GESTATIONAL THROMBOCYTOPENIA: MATERNAL AND FETAL OUTCOMES IN DUHOK

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ABSTRACT

Background: Thrombocytopenia (platelet counts less than 150 X10⁹/ L), is a common hematological finding during pregnancy ranking secondly after anemia. This study aimed to examine possible contributing factors to the low platelet count in pregnant women with thrombocytopenia during their intrapartum period and the maternal and fetal outcomes.

Patients and Methods: A total of 33,476 women with a singleton pregnancy with a gestational age of 28 weeks and beyond were admitted to the labor ward at Duhok obstetrics and gynecology hospital between May 2015 and January 2018. Applying the hospital routine admission protocol, the platelet count of each of them was estimated and a total of 802 thrombocytopenic cases were selected. All patients denied any previous related medical or obstetric histories: like hypertensive diseases of pregnancy, connective tissue disorders, immune thrombocytopenia, liver or renal disease, and drug-induced thrombocytopenia. Maternal and fetal outcomes were assessed to see if there are any risks of this incidental finding on their health.

Results: The study found that most of the patients did not needed blood or platelet transfusions, 759 (94.6%), and 788 (98.3%), respectively. None of them developed any reaction to the blood transfusions. The platelet account did not affect the mode of delivery since most of them had vaginal deliveries 572 (71 %). However, 230 (29%) of them needed a cesarean section; the reason was mainly due to obstetrical causes (failure of progress of labor, fetal distress, oligohydramnios, breech presentation, and more than one previous scar presented in labor). Most of the patients with a significant low platelet count (≤ 50 X109/L) had their newborns admitted to Neonatal Intensive Care Unit (NICU), those who received more blood or platelet transfusions had significantly lower platelet count and lower birth weights.

Conclusions: This study showed that women with markedly reduced platelet counts are more at risk, and the demand for blood and blood product transfusions is much increased, and they mostly gave birth to low birth weight babies.

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Keywords: Blood transfusion; Low birth weight; Pregnancy complications; Thrombocytopenia.

Hematological findings during pregnancy are mostly due to iron-deficiency anemia, which usually ranks first, followed by thrombocytopenia, which accounts for 7-10% of cases. Normally platelet count ranges between 150X10⁹/L - 450X10⁹/L. If the count drops below 150X10⁹/L, it is considered thrombocytopenia, which is an important finding because it may indicate a serious underlying pregnancy disorder or a bleeding tendency problem undiagnosed in the mother yet. On the other hand, it could be a physiological finding, especially if the count and function are mildly affected, and fortunately, this incidental finding accounts

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for 75% of the cases1. Gestational thrombocytopenia (GT), also called incidental thrombocytopenia of pregnancy, is a benign, self-limiting condition that requires no additional evaluation or treatment[2,3,4]. It accounts for the vast majority of cases of thrombocytopenia discovered during pregnancy and almost all cases of thrombocytopenia in women with uncomplicated pregnancies.

GT may occur during the first trimester, but it becomes more common as gestation progresses, with the highest frequency at the delivery time, accounting for about 5 to 10%[5,6]. Also, GT is typically characterized as being the most common cause of isolated thrombocytopenia at the time of delivery. However, it can occur at any time during pregnancy, being mild in 99% of women, with a platelet count between (150–100×10⁹/L), not associated with increased bleeding or bruising tendency, isolated thrombocytopenia with no other associated abnormalities on complete blood count, and no fetal or neonatal thrombocytopenia[7].

There are different causes of thrombocytopenia in pregnancy. As stated above, GT explains about 75% of all the cases, followed by hypertensive disorders that account for approximately 20%, and immune thrombocytopenia (ITP), which is usually responsible for about 3-4%. Other causes represent the remaining cases. Different theories explain the decrease in platelet count during normal pregnancy. It is thought to be due to dilution of blood under the effect of plasma expansion, which takes place at the beginning of the second trimester until term, and certainly, this finding is more exaggerated in multiple pregnancies, possibly from increased platelet clearance; as well as mean platelet volumes; platelet volume distribution width; or platelet aggregation due to high level of thromboxane A28. The mechanism(s) of GT has not been documented yet, but it may be assumed to be a physiologic adaptation of pregnancy-related to the increased plasma volume, pooling or consumption of platelets in the placenta, or other physiologic changes that occur in uncomplicated pregnancies[7].

