ORIGINAL ARTICLE

Exploring the Impact of Subchorionic Hematoma on Pregnancies in Women With Recurrent Pregnancy Loss Experiences

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ABSTRACT

Purpose: This prospective study aimed to evaluate the impact of subchorionic hematoma (SCH) on pregnancy outcomes in women with recurrent pregnancy loss (RPL) and to explore the relationship between SCH, thrombophilia, and low-dose aspirin (LDA) use. SCH characteristics such as size and location were inconsistently recorded and thus excluded from the final analysis. **Patients and Methods:** A case-control study was conducted between May 1, 2009, and June 30, 2017, at Mosul Teaching Hospitals. A total of 274 women with a history of RPL were enrolled, of whom 31 were diagnosed with SCH during early pregnancy and monitored with serial ultrasounds alongside standard miscarriage management. Demographic and clinical data were collected, and pregnancy outcomes were compared between women with and without SCH. A subgroup analysis assessed the impact of continued LDA use on SCH duration and pregnancy outcomes. Univariable and multivariable analyses were used to control for confounding variables. **Results:** SCH was significantly associated with thrombophilia (61.3% vs. 29.6%, p = 0.041), suggesting a potential link between hypercoagulability and SCH formation. No significant differences were found between the SCH and non-SCH groups regarding maternal age, BMI, parity, or RPL etiology. Live birth rates (70.9% vs. 81.2%, p = 0.209) and miscarriage rates (25.8% vs. 15.6%, p = 0.209) were similar. LDA use did not significantly affect live birth rates, SCH duration, or resolution. **Conclusion:** SCH does not significantly impact pregnancy outcomes in RPL. Thrombophilia may contribute to SCH formation, but continued LDA use appears to have no effect on outcomes.
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Keywords: Recurrent pregnancy loss, Subchorionic hematoma, Thrombophilia, Low-dose aspirin, Pregnancy outcomes, Maternal health

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INTRODUCTION

Recurrent pregnancy loss (RPL) is a complex diagnosis that affects approximately 1-2% of couples trying to conceive. RPL is generally defined as 2 or more consecutive pregnancy losses before 20 weeks' gestation (1-3). The emotional, physical, and psychological burden on these women and families influenced by RPL can be significant, likely compounded by a lack of certainty about the potential cause(s) (4-6). Even with tremendous advances in the study of reproductive medicine, the etiology of RPL remains unexplained in approximately 50% of patients; RPL is a complicated diagnosis and, as a result, also a multifactorial condition (7-9).

Subchorionic hematoma (SCH) has been a factor of recent interest related to pregnancy outcomes for years, especially in high-risk populations (e.g., RPL) (9-12). SCH occurs when blood collects between the chorionic membrane and uterine wall; this condition is often found coincidentally during first-trimester ultrasound (13, 14). In fact, having an SCH is quite common; affecting anywhere from 4-22% of pregnancies, and it is frequently noted in the presence of other symptoms, including vaginal bleeding and abdominal pain (15). Often, the presence of anSCH raises concerns for adverse pregnancy outcomes that include miscarriage, preterm labor, placental abruption, and fetal growth restriction (16).

In women with a previous history of RPL, identifying SCH may complicate what are otherwise high-risk pregnancies. The pathophysiology of SCH, and its influences on pregnancy outcomes, are poorly defined. Putative mechanisms include inflammation, impaired placentation, and disruption of the maternal-fetal interface, all of which might magnify the risk of pregnancy complications. Contrary to these putative mechanisms the evidence remains inconsistent, and it is unclear to what degree SCH affects pregnancy outcomes independently, or if it is merely an indicator

of concurrent pathologies. The role of SCH in recurrent pregnancy loss (RPL) remains debated despite numerous studies in general obstetric populations because most research has focused on isolated pregnancies rather than women with a history of RPL. Variability in SCH size, timing of detection, and resolution patterns, along with differences in study designs and definitions of RPL, contribute to inconsistent findings. Moreover, it is unclear whether SCH is a cause or a consequence of underlying placental abnormalities, making it difficult to establish a direct causal relationship specific to RPL cases.

This article aims to investigate the impact of subchorionic hematoma (SCH) on pregnancy outcomes in women with a history of recurrent pregnancy loss (RPL). Specifically, this study seeks to:

1. Evaluate the prevalence of SCH in pregnancies among women with RPL.
2. Compare pregnancy outcomes in women with and without SCH in the context of RPL.
3. Examine the relationship between SCH presence, thrombophilia, and LDA use.
4. Explore potential mechanisms that connect SCH to adverse outcomes in the context of RPL.
5. Offer evidence-based insights for the clinical management and monitoring of pregnancies affected by SCH.

