Characterization of Hellp syndrome as a complication of severe preeclampsia. A single-center observational study.

Daniela Romina Dominguez Ontano [1] ID *, Maria del Cisne Perez Grunauer [1] ID, Vicente Yuen Chon Monroy [1] ID.

1. Medical Degree, Faculty of Medical Sciences, Catholic University of Santiago de Guayaquil, Guayaquil, Ecuador.

Summary

Introduction: The objective of the present study was to characterize HELLP syndrome in women as a complication of preeclampsia at a regional reference public obstetric center in Guayaquil, Ecuador, with the hypothesis that thrombocytopenia is the most frequent clinical alteration in patients with this syndrome.

Methods: This observational study was conducted at the Matilde Hidalgo de Procel Hospital in Guayaquil, Ecuador, from January 2020 to December 2022. Pregnant patients with hypertension with HELLP syndrome were included. The variables used were age, gestational age, comorbidities, blood pressure, presence of liver disorders, length of hospitalization, type of delivery, near-miss criteria, and maternal mortality. The sample was probabilistic. Descriptive statistics were used.

Results: In 1913 patients with severe preeclampsia, the incidence of HELLP syndrome was 76 (4.0%) (95% CI 3.1%-4.8%). The median age was 28 years. The Afro-Ecuadorian population predominated. Gestational diabetes type 2 and hypertension were the most frequent comorbidities. All patients presented elevated TGO, TGP enzymes, and total bilirubin. Ninety percent of the patients demonstrated a decrease in the platelet count. Most of the patients required termination of pregnancy. The patients received treatment with corticosteroids and other medications to control their blood pressure.

Conclusions: HELLP syndrome is a significant complication of severe preeclampsia, affecting mainly women of childbearing age with various comorbidities and from different geographical areas.

Keywords:

HELLP syndrome, severe preeclampsia, mortality.

Abbreviations

HELLP: acronym for hemolysis, elevated liver enzymes, and thrombocytopenia.

Additional information

No supplementary materials are declared.

Acknowledgments

We want to thank the administrative staff and patients of the Matilde Hidalgo de Procel Specialized Hospital, Guayaquil, Ecuador, where the study was conducted.

Authors' contributions

Daniela Romina Dominguez Ontano: Conceptualization, data curation, formal analysis, funding acquisition, investigation, writing - original draft.
María del Cisne Perez Grunauer: Funding acquisition, investigation, methodology, resources, supervision, validation, visualization, writing – original draft, writing – review and editing.
Vicente Yuen Chon Monroy, conceptualization, data curation, formal analysis, funding acquisition, research.
All the authors read and approved the final version of the manuscript.

Financing

The authors of this article funded the expenses of this research.

Availability of data and materials

The datasets used and analyzed during the present study are available from the corresponding author upon reasonable request.

Obstetrics

Introduction

HELLP syndrome involves several maternal complications that increase maternal-fetal morbidity and mortality. HELLP syndrome affects 0.1% to 0.9% of all pregnancies, 10% to 20% of pregnancies with severe preeclampsia, and 50% of eclampsia cases. The syndrome includes a triad composed of hemolysis, elevated liver enzymes, and thrombocytopenia. The etiology of this syndrome is unknown, but it is a severe complication of preeclampsia. Different processes are triggered during the presentation of the syndrome, resulting in multisystem effects, with endothelial dysfunction leading to neurological and hemodynamic compromise [1].

In 80% of cases, it occurs before 37 weeks of gestation, and in 10%, it occurs before 27 weeks. The risk of presenting this syndrome again in a future pregnancy is present in 19% to 27% of the population. Genetic factors play a fundamental role, and specific maternal and fetal genotypes increase the risk of its presentation. In some cases, it occurs between 48 hours and 7 days postpartum in 31% of cases. Among the most serious complications of HELLP syndrome, the rupture of a subcapsular hepatic hematoma is described, which results in a maternal mortality of between 17% and 59%. Fetal mortality due to hepatic hematoma is 38% to 62% [2]. Characterizing the risk factors, causes, and conditions that lead to severe HELLP in patients is essential to respond on time and reduce the potential risk of maternal-fetal morbidity and mortality [3].

