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PREVALENCE AND MANAGEMENT OF MATERNAL DEATHS DUE TO ECLAMPSIA AND HELLP SYNDROME: A COMPREHENSIVE SYSTEMATIC REVIEW

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ABSTRACT

Background: *Eclampsia and HELLP syndrome, are serious complications during pregnancy, and pose significant risks to both mother and fetus. Early management of eclampsia and HELLP syndrome before delivery may improve the outcomes for patients. This study aims to systematically review the literature on the prevalence and management of eclampsia and HELLP syndrome regarding maternal deaths in the last 10 years.*

Methods: *This systematic review used the PRISMA 2020 guidelines and focused on full-text English literature published between 2014 and 2024. Editorials and review papers from the same journal, as well as submissions without a DOI, were not considered. Literature was gathered from online databases such as PubMed, SagePub, and ScienceDirect.*

Result: *In the initial stages, our research team retrieved a total of 9400 articles from reputable sources such as PubMed, SagePub, and Science Direct. After a meticulous three-level screening process, only six articles were deemed directly relevant to our ongoing systematic review and were selected for further analysis through thorough full-text reading.*

Conclusion: *Eclampsia and HELLP syndrome are both conditions that require treatment. Pregnancy termination and magnesium supplementation prevent eclampsia, while glucocorticoids are crucial for treating HELLP syndrome. Treatment should consider baseline features and long-term implications to address maternal and fetal health and well-being.*

Keyword: *Eclampsia, HELLP syndrome, prevalence, treatment*

INTRODUCTION

Hypertensive diseases of pregnancy, such as chronic hypertension, gestational hypertension, and preeclampsia, can cause substantial injury to both mother and child, especially in developing nations.[1] Eclampsia is a known complication of preeclampsia that can be very dangerous if not detected in time. Eclamptic seizures may occur at any stage of pregnancy, during labor, or after delivery. While seizures before 20 weeks of gestation are rare, they can happen in cases of gestational trophoblastic disease.[2] Infants born to mothers with hypertensive disorders of pregnancy are at increased risk of being born prematurely and suffering from complications such as respiratory distress syndrome (RDS) and sepsis.[1]

Up to 10% of pregnancies worldwide are affected by hypertensive disorders, which also account for 10% of maternal deaths in the US. These disorders include chronic hypertension, gestational hypertension, preeclampsia, eclampsia, and chronic hypertension superimposed on preeclampsia.[2] 8.6% of preeclampsia cases and 2.5% of eclampsia cases were reported in a 2013 worldwide study involving 43,364 women.[1] Eclampsia raises the mother's and child's risk of morbidity and death. According to Gracia et al.[3], the maternal death rate linked to eclampsia varies from 0% in high-income nations to 15% in low-income countries. In the United States, African American women had a greater frequency of preeclampsia and a thrice higher rate of maternal mortality than their white counterparts. Preeclampsia risk factors also include maternal age over 40, a history of preeclampsia, multifetal gestation, obesity, chronic hypertension, pregestational diabetes, renal disease, antiphospholipid syndrome, thrombophilia, lupus, and in vitro fertilisation.[2]

Eclamptic seizures are a medical emergency that must be treated right away to save the mother and foetus' lives. Magnesium sulphate should be used to reduce convulsions and is the primary treatment for eclamptic seizures. This medication must be used with caution because it has the potential to cause toxicity, respiratory paralysis, central nervous system depression, and cardiac arrest. Patients with myasthenia gravis with eclampsia may consider levetiracetam or valproic acid as alternatives because magnesium and phenytoin cause increased muscle weakness, potentially leading to a myasthenia crisis. Finally, delivering the foetus is the only definitive treatment for preeclampsia/eclampsia. Blood pressure regulation is also important postpartum because the risk of eclampsia is highest in the 48 hours following birth. Magnesium sulphate should be administered for 12 to 24 hours after delivery.[2]

HELLP syndrome is a pregnancy and postpartum condition marked by hemolysis, increased liver enzymes, and low platelets. Risk factors include multiparity, age, and genetic predisposition.[4] Recent research calls into question the notion that HELLP syndrome is usually associated with severe preeclampsia, suggesting that the two illnesses may be distinct. Some cases of HELLP syndrome occur without any prior hypertension or proteinuria.[5] The specific origin of HELLP syndrome is unknown, however it is thought to result from a systemic inflammatory process involving the complement cascade.[6] HELLP syndrome primarily involves platelet activation without affecting coagulation factors, resulting in normal levels of PT, PTT, and fibrinogen.[5]

This resulted in the diagnosis of HELLP syndrome as a unique medical disorder. Its underlying process is similar to that of preeclampsia, with endothelial damage, raised inflammatory markers, unbalanced angiogenesis, increased autoantibodies, fibrin deposition in blood vessels, and elevated platelet activity. It is hypothesised that aberrant placental growth in early pregnancy contributes to the release of hazardous chemicals, possibly contributing to the beginning and progression of HELLP syndrome in later stages of pregnancy.[6] There is currently no cure for HELLP syndrome, and patients with the disorder can quickly deteriorate due to multiple system organ failure. The placenta is delivered and removed as the primary treatment. Several studies have been published in the literature on the use of corticosteroids to treat HELLP syndrome, but no definite outcome has been identified.[7]