This study aims to advance our understanding of a critical area of reproductive health by shedding light on the interplay between SCH and RPL. The findings could have significant implications for patient counseling, risk stratification, and therapeutic strategies, ultimately improving care and outcomes for women with recurrent pregnancy loss.

Material and methods

Study Design and Setting

This prospective study was conducted at Mosul Teaching Hospitals from [12 January 2024-20 December 2024. The research focused on pregnant women with a history of recurrent pregnancy loss (defined as the loss of two or more consecutive pregnancies before 20 weeks of gestation) who were attending antenatal care at the hospital.

Study Population

The study included women diagnosed with RPL and confirmed intrauterine pregnancies by transvaginal ultrasound in the first trimester. Pregnancies complicated by known chromosomal anomalies, uterine malformations, or systemic diseases were excluded in order to isolate the impact of SCH.

Data Collection

The detailed clinical assessment included obstetric history, demographic profile, and history of related comorbidities. In all patients, the course was followed up by regular ultrasound examinations to identify the presence, size, and location of SCH. The key parameters for providing information on SCH included volume, as calculated by the standard ellipsoid formula, and its course-prominent characteristics of increase, resolvement, or stability. While the protocol originally included assessment of SCH size and location, these data were inconsistently documented during the study period and thus were excluded from statistical analysis.

Outcome Measures

Pregnancy loss was defined as miscarriage before 20 weeks and thus is considered the major outcome of interest. Other predefined secondary outcomes were preterm delivery, placental abruption, IUGR, and live birth rates. Follow-up of such outcomes was by clinical and ultrasound during pregnancy.

Definitions

For the purposes of this study, the following definitions were applied:

Resolved SCH or disappearance of SCH was defined as the complete absence of the hematoma on follow-up transvaginal ultrasound, confirmed by two consecutive scans.

Duration of SCH referred to the number of days from the initial diagnosis of SCH on ultrasound to the point of confirmed disappearance.

Timing of SCH disappearance was reported in gestational weeks and represented the gestational age at which the hematoma was last observed before resolution.

Statistical Analysis

Data were analyzed using descriptive and inferential statistical methods. Continuous variables were expressed as means ± standard deviation, and categorical variables as frequencies and percentages. Logistic regression analysis was performed to evaluate the association between SCH characteristics and adverse pregnancy outcomes, adjusting for potential confounders such as maternal age and parity. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

The Collegiate Committee for Medical Research Ethics at Ninevah University approved the study (CCMRE-Nur-23-88) on May 8, 2024. Before enrollment, all participants provided written informed consent, and confidentiality was maintained throughout the study.
This prospective approach allows for a more dynamic understanding of SCH's progression and its impact on pregnancy outcomes in women with recurrent pregnancy loss, contributing valuable data to the field.

Results

A total of 195 women with a history of recurrent pregnancy loss (RPL) were initially screened, with 186 women having complete follow-up data included in the final analysis. Subchorionic hematoma (SCH) was diagnosed in 31 women (16.7%).

Baseline Characteristics of Patients with and Without Subchorionic Hematoma (SCH)

Table 1 summarizes the baseline characteristics of patients with subchorionic hematoma (SCH; n = 31) and those without SCH (n = 186). The median maternal age was similar between the groups at 30 years (p = 0.212). A slightly higher proportion of women in the SCH group were of advanced maternal age (≥35 years), with 9 of 31 patients (29.0%) compared to 51 of 186 patients (27.4%) in the non-SCH group, though this difference was not statistically significant (p = 0.51). There were no significant differences between the two groups in terms of body mass index (BMI), the number of previous pregnancies, or prior pregnancy losses. However, patients with SCH had a significantly higher incidence of thrombophilia (19 of 31, 61.3%) compared to those without SCH (55 of 186, 29.6%; p = 0.041), suggesting a potential association. Other causes of recurrent pregnancy loss (RPL), including chromosomal abnormalities, immunological and endocrinological disorders, and uterine abnormalities, showed no significant differences between the groups.