The placenta has many vascular characteristics in common with the spleen, a major physiologic platelet sequestration site. An analysis of placental histology following 40 scheduled cesarean deliveries found that platelets were present in many areas in the perivillous fibrinoid supporting the idea that platelet sequestration and consumption in the placenta play a role in GT[8,9]. In GT, the platelet count is usually mildly affected; however, the function is not affected. So overall, it is not associated with maternal and fetal adverse outcomes. By contrast, significant thrombocytopenia related to medical conditions, whether it was pregnancy-related or not, can lead to adverse effects that necessitate multidisciplinary care during the antenatal period and require specific monitoring and management during the intrapartum period[4].

The current study aims to correlate incidental thrombocytopenia during the intrapartum period with maternal and fetal outcomes. This correlation will focus on women presented in labor, whether delivered vaginally or needed an urgent intervention like an emergency cesarean section because of obstetrical indication.

PATIENTS AND METHODS

In this hospital-based retrospective analytical study, the medical files of 33476 singleton pregnant women at the time of delivery, who presented to the labor word of Duhok obstetrics and gynecology hospital between May 2015 and Jan. 2018 were reviewed. While applying the routine protocol of admission, incidental thrombocytopenia was noticed in 802 of them. All were 28 weeks and beyond pregnant women and had a negative history of any other medical diseases, their maternal and fetal outcomes were reviewed, and findings were analyzed.

Data Collection

After taking permission from the hospital administrative committee to access hard copies of the patient's medical files, case sheets of 33,476 singleton pregnant women at the time of delivery were selected and reviewed.

Exclusion Criteria

Women with essential hypertension or hypertensive diseases of pregnancy, connective tissue diseases, immune thrombocytopenia (ITP), liver diseases, renal diseases and/or drug-induced thrombocytopenia were excluded. For the initial workup, results of complete blood counts of thrombocytopenic women, antenatal data for obstetrical, past medical, drug history, and family history of thrombocytopenia or bleeding tendencies were reviewed. Documented initial assessment notes of any underlying health problems like hypertension and vaginal bleeding were noticed, leaving only 802 cases (2.4%) of incidental thrombocytopenia to be included in the research. Points that were reviewed and included:

Peripartum course

Maternal factors:

Mode of delivery: Vaginal Delivery (VD) or Caesarean Section (C/S)

Women who developed postpartum hemorrhage.

Interventions are other than regular hospital protocol granted (e.g., fetal blood sampling).

Number of patients received blood and blood products,

Adverse transfusion reactions developed (hemolytic and non-hemolytic transfusion reactions).

Fetal factors:

Fetal weight, wellbeing, and gender.

Rate of neonatal intensive care unit (NICU) admission.

STATISTICAL ANALYSIS

The demographic and clinical characteristics of patients were presented in mean and ranges. The prevalence of birth weight categories, blood and platelet transfusions, and reaction to blood transfusions were documented. A comparison of platelet counts in patients with different characteristics using independent *t*-test and One-way ANOVA-was tested. Correlation of age with platelet counts and correlation of birth weight with blood and platelet transfusions in pregnant women with thrombocytopenia was examined using Spearman's ratio test. The significant level of difference and association was determined in a P-value of less than 0.05. The statistical package for social sciences version 25 (SPSS 25; IBM Corp; USA) was used for statistical calculations.

ETHICAL APPROVAL

The ethical approval of the study was taken from Kurdistan Board for Medical Specialties (KBMS), and the permission letter was granted by the directorate of health and legal unit of Duhok Obstetrics and Gynecology Hospital for accessing patients' data.

RESULTS

Maternal Outcomes

In this study, 802 women from Duhok obstetrics and gynecology teaching hospital were included. The median age of the patients was 27, ranging between 15 and 47 years, most of them were below 30 years old, as shown in (Fig. 1).