The current study found that death among women with eclampsia is associated with a low platelet count caused by HELLP syndrome and severe systolic hypertension. The incidence of eclampsia was 1 in 587 births, or 17 per 10,000. Low-income nations account for 85% of all births among adolescent moms. Given the prevalence of adolescent pregnancy in these nations, as well as the increased frequency of eclampsia among teenaged girls, the incidence of eclampsia is predicted to be high. The current study demonstrated that maternal death from hypertensive illnesses of pregnancy is associated with a lethal triad: eclampsia, severe systolic hypertension, and thrombocytopenia caused by HELLP syndrome. To reduce the frequency of eclampsia deaths, early detection and adequate care of HELLP syndrome are required, as well as the prevention of seizures and severe hypertension in women diagnosed with the syndrome.[3]

The purpose of this study is to conduct a systematic evaluation of the literature on the prevalence and management of maternal mortality caused by eclampsia and HELLP syndrome over the last decade.

METHODS

Protocol

The study's author carefully followed the requirements provided in the Preferred Reporting Items for Systematic Review

and Meta-Analysis (PRISMA) 2020. The goal of this was to ensure that the study met all of its criteria. The approach chosen was specifically designed to ensure the accuracy and dependability of the investigation's findings.

Criteria for Eligibility

This study systematically reviews the management of micronutrients in patients who have had bariatric surgery in the literature over the last decade. This study attempts to provide insights and improve patient treatment techniques by meticulously analysing data. The major goal of this paper is to highlight the overall significance of key issues identified in the literature.

This study uses tight inclusion and exclusion criteria to assure the quality of the literature included. Papers must be in English and published between 2014 and 2024 to meet the inclusion criteria. Exclusion criteria include editorials, submissions without a DOI, already published review papers, and duplicate journal entries.

Search Strategy

The keywords used for this research is "eclampsia and hellp syndrome treatment". The Boolean MeSH keywords inputted on databases for this research are: *((("eclampsia"[MeSH Terms] OR ("eclampsia"[All Fields] AND "severe eclampsia"[All Fields]) OR ("hellp syndrome"[MeSH Terms] OR ("hellp"[All Fields] AND "syndrome"[All Fields]) AND ("therapeutics"[MeSH Terms] OR "therapeutics"[All Fields] OR "treatments"[All Fields] OR "therapy"[MeSH Subheading] OR "therapy"[All Fields] OR "treatment"[All Fields] OR "treatment s"[All Fields])))*

Data retrieval

The authors conducted this systematic review by carefully evaluating each study's abstract and title to establish its relevance. Only papers that met the inclusion criteria and were relevant to the article's objectives were selected for further review. A continuous pattern found across numerous investigations eventually led to a definitive outcome. The selected submissions required to be in English and full-text. The review was carried out with the highest rigour, including only material that matched all predefined inclusion criteria and was directly relevant to the researched topic. Studies that did not fit these criteria were systematically rejected, and their results were not considered. A thorough analysis was conducted, looking at numerous details discovered during the research process, such as titles, authors, publication dates, locations, study procedures, and parameters.

Quality Assessment and Data Synthesis

The writers independently examined the research offered in each publication's title and abstract to determine which ones needed additional investigation. The following phase entailed reviewing all of the papers that fulfilled the pre-established criteria for inclusion in the review. The choice to include an article in the review was based on the findings discovered during the evaluation process. This criterion served the objective of streamlining the paper selection process for further evaluation, allowing for a thorough discussion of previous investigations and the factors that qualified them for inclusion in the review.