The objective of the present study was to characterize HELLP syndrome as a complication of preeclampsia in a regional public reference obstetric center in Guayaquil, Ecuador, with the hypothesis that thrombocytopenia is the most frequent clinical alteration in patients with this syndrome.

Materials and methods

Study design

This cross-sectional observational study is descriptive. The source is retrospective.

Scenery

The study was conducted at the Matilde Hidalgo de Procel Specialized Hospital of the Ministry of Public Health of Ecuador, located in Guayaquil, Ecuador. It lasted from January 1, 2020, to December 31, 2022.

Participants

Records of patients with hypertensive disorders of pregnancy presenting with HELLP syndrome were included. No patients were excluded or eliminated from the analysis.

Variables

The variables used were age, gestational age, comorbidities, blood pressure, presence of liver disorders, length of hospitalization, type of delivery, near-miss criteria, and maternal mortality.

Data sources/measurements

The source was indirect; an electronic form was filled out from the data in the medical records. Records with the following ICD-10 codes were included: (O14.2) HELLP syndrome.

Biases

Applying the participant selection criteria avoided observation and selection bias. To avoid possible interviewer, information, and memory biases, the principal investigator kept the data at all times via a guide and records approved in the research protocol. Two researchers independently analyzed each record in duplicate, and the variables were recorded in the database once their concordance was verified.

Study size

The sample was probabilistic. According to INEC data, there are 1.4 million women in the Guayas, 53.2% of whom are of childbearing age (744,800). With a fertility rate of 42.8 per 1000 women in Ecuador, 31,877 possible pregnancies are possible. With an expected frequency of HELLP syndrome of 5.1%, a confidence limit of 5%, and a confidence interval of 95%, the sample size was 74 cases. The EPI info TM program (Version 7.2.5, CDC, Atlanta, USA, September 2022) was used for the sample calculation.

Quantitative variables

Descriptive statistics were used. The results are expressed as frequencies and percentages. The categorical variables were not converted into quantitative variables.

Statistical analysis

Descriptive Statistics: Qualitative variables were analyzed via frequencies and percentages, whereas quantitative variables were described via central tendency and dispersion measures. A 95% confidence interval is presented for a proportion of the relevant prevalences. The statistical package used was IBM

Corp. (released in 2017). IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

Results

Participants

A total of 1913 records of patients with severe preeclampsia were reviewed. The incidence of HELLP syndrome was 76 cases, representing a prevalence of 4.0% (95% CI 3.1%-4.8%). There were 33 cases in 2020 (43.43%), 24 cases in 2021 (31.57%), and 19 cases in 2022 (25%).

Main characteristics of the study group

The median age of the patients in the study group was 28 years, the 25th percentile was 23 years, and the 75th percentile was 36 years. There were 28 cases in women from urban areas (36.85%), 36 cases in marginal urban areas (47.37%), and 12 cases in rural areas (15.78%). In terms of ethnicity, there were 7 white women (9.21%), 23 Hispanic women (30.26%), and 46 Afro-Ecuadorian women (60.53%). In terms of level of education, 23 patients had primary education (30.26%), 45 patients had secondary education (59.22%), and eight patients had higher education (10.52%). The demographic and clinical characteristics of the study group are presented in Table 1.

Table 1. Demographic and clinical characteristics of the study group.

	N=76	Percentage
Number of pregnancies		
Grand multiparous	41	53.95%
Multiparous	16	21.05%
Nulliparous	19	25.00%
Trimester of gestation		
Third trimester	47	61.85%
Second trimester	29	38.15%
Maternal comorbidities		
Obesity	35	46.05%
Type 2 diabetes mellitus	20	26.32%
Previous hypertension	11	14.47%
Others	10	13.16%

HELLP criteria

There was an increase in the enzymes TGO and TGP and total bilirubin in all patients. Thrombocytopenia was present in 69 patients (90.78%). Table 2 presents the characteristics of the management of patients with HELLP syndrome. There were 2 cases of mortality in the institution and two additional cases of women referred to the intensive care unit outside the institution. This represents a mortality rate of 5.3% (95% CI 0.2%-10.3%).