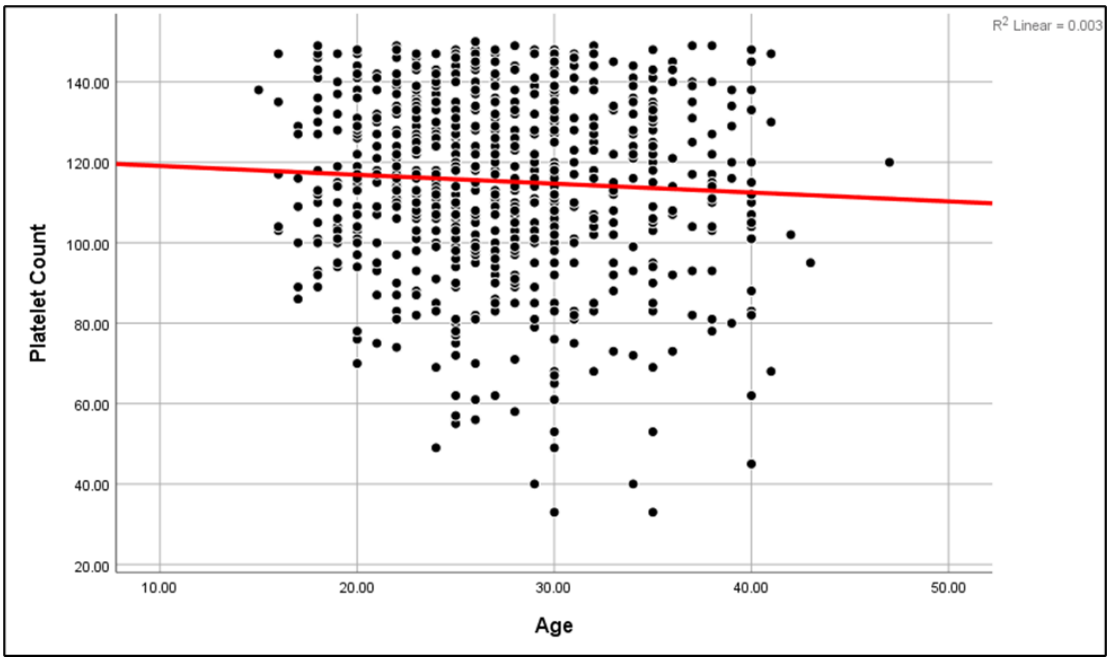

Figure 1: Correlation of age with platelet count in pregnant women with thrombocytopenia (*r*=-0.031; *P*=0.381).

The demographic characteristics of the patients are shown in, table 1. The median value of the platelet count was 115 X 109/L ranging between 33 X 109/L and 150 X 109/L.

Table 1: Demographic/ clinical characteristics of patients with thrombocytopenia (n=802)

Patients' characteristics	Median	Range
Age (years)	27	15 - 47
Platelet counts	115 X 10^9/L	33 - 150 X 10^9/L
Neonatal Birth weight (Kg)	3.24	0.70 - 5.40

The severity of the thrombocytopenia cases were subdivided into three main groups. Mild thrombocytopenia (100X109/L-150X109/L) was found in 640 (80%) of women, moderate thrombocytopenia (50X109/L-100X109/L) was found in 150 (19%), and severe thrombocytopenia (<50X109/L) was seen in 13(1%.) only, Fig2.

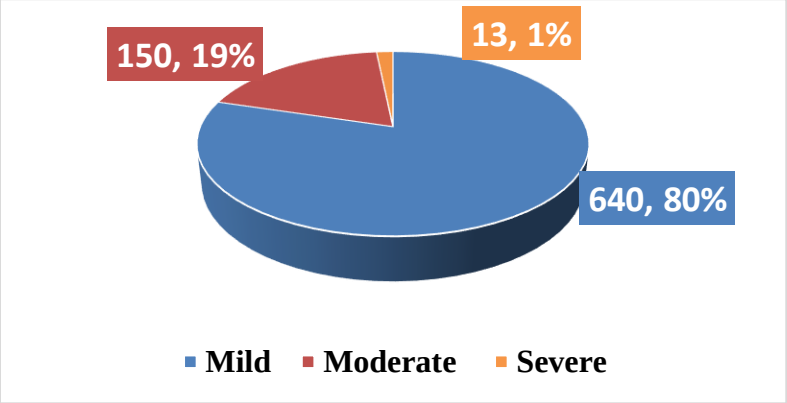

Fig 2: Distribution of the severity of thrombocytopenia among the study patients

The study revealed that 572 (71.3%) of the patients had a normal vaginal delivery. In comparison, 230(28.7%) has been delivered by cesarean section, most commonly due to obstetrical indications, (failure of progress of labor, fetal distress, oligohydramnios, breech presentation and women with more than one scar presenting in labor). Postpartum hemorrhage (PPH), classified as minor PPH (500–1000 ml) and major (more than 1000 ml), was encountered in 31 (3.9%) of the patients, with 27 (3.4%) of them having minor, and 4 (0.5%) having major PPH, despite routine active management of the third stage of labor, and 3 patients (0.37%) developed a hematoma at the surgical site (table 2).