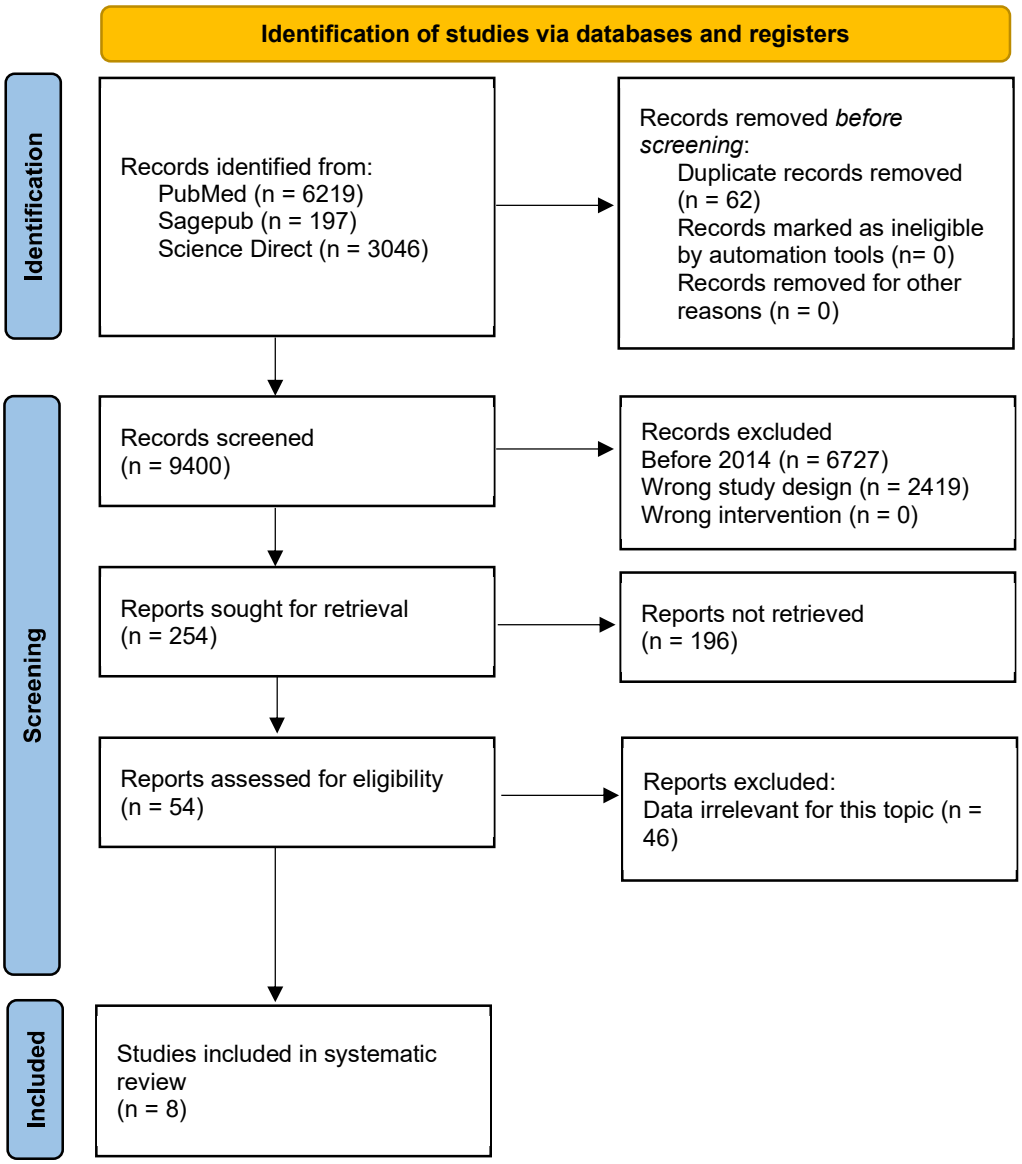

Figure 1. Article search flow chart

RESULT

In the initial stages, our research team retrieved a total of 9400 articles from reputable sources such as PubMed, SagePub, and Science Direct. After a meticulous three-level screening process, only six articles were deemed directly relevant to our ongoing systematic review and were selected for further analysis through thorough full-text reading. For ease of presentation, we have compiled the literature that has been included in this analysis into Table 1.

Table 1. The literature included in this study

Author	Origin	Method	Sample	Result
Gracia et al.[8] (2017)	Panama	Randomized Controlled Trial	284 patients	During the trial period, 284 patients volunteered to participate; 143 were randomly assigned to receive Mg for 24 hours postpartum, and 141 to receive Mg for 6 hours postpartum. There were no significant variations in baseline characteristics between the two groups

				tested. There were no significant differences between the groups in terms of overall problems or any specific complication. There were no reports of maternal deaths.
Wen et al.[9] (2018)	Multicenter	Randomized Controlled Trial	2464 patients	Pre-eclampsia occurred in 169/1144 (14.8%) women in the folic acid group and 156/1157 (13.5%) in the placebo group (relative risk 1.10, 95% confidence interval 0.90 to 1.34; P=0.37). There was no evidence of differences between the groups for any other adverse maternal or neonatal outcomes.
Kang et al.[10] (2019)	Suzhou, China	Retrospective case control study	151 patients	A study involving 151 patients with HELLP syndrome categorized them into treatment and control groups based on severity grades. Most outcomes, including maternal and fetal adverse events, showed no significant differences between the groups. However, the third-grade control group had a higher primipara rate, and the second-grade treatment group exhibited a higher preterm delivery rate compared to their respective controls. Key biochemical markers did not differ among the groups.
Pascoal et al.[11] (2019)	Brazil	Randomized Controlled Trial	62 patients	Serum magnesium levels were higher in the 2-gram/hour group, with a statistically significant difference from 2 hours after the beginning of the magnesium sulfate infusion (P <.05). Oliguria was the most common complication recorded in both groups, with no significant difference between the 2 regimens (RR 0.88; 95% CI: 0.49–1.56; P =.65). No cases of eclampsia occurred. Side effects were more common in the 2-gram/hour group (RR 1.89; 95% CI: 1.04–3.41; P = .02); however, all were mild. There were no differences between the 2 groups regarding neonatal outcomes, except for

