SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Hematology

Epidemiological, Biological and Etiological Profile of Thrombocytopenia Diagnosed at the Hematology Laboratory of the Arrazi Hospital of the University Hospital Center Mohammed Vi-Marrakesh- Prospective Study (March 2021-August 2021)

Ibtissame Benhamou[1, 2*], Meryem Chouikh[1, 2], Sanae Sayagh[1, 2]

[1]Hematology Laboratory, University Hospital Mohammed VI, Marrakesh, Morocco
[2]Faculty of Medicine and Pharmacy, University Cadi Ayyad, Marrakesh, Morocco

DOI: 10.36347/sasjm.2022.v08i08.009 | **Received:** 13.07.2022 | **Accepted:** 24.08.2022 | **Published:** 26.08.2022

***Corresponding author:** Ibtissame Benhamou
Hematology laboratory, University Hospital Mohammed VI, Marrakesh, Morocco

Abstract **Original Research Article**

Study objectives: This study attempts to describe the epidemiological and biological profiles as well as the common etiologies of thrombocytopenia in patients admitted to University Hospital center Mohammed VI in Marrakesh, Morocco, over a period of six months between March 2021 and August 2021. ***Patients and methods:*** This is a prospective study of 673 patients hospitalized in the University Hospital center -Mohammed VI-Marrakesh between March and August 2021 whose admission blood tests show thrombocytopenia. ***Results:*** Thrombocytopenia was found in 673 patients, mainly from the intensive care unit (28%) and the department of hematology & oncology (16%), the sex ratio was 1.3 with a male predominance of 58%, the average age of our patients was 37.1 years. On biological plan, prothrombin (PT) and CRP were the two most noticed disturbed biological markers in our series, at 50% and 79% respectively, the etiological profile of our patients demonstrated a predominance of peripheral thrombocytopenia at 83.2%, The most frequent causes were infectious (43%), bacterial, viral or parasitic, followed by anomaly of distribution of platets (12%) and immunological thrombocytopenia (9%). ***Conclusion:*** Our study shows that thrombocytopenia is a frequent biological anomaly that can affect both sexes, of any age, it is most often multifactorial, but the main cause is infection, requiring a correlation of epidemiological, clinical and biological profiles in order to adapt the treatment.

Keywords: Thrombocytopenia, Epidemiology, Biology, Platelets, Infections, Hemorrhage.

INTRODUCTION

Referring to the standards of the various laboratories, the number of platelets is between 150,000-500,000/mm^3 [1].

Thrombocytopenia is defined as a platelet count below 150,000/mm^3. The results of the Third American National Health and Nutrition Survey (NHANES III) [2] confirm the traditional value of 150,000/mm^3 as the lower limit of normal.

However, a platelet count between 100,000 and 150,000/mm^3 does not necessarily indicate disease if it has been stable for more than 6 months [2] and adopting a cut-off value of 100,000/mm^3 may be more appropriate to identify a pathological condition; In addition, it is now recognized that in many non-Western countries the lower threshold for normal platelet count is 150,000/mm^3. It was the threshold adopted in our study.

It is often discovered by chance when obtaining a complete blood count prescribed by a clinician in a specific medical context. The etiology is usually unclear, multifactorial, and further investigations are often required.

The objective of this study is to describe the epidemiological and etiological profiles of the thrombocytopenia diagnosed at the central hematology laboratory of the University Hospital center-Mohammed VI in Marrakesh, the biological abnormalities associated with it, and compare them with data from the literature.

MATERIALS AND METHODS

This is a prospective study on all blood counts of patients hospitalized in the various departments (Intensive care units, Hematology, Pediatrics, Gynecology, Hepato-Gastro-Enterology ...) or external consultant within the Mohammed VI University Hospital center of Marrakech, between March and August 2021. The samples were taken from EDTA tubes, analyzed in less than two hours, in one of the two hematology analyzers used, Sysmex XT 4000i and Sysmex XE 5000, a blood smear is then made, stained with MGG (May Grunwald-Giemsa), dried and then read under an optical microscope at magnification x100 in order to eliminate the presence of platelet aggregates signifying a false thrombocytopenia (Image 1).