Table 2: Prevalence of Postpartum Hemorrhage in pregnant with thrombocytopenia

Post Partum Hemorrhage	Frequency	Percentage %
Minor PPH	27	3.45
Major PPH	4	0.5
Post-operative hematoma	3	0.4
Total PPH cases	31	3.9

The study did not find any significant difference in the platelet count in patients with different modes of delivery. (P=0.238) (Table 3). Most of the patients did not need blood transfusions 759 (94.6%). Twenty-one of them 21 (2.6%) needed one unit, 12 (1.5 %) needed two units, 4 (0.5%) needed three units, 3 (0.4%) needed four units, 3 (0.4%) needed ≥ 5 units. Similarly, most of the patients did not needed platelet transfusions 788 (98.3%), whereas some of the patients needed platelet transfusion; one (0.1%) needed 2 units; one (0.1%) needed 3 units; seven (0.9%) needed 4 units; four (0.5%) needed 6 units; and one (0.1%) needed10 units. Most patients did not react to the blood transfusion 797 (99.4%). It has been noted that patients who received more blood and platelet transfusions had significantly lower platelet count (P<0.001), table 3.

Table 3: Comparison of mean platelet count in patients with different characteristics

Characteristics (n=802)	Platelet count (N X109/L)		P-value
	Mean	SD	
Delivery			0.238*
VD	115.86	20.71	
C/S	113.86	24.00	
NICU Admission			0.013*
Yes	108.97	24.97	
No	115.86	21.31	
Blood Transfusion			<0.001**
1	102.76	24.68	
2	106.75	26.43	
3	105.50	20.04	
4	90.33	32.87	
6	63.67	33.50	
Platelet Transfusion			<0.001**
2	89.00	.	
3	120.00	.	
4	77.00	26.46	
6	80.00	34.79	
10	55.00	.	
Birth weight			0.011**
Normal Weight	116.05	21.01	
LBW	109.82	24.70	
VLBW	102.22	35.22	
VELBW	94.67	39.55	

*** Independent t-test and ** ANOVA One-way was performed for statistical analysis.**

Fetal outcomes

In respect to the fetal related findings, this study has found a male to female ratio of 1.24:1 amongst all the birth outcomes. The mean birth weight was 3.24 Kg. Most of the newly born babies had normal weights 714 (89.0%), 64 (8.0%) of them had low birth weights (LBW), and 16 (2%) had very low birth weights (VLBW), while the remaining 8 (1%) had extreme low birth weight (ELBW), Fig. 3.

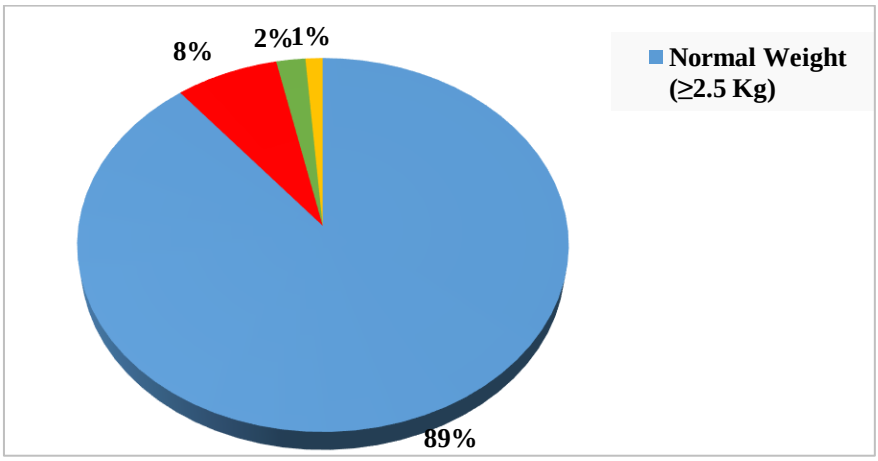

Figure 3: Neonatal Birth Weight

Those ladies who delivered lower birth weight babies had significantly lower platelet counts (P=0.011) (Table 3). The majority of the babies did not need NICU admission. Those admitted mostly had prematurity, respiratory distress, and low birth weight/ very low birth weight. The cause of the statistical significance was that patients whom their infants were admitted to NICU had significantly lower platelet counts than those whose infants were not admitted to the NICU (108 X 109/L vs. 115X 109/L) *P*=0.013, table 3.

The study showed that platelet transfusion significantly decreased with increasing birth weight (*r*=-0.092, P=0.01), Fig. 4.