				admission to neonatal intensive care, which was more frequent in the 1-gram/hour group (25% vs 6.3%; P =.04).
Vousden et al.[12] (2019)	Multicenter	Randomized Controlled Trial	2692 patients	Between 1 April 2016 and 30 November 2017, 2,692 women had eclampsia (0.5%). In total, 6.9% (n = 186; 3.47/10,000 deliveries) of women with eclampsia died, while another 51 died from other complications of hypertensive disorders of pregnancy (0.95/10,000). The CRADLE intervention had no meaningful effect on the rates of eclampsia, stroke, maternal death, or intensive care unit hospitalisation among pregnant women with a hypertension illness. There was no discernible relationship between magnesium sulphate availability and the incidence of eclampsia across sites (p = 0.12).
Cui, et al.[13] (2020)	Beijing, China	Retrospective cohort study	106 patients	A retrospective cohort study at Peking University Third Hospital analyzed 106 pregnant women diagnosed with HELLP syndrome from August 2010 to January 2017, alongside a control group of 100 healthy pregnant women. The study collected demographic data, hospital stay duration, postpartum complications, and coagulation marker levels. Results showed a higher incidence of preeclampsia in HELLP syndrome patients with postpartum hemorrhage. Additionally, fibrinogen levels were significantly lower in postpartum hemorrhage cases compared to non-hemorrhage cases and healthy pregnant women. Multivariate analysis indicated that decreased fibrinogen levels independently predicted postpartum hemorrhage in HELLP syndrome patients. The study concluded that fibrinogen levels had good predictive value for postpartum hemorrhage, with

				a cutoff value of 3.04 g/L showing a sensitivity of 90.90% and specificity of 75.80%.
Duvekot et al.[14] (2020)	Multicenter	Randomized Controlled Trial	56 patients	The trial was halted after 35 months because of slow recruitment. Between February 2011 and December 2013, a total of 56 women were randomized to immediate delivery (n = 26) or temporizing management (n = 30). Median gestational age at randomization was 30 weeks. Median prolongation of pregnancy was 2 days (interquartile range 1-3 days) in the temporizing management group. Mean birthweight was 1435 g after immediate delivery vs 1294 g after temporizing management (P = .14). The adverse perinatal outcome rate was 55% in the immediate delivery group vs 52% in the temporizing management group (relative risk 1.06; 95% confidence interval 0.67-1.70). In both groups there was one neonatal death and no maternal deaths. In the temporizing treatment group, one woman experienced pulmonary edema and one placental abruption. Analyses of only the singleton pregnancies did not result in other outcomes.
Sun, et al.[7] (2023)	Multicenter	Randomized controlled trial	485 patients	In a study involving 485 patients from 7 randomized controlled trials, corticosteroid therapy did not show significant improvement in maternal outcomes compared to placebo. This included outcomes such as maternal morbidity, eclampsia, acute renal failure, pulmonary edema, and oliguria. Additionally, there were no significant differences observed in neonatal outcomes between corticosteroid therapy and placebo.

According to a 2017 study by Gracia et al., patients got a 4 g magnesium infusion and an average of 4 hours of magnesium before labour. Interestingly, 66% of the population had a caesarean section. The postpartum hospitalisation stay lasted three days. Foetal compromise, anterior caesarean section, unfavourable cervix, and lack of labour progress were the reasons for caesarean section, with no difference between groups. Furthermore, no significant differences were seen

between the groups in terms of overall or specific problems. However, three secondary variables showed substantial variations. 1) The group that received Mg for 24 hours had higher diuresis between 6 and 12 hours postpartum; 2) the group that received Mg for 6 hours postpartum had a 14-hour shorter time to onset of ambulation ($p = 0.001$); and 3) the group that received Mg for 6 hours postpartum began breastfeeding 11 hours earlier ($p = 0.001$). There were no incidents of maternal death, and all patients were released in good overall health.[8]

In a trial intervention conducted by Wen et al. 2018, pregnant women were given either 4.0 mg of folic acid or a placebo from 8-16 weeks of gestation until delivery. Blood sample analyses showed that serum folate was significantly higher in the folic acid group, while red blood cell folate levels were similar. No significant differences were observed in reported adverse events or severe adverse events between the two groups.[9]

A study conducted by Kang et al. in 2019 examined the efficacy of prenatal glucocorticoid administration in HELLP syndrome. The study's results showed no considerable differences between the treatment and control groups in terms of patient characteristics, disease progression, postpartum hemorrhage volume and rate, maternal damage, ICU admission rate, perinatal mortality rate, or overall fetal adverse outcomes. These findings indicate that administering high-dose glucocorticoids does not significantly improve maternal and fetal prognoses. Furthermore, using high-dose glucocorticoids did not reduce the requirement for blood products.[10]