Table 2. Features of the management of patients with HELLP syndrome.

	N=76	Percentage
Termination of pregnancy		
Premature	22	28.95%
Term	54	71.05%
Type of delivery		
Vaginal	28	36.84%
Cesarean section	48	63.16%
Therapeutic management		
Hospitalization > 72 hours	73	96.05%
Corticosteroids	74	97.37%
Magnesium sulfate in the first 48 hours	76	100.0%
Administration of blood products	59	77.63%
Water restriction	49	64.47%
Hourly diuresis control	76	100.00%
Laboratory analysis every 12 hours	47	61..84%
Blood gas analysis	45	59.21%
Chest X-ray	69	90.79%
Vital signs according to score	44	57.89%

Discussion

The research results revealed that, in terms of parity, the highest percentage corresponded to grand multiparous patients, at 53.94%. Notably, during the period from June to December 2021, HELLP syndrome in primiparous pregnant women occurred with a frequency of 54%, whereas from January to June 2022, the frequency was 46%.

The frequency is similar to that reported in other studies [4], whose published results specify that 50% of primiparous pregnant women presented HELLP syndrome, whereas in different populations, it is only 14%. Notably, HELLP syndrome occurs in almost half of the primiparous pregnant women who are treated at complex hospital institutions [5].

Concerning age, the results of the present study revealed that extreme-age patients presented a greater risk of HELLP as a serious complication.

The present study's results regarding platelet openness revealed that the percentage of appearance was 90.78%, which is in accordance with the study's hypotheses.

Regarding hypertension in the present study, patients with HELLP syndrome had high blood pressure levels in only 59% of the patients. Compared with other studies, the results indicate that hypertension occurred in 87% of patients [6, 7]. In this same study, the percentages were within the confidence interval of 0.2--10% for maternal mortality.

Concerning preexisting morbidities in the present study, obesity was the morbidity that presented the highest percentage at 47.3%.

Concerning managing HELLP syndrome in patients treated at the Matilde Hidalgo Specialized Hospital, it was

necessary to create a table highlighting the most critical actions. Regarding hospitalization for more than 72 hours, 100% of the HELLP syndrome patients were affected. Regarding the administration of dexamethasone, it was fulfilled in 74 patients. Regarding the administration of magnesium sulfate for 48 hours, it was fulfilled in all patients. Regarding the administration of derivatives, it was fulfilled in 59 patients. Water restriction was indicated in 49 patients, and diuresis control in 100 administrations of magnesium sulfate for 48 hours was achieved.

Only 47 patients underwent 12-hour examinations, 45 underwent blood gas tests, 69 underwent X-rays, and 46 had vital signs according to the score. Current studies need to provide a detailed breakdown of the management of HELLP syndrome in terms of length of stay, consumption of blood products, and so on. Many research projects are aimed at analyzing clinical cases rather than hospital populations. New prospective and comparative studies will have to resolve these initial observations.

Conclusions

Most affected women were of reproductive age, with a median age of 28. A wide distribution was observed in terms of the number of previous pregnancies, indicating that HELLP syndrome can occur in nulliparous and multiparous women. Type 2 diabetes mellitus and arterial hypertension were the most frequent comorbidities in the study group, highlighting the importance of considering these risk factors in the evaluation and management of patients with preeclampsia. Elevated transaminase (AST and ALT) and total bilirubin levels are constant findings in patients with HELLP syndrome, confirming the liver involvement characteristic of this condition. Therapeutic management focuses on the termination of pregnancy, the administration of corticosteroids, and the control of blood pressure levels, which is consistent with current clinical guidelines for the management of this obstetric complication.

References

1. Adorno M, Maher-Griffiths C, Grush Abadie HR. HELLP Syndrome. Crit Care Nurs Clin North Am. 2022 Sep;34(3):277-288. doi : 10.1016/j.cnc.2022.04.009. Epub 2022 Jul 20. PMID: 36049847.