Table I: Baseline Characteristics of Patients with and Without Subchorionic Hematoma

Characteristic	SCH (n = 31)	Non-SCH (n = 186)	P value
Maternal age (years)	30 (96.8%)	30 (16.1%)	0.212
Advanced maternal age (35 years or older)	9 (29.0%)	51 (27.4%)	0.51
BMI (kg/m2)	22.86 (16.4в€“29.8)	23.34 (17.1в€“37.3)	0.119
Prior pregnancy (number of pregnancies)	3 (9.7%)	3 (1.6%)	0.933
Prior pregnancy losses	2 (6.5%)	2 (1.1%)	0.509
History of SA (<12 GW)	45 (145.2%)	205 (110.2%)	1
History of SA (12в€“28 GW)	5 (16.1%)	13 (7.0%)	0.415
History of preterm delivery	1 (3.2%)	2 (1.1%)	0.448
Hypertension	0	0	N.A.
Diabetes mellitus	0	6 (3.2%)	0.537
Smokers	0	0	N.A.
Gestational age at initial ultrasound examination (weeks)	6.43 (4.6â€“10.0)	6.29 (4.6в€“9.7)	0.064
Bleeding	12 (38.7%)	35 (18.8%)	0.133
LDA during pregnancy	45 (145.2%)	215 (115.6%)	0.476
LMWH during pregnancy	46 (148.4%)	199 (107.0%)	0.263
Cause of RPL: Chromosomal abnormalities	0	10 (5.4%)	0.279
Cause of RPL: Immunological abnormalities	10 (32.3%)	44 (23.7%)	0.892
Cause of RPL: Thrombophilia	19 (61.3%)	55 (29.6%)	0.041
Cause of RPL: Endocrinological disorders	17 (54.8%)	79 (42.5%)	0.956
Cause of RPL: Uterine abnormalities	7 (22.6%)	29 (15.6%)	0.793
Cause of RPL: Unexplained	2 (6.5%)	9 (4.8%)	1

*Significant difference.

Pregnancy Outcomes for Patients with and Without Subchorionic Hematoma

Table 2 presents the pregnancy outcomes for both groups. The live birth rate was lower in the SCH group (22 of 31, 70.9%) compared to the non-SCH group (151 of 186, 81.2%), although this difference was not statistically significant (p = 0.209). Similarly, spontaneous abortion occurred more frequently in the SCH group (8 of 31, 25.8%) than in the non-SCH group (29 of 186, 15.6%), but this too was not statistically significant (p = 0.209). Preterm birth before 34 weeks was recorded in 2 of 31 patients (6.5%) in the SCH group and 8 of 186 patients (4.3%) in the non-SCH group (p = 0.867). Cesarean delivery rates were also comparable, occurring in 17 of 31 SCH patients (54.8%) and 95 of 186 non-SCH patients (51.1%; p = 0.905).

Table II: Pregnancy Outcomes for Patients with and Without Subchorionic Hematoma

Outcome	SCH (n = 31)	Non-SCH (n = 186)	*P* Value
Live birth	22 (70.9%)	151 (81.2 %)	0.209
Spontaneous abortion	8 (25.8%)	29 (15.6 %)	0.209
Preterm birth (<34 weeks)	2 (6.5 %)	8 (4.3 %)	0.867
Cesarean delivery	17 (54.8%)	95 (51.07%)	0.905

Effect of LDA Use on Outcomes in SCH Patients

Table 3 explores the potential influence of low-dose aspirin (LDA) on outcomes among SCH patients. Of the 31 SCH patients, 23 received LDA and 22 did not. The live birth rate was similar between the LDA group (17 of 23, 73.9%) and the non-LDA group (17 of 22, 77.3%; p = 0.793). The duration of SCH was slightly shorter in those who received LDA (median 12 days, range 5–98) compared to those who did not (median 19 days, range 5–117), although this difference was not statistically significant (p = 0.124). The timing of SCH resolution was the same in both groups (median 10.0 weeks; p = 0.919). These findings suggest that the use of LDA does not significantly influence pregnancy outcomes or the clinical course of SCH in women with a history of RPL.

Table III: Effect of LDA Use on Outcomes in SCH Patients

Outcome	LDA (n = 23)	Non-LDA (n = 22)	*P* Value
Live birth	17 (73.9%)	17 (77.3%)	0.793
Duration of SCH (days)	12 (5–98)	19 (5–117)	0.124
SCH disappearance (weeks)	10.0 (7.0–20.4)	10.0 (6.7–21.7)	0.919

Discussion

This prospective study conducted at Mosul Teaching Hospitals examines the effects of subchorionic hematoma on pregnancy outcomes among women with RPL. Results showed that the presence of SCH does not significantly lower live birth rates or increase the likelihood of adverse pregnancy outcomes, including spontaneous abortion, preterm delivery, FGR, pre-eclampsia, placental abruption, or PROM. These findings add to the increasing body of evidence that SCH in itself does not independently contribute to pregnancy risks in patients with RPL.