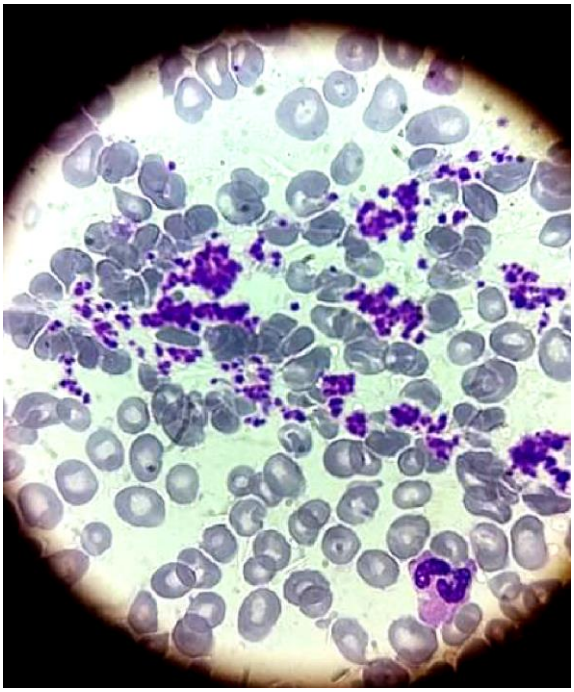

Image 1: Blood smear observed at magnification *100 of a thrombocytopenia at 90,000/mm^{3}showing platelet aggregates, this is a false thrombocytopenia

We have included in this study patients of both sexes, different age groups with a platelet count <150.000/mm^3 or presenting an alarm on the analyzer indicating an abnormal distribution of platelets.

The parameters collected for this study are distributed as follows:

- Epidemiological data: age and sex
- Clinical data: Admissions department, personal history and clinical symptoms, current treatment and diagnosis retained
- Paraclinical data other than platelet count: Leukocyte count, hemoglobin count, prothrombin time(PT),activated partial thromboplastin time (APTT) and other complement blood tests as l: blood smear, bone marrow smear, CRP, blood cultures, urea, creatinine, hepatic transaminases, anti-nuclear antibodies (ANA)…..

The data collection was done using the patient identifier number (IP) on the computer systems, through the HOSIX and iLAB software and then the data entry and analysis took place on Microsoft Office Excel 2016.

We have excluded from our study false thrombocytopenia re-checked on sodium citrate tubes instead of EDTA ones, cases whose medical file is not usable, cases admitted to the emergency department, as well as patients who presented old thrombocytopenia long before hospital admission during the study period.

All our data has been collected and processed in strict compliance with medical secrecy.

RESULTS

In the present study, 673 patients with thrombocytopenia met our inclusion criteria and were evaluated. The majority of our samples came from intensive care units (28%), hematology and oncology department (16%), hepato-gastroenterology department (10%), gynecology-obstetrics department (9.5%), Cardiology department (8%), Nephrology (7%), Infectious Diseases (6.5%), Internal Medicine (6%), Pediatrics (4.5%) and the rest of the medical and surgical departments as well as outpatient consultants (4.5%).

The number of women was 284 (42%) and men was 389 (58%) with a sex ratio of 1.3.The average age of patients was 37.1 years old with extremes ranging from 3 days to 87 years old, the predominant age group is that over 35 years with a percentage of 47%.

We classified our patients according to the severity of their platelet count (Table 1). In general [3], if the number of platelets is superior to 100,000/mm^3, we speak of benign thrombocytopenia, and in this case bleeding is rare. However, it is rather long-lasting than the usual bleeding in moderate thrombocytopenia between 50,000 and 100,000/mm^3, especially in case of serious injuries, as for severe thrombocytopenia in which the platelet count is less than 50,000/mm^3, the bleeding is very common.