2. Farahi N, Oluyadi F, Dotson AB. Hypertensive Disorders of Pregnancy. Am Fam Physician. 2024 Mar;109(3):251-260. PMID: 38574215.

3. Souza RT, Cecatti JG, Passini R Jr, Tedesco RP, Lajos GJ, Nomura ML, Rehder PM, Dias TZ, Haddad SM, Pacagnella RC, Costa ML; Brazilian Multicenter Study on Preterm Birth study group. The Burden of Provider-Initiated Preterm Birth and Associated Factors: Evidence from the Brazilian Multicenter Study on Preterm Birth (EMIP). PLoS One. 2016 Feb 5;11(2):e0148244. doi: 10.1371/journal.pone.0148244. PMID: 26849228; PMCID: PMC4743970.

4. McCormick PA, Higgins M, McCormick CA, Nolan N, Docherty JR. Liver infarction, hematoma, and rupture in HELLP syndrome: support for a vasospastic hypothesis. J Matern Fetal Neonatal Med. 2022 Dec;35(25):7942-7947. doi: 10.1080/14767058.2021.1939299. Epub 2021 Jun 15. PMID: 34130599.

5. Coral-Almeida M, Sanchez ME, Henriquez-Trujillo AR, Barriga-Burgos M, Alarcon-Moyano E, Tejera E. Ethnicity, geography and altitude considerations and maternal mortality associated with HELLP syndrome in Ecuador: a population-based cohort study. BMC Pregnancy Childbirth. 2024 Sep 7;24(1):585. doi:. PMID: 39244549; PMCID: PMC11380354.

6. Editorial Office of Asian Biomedicine. Hypertension, preeclampsia, and HELLP syndrome in pregnancy. Asian Biomed (Res Rev News). 2023 Oct 26;17(5):206-207. doi: 10.2478/abm-2023-0061. PMID: 37899761; PMCID: PMC10602631.

7. Rimboeck J, Gruber M, Weigl M, Huber P, Lunz D, Petermichl W. Obesity Correlates with Chronic Inflammation of the Innate Immune System in Preeclampsia and HELLP Syndrome during Pregnancy. Biomedicines. 2023 Oct 20;11(10):2851. doi: 10.3390/biomedicines11102851. PMID: 37893224; PMCID: PMC10604126.

Statements

Ethics committee approval and consent to participate

The bioethics committee of the Faculty of Medical Sciences of the Universidad Católica Santiago de Guayaquil approved the study

Consent to publish

This information was not needed because the present study did not publish images, radiographs, or specific patient studies.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Author information

Daniela Romina Dominguez Ontano, Doctor from the Catholic University of Santiago de Guayaquil. (Guayaquil, 2024).
Email: danieladominguezont@gmail.com
ORCID https://orcid.org/0009-0006-0920-9670

Maria del Cisne Perez Grunauer, Doctor from the Catholic University of Santiago de Guayaquil. (Guayaquil, 2024).
Email: mariadelcisne_pg@hotmail.com
ORCID https://orcid.org/0009-0009-9173-3069

Vicente Yuen Chon Monroy,
ORCID https://orcid.org/0000-0003-4489-4512

Editor's Note

The Journal Actas Médicas (Ecuador) remains neutral concerning the claims jurisdictional in maps published and affiliations institutional.

Received: October 1, 202 4.
Accepted: November 28, 2024.
Published: November 30, 202 4.
Editor: Dr. Mayra Ordoñez Martínez.

How to cite:

Dominguez D, Perez M, Chon V. Characterization of the syndrome Hellp as a severe complication of preeclampsia: a single-center observational study. Actas Médicas (Ecuador) 2024; 33(2):120-125.

Correspondence: Daniela Romina Dominguez Ontano. Mail: danieladominguezont@gmail.com
Address: R492+MJF, Av. Kennedy, Guayaquil CP 090514, Guayaquil. Medical School, Faculty of Sciences Medical, University of Guayaquil. Telephone: (04) 228--1148.