The study by Pascoal et al. in 2019 found similar baseline characteristics in both groups. Severe preeclampsia and comorbidities were prevalent in both groups. The incidence of complications was similar, except for oliguria, which was common in both groups. Birthweight was significantly different, with an average weight of 2917 grams in the 2-gram group and 2436 grams in the 1-gram group. No significant differences were found in Apgar scores or neonatal outcomes, except for a higher frequency of intensive care unit admission in the 1-gram group.[11]

According to Vousden et al. 2019, the CRADLE intervention had no meaningful effect on the rates of eclampsia, stroke, maternal death, or ICU admissions. Eclampsia rates varied between sites, with a considerable decrease in Haiti and Zambia Centre 1 and a large increase in Malawi and Uganda Centre 2. The majority of eclampsia occurrences occurred before birth in women aged 20 to 34. Magnesium sulphate was available in 74.7% of facilities, with no notable change over the experiment period. The availability of magnesium sulphate had no significant effect on the proportion of eclampsia cases.[12]

Cui and colleagues (2020) found that a low level of fibrinogen (FIB) during pregnancy can be used as a reliable biomarker to predict postpartum hemorrhage in women who have HELLP syndrome. This discovery highlights the importance of using FIB levels to guide monitoring and evaluate the outlook for pregnant women with HELLP syndrome.[13]

The study by Duvekot et al. 2020 found that chronic hypertension and multiple pregnancies were slightly more common in the immediate delivery group. Adverse neonatal outcome in the whole group was 54% and HELLP syndrome was present in 41% of the women.[14]

Sun and colleagues tested the efficiency of corticosteroids in HELLP syndrome patients in 2023. They discovered that corticosteroids did not improve clinical outcomes for pregnant women or babies. The outcomes included maternal morbidity, eclampsia, acute renal failure, pulmonary edoema, and oliguria.[7]

DISCUSSION

It has become common for pregnant women in many countries to take folic acid supplements. In our study, more than 80% of women took these supplements, often at high doses of 4.0-5.0 mg per day throughout their pregnancy. However, previous research on folic acid supplementation during pregnancy did not include pre-eclampsia due to a lack of clinical trial data. The Effect of High Dose Folic Acid Supplementation in Pregnancy on Pre-Eclampsia (FACT) study aims to address this gap in knowledge through a large, rigorous, randomized, double-blind, placebo-controlled, multinational, and multicenter phase III trial. This study offers several advantages and is designed to provide conclusive evidence of the effects of high-dose folic acid supplementation during pregnancy.[9]

Approximately 80% of eclampsia instances occur during pregnancy or intrapartum, with only about 20% occurring after birth.[8] The analysis by Vousden et al. gives reliable contemporaneous estimates of the incidence of eclampsia and hypertensive disorders of pregnancy using the biggest available prospective dataset from 8 low- and middle-resource settings. Overall, 0.5% of the women in our sites developed eclampsia, 57.2% were admitted to the ICU, and 6.9% died. Our site study reveals significant variance in the rates of eclampsia, maternal death, and ICU admission due to hypertensive diseases of pregnancy. According to Vousden et al., the wide difference in eclampsia death rates between nations highlights the persistence of inequality and inequity in the management of hypertensive diseases of pregnancy. Previous research has shown that organ dysfunction is up to 60 times more common in women with eclampsia than in women without. In this study, women under the age of 20 accounted for roughly one-third of all eclampsia cases.[12] Pregnancy

termination and magnesium supplementation are the two most well-known techniques for preventing eclampsia. All of the trials examined administered Mg beginning at diagnosis in the antepartum interval and continuing for 24 hours postpartum; most studies started Mg during labour. According to the findings of Gracia et al., after starting an infusion and receiving Mg (4 g on average) for less than 8 hours before birth, continuing the Mg for 24 hours postpartum is no better than maintaining it for 6 hours. Interestingly, no cases of eclampsia were reported in this investigation, which was unexpected. This study was unable to determine the effective minimal magnesium dose; however, our findings indicate that a 4 g infusion plus an average of 4 g before birth and 6 g postpartum (14 g total) is sufficient to avoid eclampsia. Many hospitals across the world, including Panama, confine postpartum magnesium patients to bed for 24 hours. Furthermore, this restriction makes nursing difficult or impossible at the moment. As expected, in this trial, the group that only received postpartum magnesium for 6 hours began ambulating significantly earlier and nursing sooner.[8]