On biological plan, the haemostasis assessment was disturbed, with an elongated APPT in 16% of patients, a low PT in 50%. Leukocyte levels were normal in 29% of patients, decreased in 16% of cases and high in 55% of cases. 57% of our patients were anemic. The renal and hepatic assessments were disturbed respectively in 28% and 19% of our patients. C Reactive protein (CRP) was positive in 79% of patients with an average value exceeding 73 mg/l, blood cultures and viral serologies were performed only in

372 patients, most of whom were admitted to intensive care units, proving positive successively for 128 patients (34.4%) and 111 (16.5%) patients. ANAs were identified in 7.7% of our patients, The myelogram was requested for 237 cases concluding with central thrombocytopenia in 15,7% of cases. The initial anamnesis noted a heparin intake in 4.8% of our patients.

Faced with any thrombocytopenia, a distinction is made between central and peripheral origin. Table 2 shows the etiologies retained for each case of thrombocytopenia, after analysis of their clinical and paraclinical profiles. The thrombocytopenias admitted to the intensive care units were most often multifactorial. In our study, we preferred to retain the first suspected etiology on admission, except for 1.1% of cases where it was difficult to incriminate a single etiological factor.

Table 1: Severity of thrombocytopenia in our series

Gravity	Frequency (%)
Benign	42%
Moderate	42.8%
Severe	15.2%

Table 2: Etiological profile of our series

Origin of thrombocytopenia	Etiology	Frequency (%)
Central (15.7%)	Leukemias	3.1%
	Chemo-induced	3.4%
	Vitamin deficiencies	3.2%
	Multiple myeloma	2.5%
	Other causes (metastatic medullary invasion, lymphoma, infectious, toxic, etc.)	3.5%
Peripheral (83.2%)	infections	43%
	Platelet distribution abnormalities (Hypersplenism, burns, etc.)	12%
	Immunological	9%
	Gestational	6.7%
	Medications including heparin	5%
	Thrombotic microangiopathies	4%
	Disseminated intravascular coagulation (DIC)	3.5%
Not identified (1.1%)	_	1.1%

DISCUSSION

In the literature, several studies have been conducted on thrombocytopenia in different hospital departments (Resuscitation, Internal Medicine, etc.), however, our study is the first conducted in a central laboratory that drains samples from different departments in the university hospital center., the disparity of certain results between the studies is mainly linked to the field of study, the type of population studied, the duration chosen and the variety of inclusion criteria.

In a cross-sectional study conducted in India at the civil hospital of Ahmedabad, over a period of one month, Bhalara SK *et al*., [4] objectified on the 412 patients included in their study a male predominance at 57% with one gender ratio at 1.3, which is consistent with the results of our study.

Another study conducted in India also, by khan SA *et al*., [5], the number of patients identified was 50 patients presenting with both fever and thrombocytopenia, the male predominance was the rule with a rate of 54% and a sex ratio at 1.2.The average age of our patients was 37.1%, which is consistent with the study by Khan SA *et al*., [5], Lim.SY *et al*., [6] conducted a prospective study in an intensive care unit on a period of 7 months, and had noted an average age of 62.4 years old, however, these studies had excluded children and young adults from their samples.

In other national and international studies conducted in intensive care units [7, 8,9], it was found that the main biological abnormalities associated with thrombocytopenia were renal failure and low prothrombin level, in our series , these abnormalities were found respectively in 28% and 50% of cases, with a positive CRP in 79% of patients.

Peripheral thrombocytopenias are the most common in our series and the first etiology identified was infection most often of bacterial (22%), viral (2%) or parasitic origin (1.7%), observed especially in moderate and severe thrombocytopenias, this was the case for Bhalara SK *et al*., [4], as well as Khan SA *et al*., [5], who identified dengue virus as the main cause of fever-associated thrombocytopenia in India, followed by of Malaria. Thrombocytopenia due to distribution anomalies linked to hypersplenism, extensive burns, post-transfusion purpura, etc. As well as thrombocytopenia of immunological origins, particularly following systemic diseases, transfusion incompatibility… were the other frequent causes.

CONCLUSION

Within the limits of this study, we can conclude that thrombocytopenia is a common biological abnormality that can affect both sexes, of any age, infectious causes are the most frequent etiologies hindering prognosis, it is associated with significant morbidity-mortality, a risk of hemorrhage and an often prolonged duration of hospitalization where from the necessity of a narrow clinico-biological collaboration to adopt a catch in quick and proper load.

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