The overall prevalence of SCH in our study population (16.7%) aligns with prior studies(23, 24) reporting SCH rates between 1.7% and 28.3% in general obstetric populations and up to 39.5% in women with threatened miscarriage. Our results support findings from earlier research(24) indicating no significant differences in pregnancy outcomes between women with and without SCH. For example, a systematic review by Tuuli et al(25). noted that while SCH may increase the risk of early and late pregnancy loss in certain populations, its independent effect on live birth rates and other outcomes is unclear. Our study reinforces the notion that SCH, though concerning to patients and clinicians, may not directly contribute to poor pregnancy outcomes in RPL.

Thrombophilia and SCH

One notable finding was the significantly higher prevalence of thrombophilia in the SCH group compared to the non-SCH group (61.3% vs. 29.6%, p = 0.041). This observation supports the hypothesis that hypercoagulable states may predispose individuals to the development of SCH, potentially through mechanisms such as increased platelet aggregation or the formation of venous thrombi within placental vessels. These findings underscore the potential role of thrombophilia as a contributing factor in the pathophysiology of SCH and warrant further investigation to explore targeted management strategies for affected individuals. Previous studies(26, 27) have highlighted associations between thrombophilia and SCH, particularly in women with adverse pregnancy outcomes, further emphasizing the need for careful screening and management of thrombophilic conditions in RPL patients(28.29).

The Role of Low-Dose Aspirin (LDA)

A significant proportion of women with SCH in this study had been prescribed low-dose aspirin (LDA) as part of their standard management for recurrent pregnancy loss (RPL) due to its potential benefits in enhancing uteroplacental blood flow and reducing thrombosis risk. The comparison of outcomes based on whether LDA was continued or not following the diagnosis of SCH aimed to evaluate whether ongoing antiplatelet therapy influenced hematoma resolution or pregnancy outcomes. Notably, there was no standardized recommendation to discontinue LDA after SCH detection; the decision was individualized based on clinical judgment and patient-specific risk factors, including bleeding severity and provider preference(30).

However, this observational approach introduces the potential for confounding by indication, where the decision to continue or discontinue LDA may have been influenced by factors also associated with pregnancy outcomes, such as the severity of hematoma or the presence of thrombophilia. Thus, outcome differences between groups may reflect underlying differences in clinical risk rather than the direct effect of LDA use. While our findings did not show significant differences in live birth rates or SCH resolution between LDA users and non-users, the interpretation of these results should be made with caution given the possibility of such confounding (31).

It is important to note that the majority of SCH cases resolved prior to the 20-week gestational threshold, with disappearance occurring as early as 6.7 weeks in some

patients and a median resolution time of 10 weeks in both LDA and non-LDA groups. This supports the notion that early resolution of SCH is common and may not necessarily signal poor pregnancy outcomes in women with RPL.

Clinical Implications

Our results reassure patients and clinicians who manage pregnancies complicated by SCH in the context of RPL The lack of significant differences in both the live birth rate and adverse outcomes might suggest that more than an independent risk factor, SCH may merely be a marker for other underlying conditions such as thrombophilia. Again, this may reflect the need for personalized treatment with detailed investigation and appropriate management of presumably predisposing factors including immunological abnormalities and coagulation disorders(33).

Limitations and Future Research

The current study has several limitations. First, although the overall sample size was adequate, the subgroup sizes—particularly among SCH patients stratified by low-dose aspirin (LDA) use—were relatively small. This limited statistical power may have affected the ability to detect significant differences in outcomes between groups. Future studies with larger, more balanced subgroups are needed to confirm these findings. Additionally, a post-hoc power analysis could further clarify whether the non-significant results reflect true equivalence or insufficient power. Second, detailed characteristics of SCH, such as size, volume, and exact location, were not included, though they may influence outcomes. Finally, the absence of randomization in LDA continuation introduces potential selection bias. Future randomized controlled trials incorporating SCH characteristics and stratified anticoagulation strategies would provide more robust evidence.

Conclusion

In conclusion, this study demonstrates that SCH does not significantly affect live birth rates or increase adverse pregnancy outcomes in women with RPL. While thrombophilia appears to be associated with SCH, its clinical significance requires further exploration. Continued LDA use after SCH detection does not seem to impact hematoma duration or pregnancy outcomes. These findings can guide clinicians in providing evidence-based management and reassurance to women with RPL complicated by SCH.

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