A recent systematic review of studies using various magnesium sulfate regimens discovered that, in the vast majority of cases, serum magnesium levels were below the therapeutic level, though higher levels were found with the 2-gram/hour regimen and intramuscular administration.[11] The limitations of the majority of those studies were not only the small sample sizes and few blood samples collected per patient to assess magnesium levels but also the inclusion of patients with eclampsia.[15] The 2-gram group experienced significantly more adverse effects than the other groups. This conclusion is consistent with previous evidence indicating that these effects are directly related to serum magnesium levels. Nonetheless, the side effects seen were minor, and there was no need to halt treatment in any of the instances.[11] A Cochrane meta-analysis revealed significantly fewer adverse effects than this randomized study (71% in the 2-gram group and 41.9% in the 1-gram group versus 24% in the meta-analysis).[16] Oliguria was the most prevalent consequence related to preeclampsia. Magnesium sulfate has also been linked to a 5% increase in the incidence of cesarean section when compared to placebo or other anticonvulsants.[11] Magnesium sulfate, which can pass the placental barrier, may function as a vasodilator and muscle relaxant in neonates. There is already evidence to support its neuroprotective effects.[17] In Pascoal study's, a difference was discovered in birthweight. Although statistically significant, this difference is unlikely to be clinically meaningful and may have occurred at random due to the small sample size. It is fair to suppose that the severe neonatal effects observed in women exposed to magnesium sulfate were proportionate to the medication dose and corresponding magnesium levels. The most significant limitation of the current study was its small sample size, which prevented any conclusions from being drawn about whether the two regimens utilized give equivalent protection against eclampsia.[11] The use of magnesium sulphate to prevent eclampsia and timely delivery after diagnosis continue to be important strategies for reducing maternal and perinatal mortality from hypertensive disorders of pregnancy at the facility level, but interventions should also be tailored to specific regions' needs.[12]

Duvekot et al.'s study analyzed the benefit of temporizing management vs immediate delivery in women with severe preeclampsia. The result is consistent with the maternal complication rate of Vigil-de-Gracia's largest and most recent study[18]; however, unlike our study, that trial did not include women with HELLP syndrome, and not all women in that study had severe preeclampsia. Duvekot et al trial's 2-day prolongation differs from the most recent and largest trial, which reported an 8.1-day prolongation. It was determined that temporizing management under stringent regulations is safe and may be associated with lower neonatal morbidity.[14] The most recent and largest trial by Vigil-De Gracia found no neonatal benefits from expectant management.[18] An earlier meta-analysis published in 2017 contained seven trials, including ours. The authors concluded that elective birth reduced the risk of placental abruption by half in women with early-onset severe preeclampsia. One strength of this experiment is that temporizing management under supervision with stringent restrictions looks safe in this phase of gestation in women with severe preeclampsia.[14]

Many researchers feel that HELLP syndrome is a consequence of preeclampsia, whereas others believe it is a separate condition. Researchers discovered that inheritance, immunology, inflammation, metabolism, and blood coagulation are all linked to HELLP syndrome. Once this syndrome develops, it is fatal. As a result, quick diagnosis and appropriate treatment are critical.[10] In the normal physiological state, the procoagulant and anticoagulant fibrinolysis systems maintain hemodynamic balance. Patients with HELLP syndrome, on the other hand, have extensive endothelial cell damage, and persistent activation of platelets and clotting factors, followed by secondary activation of anticoagulant proteins and fibrinolysis systems, resulting in chronic hemostatic changes. As a result, coagulation system problems may predispose to postpartum hemorrhage in the HELLP syndrome.[13] Postpartum hemorrhage is caused by uterine contractions and hemostatic failure.[19] In their study, Cui et al. found that the most common complication among pregnant women with HELLP syndrome was postpartum hemorrhage (10.38%). They also found that healthy pregnant women had greater levels of FIB than pregnant women with HELLP syndrome ($P < .001$).[13] This outcome was consistent with the findings of Haram et al.[20] Multivariate analysis revealed that lower FIB levels independently predicted postpartum hemorrhage in pregnant patients with HELLP syndrome. As a shared substrate of thrombin and plasmin, FIB levels may be more sensitive to the extent of hemostatic system consumption. These findings indicate that maintaining a certain level of FIB in pregnant women with HELLP syndrome during the perinatal period may help lower the risk of postpartum hemorrhage.[13]

Glucocorticoids play a vital function in treating HELLP syndrome. Glucocorticoids not only increase fetal lung maturation and protect against hyaline membrane disease, but they also improve maternal laboratory indices, particularly BPC levels.

