedures, such as the placement of a central or peripheral approach, or the performance of various biopsies. Secondly, the therapeutic management of patients with thrombocytopenia and HIV infection is different, given the immunosuppression associated with HIV.

Based on our biological results, Platelet count is an essential test for studying primary haemostasis. In the case of thrombocytopenia (platelet count below 150,000/mm3), the test must be checked on a 2nd sample and confirmed by studying the blood smear. This is essential to exclude the existence of platelet aggregates formed in vitro, which can sometimes lead to misdiagnosis (Gérard et al., 2011). A normal red blood cell count was observed in 63% of patients, while the rest (37%) showed a decrease in this parameter. 52% of our cases had normal hemoglobin level. A decrease in hemoglobin level was observed in 37%, while the rest of the patients (11%) had an elevated hemoglobin level. The low hemoglobin level in 37% of patients indicates the presence of anemia associated with thrombocytopenia. Our results concur with those of (Edjeme and Lath, 2008), who also recorded a below-normal hemoglobin level accompanied by anemia and thrombocytopenia. Anemia appears in cases of red blood cell deficiency where the body receives too little oxygen, which can lead to a drop in energy

associated with fatigue, such that the slightest physical effort causes abnormal shortness of breath and cardiac palpitations. A low hemoglobin level is generally associated with insufficient iron reserves or B12 / B9 vitamin deficiency (Lanz, 2011). The majority of our patients (81%) had normal white blood cell counts. An increased or decreased white blood cell count is often indicative of an underlying disease. Leukopenia, a decrease in the number of white blood cells, often makes people more susceptible to infection. Leukocytosis, an increase in the number of white blood cells, is often due to the body's normal response to combat an infection, or to certain medications. However, increased white blood cell counts are also caused by bone marrow cancers (such as leukemia), in which affected cells multiply uncontrollably (David, 2023).

5. Conclusion

In our retrospective study, in the hematology department of Batna Hospital University Center, concerning 54 thrombocytopenia medical files, covering a period of 04 years from 2020 to 2023, we can better define the epidemiological, clinical and especially biological characteristics of thrombocytopenia. At the end of this work, we can propose to extend the epidemiological survey to the different Algerian territories, involving a larger number of university hospitals, in order to standardize thrombocytopenia data in Algeria. Finally, the elaboration of national registers can give clearer ideas on the epidemiological data of the different thrombocytopenias (incidence and prevalence).

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