However, throughout the last 20 years, glucocorticoid treatment, particularly high-dose glucocorticoids, has become contentious.[21] This study conducted a retrospective examination of high-dose glucocorticoid treatment for HELLP syndrome. This study suggests that high-dose glucocorticoids do not significantly improve maternal and fetal outcomes. Furthermore, high-dose glucocorticoids did not diminish the utilization of blood products.[10] These findings are congruent with those of Pourrat et al.[16] Sun et al. conducted a meta-analysis to investigate the effects of corticosteroids on maternal complications such as DIC, maternal mortality, eclampsia, acute renal failure, hemorrhagic manifestations, pulmonary edoema, and oliguria, as well as foetal complications such as perinatal death, intrauterine growth restriction, preterm birth, neonatal thrombocytopenia, leukopenia, neutropenia, and RDS. As a result, no data supporting the efficacy of corticosteroid administration. Although some of the included RCTs showed improved outcomes for moms with HELLP syndrome, no significant associations were found in our pooled meta-analysis. Oliguria, a key patient-oriented outcome of the HELLP syndrome, did not show significant differences between corticosteroid and placebo treatment.[7] A study from Abramovici et al. found that neonatal morbidity and death were linked to gestational age, not the presence or absence of HELLP syndrome, in neonates with obvious pathological manifestations like respiratory distress syndrome (RDS) or intraventricular hemorrhage (IVH) between weeks 24 and 36. However, one trial by Morhart et al. found that prenatal corticosteroid (ACS) treatment significantly reduced the risk of RDS and IVH in preterm infants.[23] According to the latest study, corticosteroid treatment for patients with HELLP syndrome should take into account not only the patients' baseline features but also the long-term implications of medication to properly address maternal and fetal health and well-being.[7]

CONCLUSION

Pregnancy termination and magnesium supplementation are two well-known techniques for preventing eclampsia. The use of magnesium sulphate to prevent eclampsia and quick delivery after diagnosis is still a significant strategy for reducing maternal and perinatal mortality from hypertensive diseases of pregnancy at the facility level. HELLP syndrome, a condition linked to inheritance, immunology, inflammation, metabolism, and blood coagulation, is fatal once it develops. Glucocorticoids play a vital role in treating HELLP syndrome, increasing fetal lung maturation, and protecting against hyaline membrane disease. The latest study suggests that corticosteroid treatment for patients with HELLP syndrome should consider not only baseline features but also the long-term implications of medication to address maternal and fetal health and well-being.

REFERENCES

[1] Tjandraprawira, K. D., Kusumah, A. Y., Kamilah, A. Y., Putri, D. I., Ananta, M. R., Sari, S. P., Djuwantono, T., & Petrie, A. (2021). Management and perinatal outcomes of hypertensive disorders of pregnancy in a low-resource setting in Indonesia. 38. https://doi.org/10.1177/20503121211060194

[2] Magley M, Hinson MR. Eclampsia. [Updated 2023 Jan 30]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK554392/

[3] Gracia, P. V., Rojas-suarez, J., Ramos, E., Reyes, O., Collantes, J., Quintero, A., Huertas, E., Calle, A., Turcios, E., & Chon, V. Y. (2015). International Journal of Gynecology and Obstetrics Incidence of eclampsia with HELLP syndrome and associated mortality in Latin America. International Journal of Gynecology and Obstetrics. https://doi.org/10.1016/j.ijgo.2014.11.024

[4] Adorno M, Maher-Griffiths C, Grush Abadie HR. HELLP Syndrome. Crit Care Nurs Clin North Am. 2022 Sep;34(3):277–88.

[5] Khalid F, Mahendraker N, Tonismae T. HELLP Syndrome. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2024 Feb 20]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK560615/

[6] Wallace K, Harris S, Addison A, Bean C. HELLP Syndrome: Pathophysiology and Current Therapies. Curr Pharm Biotechnol. 2018;19(10):816–26.

[7] Sun, W.-J., Hu, J., Zhang, Q., & Shan, J.-M. (2023). Administration of corticosteroid therapy for HELLP syndrome in pregnant women: evidences from seven randomized controlled trials. Hypertension in Pregnancy, 42(1), 2276726. https://doi.org/10.1080/10641955.2023.2276726

[8] Gracia, P. V., Ramirez, R., Durán, Y., & Quintero, A. (2017). Magnesium sulfate for 6 vs 24 hours post delivery in patients who received magnesium sulfate for less than 8 hours before birth : a randomized clinical trial. 4–9. https://doi.org/10.1186/s12884-017-1424-3

[9] Wen, S. W., White, R. R., Rybak, N., Gaudet, L. M., Robson, S., Hague, W., Simms-Stewart, D., Carroli, G., Smith, G., Fraser, W. D., Wells, G., Davidge, S. T., Kingdom, J., Coyle, D., Fergusson, D., Corsi, D. J., Champagne, J., Sabri, E., Ramsay, T., … Walker, M. C. (2018). Effect of high dose folic acid supplementation in pregnancy on pre-eclampsia (FACT): double blind, phase III, randomised controlled, international, multicentre trial. BMJ (Clinical Research Ed.), 362, k3478. https://doi.org/10.1136/bmj.k3478

[10] Kang, S., Zhou, L., Wang, X., Li, Y., & Wang, Y. (2019). Effectiveness of high-dose glucocorticoids on hemolysis, elevating liver enzymes, and reducing platelets syndrome. The Journal of International Medical Research, 47(2), 738–747. https://doi.org/10.1177/0300060518809783

[11] Pascoal, A. C. F., Katz, L., Pinto, M. H., Santos, C. A., Braga, L. C. O., Maia, S. B., & Amorim, M. M. R. (2019). Serum magnesium levels during magnesium sulfate infusion at 1 gram/hour versus 2 grams/hour as a maintenance dose to prevent eclampsia in women with severe preeclampsia: A randomized clinical trial. Medicine, 98(32), e16779. https://doi.org/10.1097/MD.0000000000016779

[12] Vousden, N., Lawley, E., Seed, P. T., Gidiri, M. F., Goudar, S., Sandall, J., Chappell, L. C., & Shennan, A. H. (2019). Incidence of eclampsia and related complications across 10 low- and middle- resource geographical regions : Secondary analysis of a cluster randomised controlled trial. PLoS Medicine, April 2016, 1–15.

[13] Cui, C., Ma, S., & Qiao, R. (2020). Prenatal Plasma Fibrinogen Level Predicts Postpartum Hemorrhage of Patients With HELLP Syndrome. Clinical and Applied Thrombosis/Hemostasis : Official Journal of the International Academy of Clinical and Applied Thrombosis/Hemostasis, 26, 1076029619894057. https://doi.org/10.1177/1076029619894057

[14] Duvekot, J. J., Duijnhoven, R. G., van Horen, E., Bax, C. J., Bloemenkamp, K. W., Brussé, I. A., Dijk, P. H., Franssen, M. T., Franx, A., Oudijk, M. A., Porath, M. M., Scheepers, H. C., van Wassenaer-Leemhuis, A. G., van Drongelen, J., Mol, B. W., & Ganzevoort, W. (2021). Temporizing management vs immediate delivery in early-onset severe preeclampsia between 28 and 34 weeks of gestation (TOTEM study): An open-label randomized controlled trial. Acta Obstetricia et Gynecologica Scandinavica, 100(1), 109–118. https://doi.org/10.1111/aogs.13976

[15] Okusanya, B. O., Oladapo, O. T., Long, Q., Lumbiganon, P., Carroli, G., Qureshi, Z., Duley, L., Souza, J. P., & Gülmezoglu, A. M. (2016). Clinical pharmacokinetic properties of magnesium sulphate in women with pre-eclampsia and eclampsia. BJOG : An International Journal of Obstetrics and Gynaecology, 123(3), 356–366. https://doi.org/10.1111/1471-0528.13753

[16] Duley, L., Gülmezoglu, A. M., Henderson-Smart, D. J., & Chou, D. (2010). Magnesium sulphate and other anticonvulsants for women with pre-eclampsia. The Cochrane Database of Systematic Reviews, 2010(11), CD000025. https://doi.org/10.1002/14651858.CD000025.pub2

[17] Abbassi-Ghanavati, M., Alexander, J. M., McIntire, D. D., Savani, R. C., & Leveno, K. J. (2012). Neonatal effects of magnesium sulfate given to the mother. American Journal of Perinatology, 29(10), 795–799. https://doi.org/10.1055/s-0032-1316440

[18] Vigil-De Garcia, P., Tejada, O., Minaca, A., Tellez, G., Chon, V., Herrarte, E., Villar, A., & Ludmir, J. (2013). Expectant management of severe preeclampsia remote from term : the MEXPRE Latin Study , a randomized , multicenter clinical trial. American Journal of Obstetrics & Gynecology, 425 (November). https://doi.org/10.1016/j.ajog.2013.08.016

[19] Evensen, A. N. N., Health, P., Anderson, W. J. M., Family, F., Residency, M., & Fontaine, P. P. (2017). Postpartum Hemorrhage: Prevention and Treatment.

[20] Haram, K., Mortensen, J. H., Mastrolia, S. A., & Erez, O. (2016). Disseminated intravascular coagulation in the HELLP syndrome: how much do we really know? Kjell. The Journal of Maternal-Fetal & Neonatal Medicine, 7058(May). https://doi.org/10.1080/14767058.2016.1189897

[21] Yang, L., Ren, C., Mao, M., & Cui, S. (2016). Prognostic Factors of the Efficacy of High-dose Corticosteroid Therapy in Hemolysis , Elevated Liver Enzymes , and Low Platelet Count Syndrome During Pregnancy. Medicine, 95(13), 1–7. https://doi.org/10.1097/MD.0000000000003203

[22] Pourrat, O., Dorey, M., Ragot, S., Hauteclocque, A., & Deruelle, P. (2016). High-Dose Methylprednisolone to Prevent Platelet Decline in Preeclampsia. The American College of Obstetricians and Gynecologist, 128(1), 153–158. https://doi.org/10.1097/AOG.0000000000001470

[23] Morhart, P., Gärtner, J., Weiss, C., Stumpfe, F. M., Dammer, U., Faschingbauer, F., Fahlbusch, F. B., Beckmann, M. W., & Kehl, S. (2022). Influence of Timing of Antenatal Corticosteroid Administration on Morbidity of Preterm Neonates. In Vivo (Athens, Greece), 36(4), 1777–1784. https://doi.org/10.21873/invivo.12891