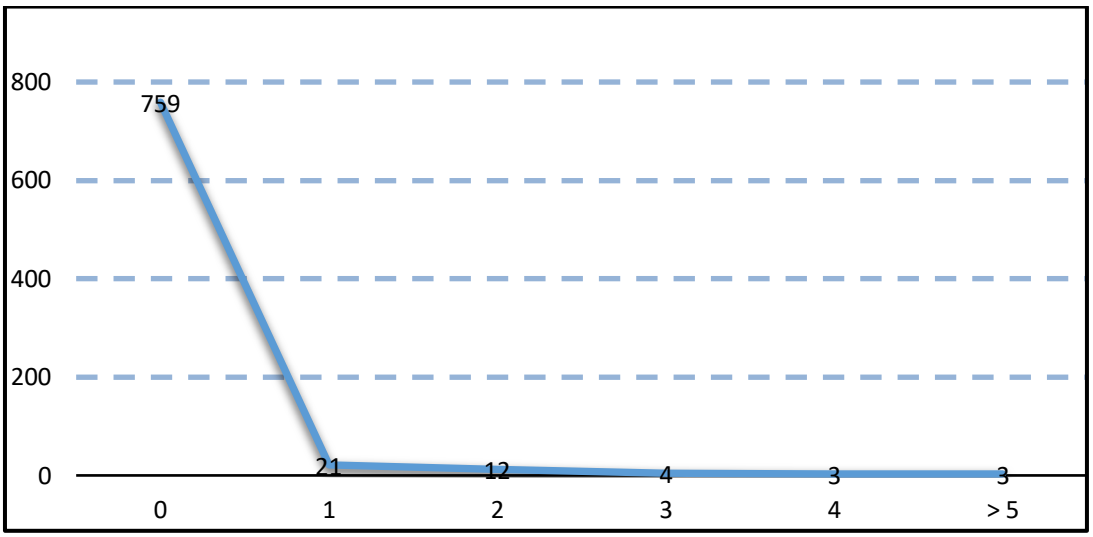

Figure 4: Patients Transfusion Needs

DISCUSSION

The study was conducted to determine the risk of incidental thrombocytopenia on mother and fetus health and whether any precautions are needed while receiving these patients unexpectedly during labor. In this study, among the thrombocytopenic pregnant women, mild thrombocytopenia was found in 80%, and 19% had moderate thrombocytopenia. These results are in line with studies conducted in Ghana, India, and Nigeria[10,11,12], which showed a high frequency of mild thrombocytopenia. Such degrees of thrombocytopenia is consistent with that required for most of the obstetrical procedures to be accomplished without fear of bleeding or needing platelets transfusions[13]. The rate of drop in platelets count in those women with no history of platelet disorders as compared to the criteria of GT were very comparable. However, GT is a diagnosis of exclusion[1,14]. In those pregnant women who were delivered vaginally (71.3%) and undergoing active management of the third stage of labor (according to the hospital protocol), the rate of postpartum hemorrhage was 3.95% (minor 3.45%, significant 0.5%). The latter finding is an acceptable rate, according to the WHO recommendations on the prevention and treatment of postpartum hemorrhage[14]. For almost all those who underwent C/S, the indications were obstetrical, and only 0.3 % developed surgical site hematoma. Despite different delivery modes, the study did not find any significant difference in the

platelet count (P=0.238)[9]. Most women did not need blood and blood product transfusions, but those who needed it were found to have significantly lower platelets counts (P< 0.001) this could be explained as the benign course of gestational thrombocytopenia[2,9].

Regarding fetal outcomes, the average body weight was 3.24.kg, with more than 90% having standard weights[2,5,10], and not needing further care than initial baby resuscitation steps. Although the male to female ratio was 1.4:1, this study did not find any significant relationship between gender and platelet count (P= 0.291). Most of the admission indications were respiratory distress and prematurity. Furthermore, the study also showed that mothers of those babies who were admitted to NICU had lower platelets count compared with mothers of babies who were not admitted, and those babies who were having low birth weights had mothers with lower platelets count (P =0.011). These findings raise the possibility of underlying maternal condition missed during regular antenatal care or the routine admission protocol since gestational thrombocytopenia which account for most of the cases, does not generally affect the fetal growth nor does it lead to very low maternal platelets counts[5,10], however, future researches are required to assign a special consideration to those women admitted with very low count and negative medical history to be able to diagnose the cause more specifically and monitor these babies more carefully.

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پوختە

کێمبوونا پەڕێن خوینێ د ماوەیێ دوگیانیێ دا: کارتێکرنا وێ ل سەر دەرئەنجامێن دایک و زارۆکی

پێشەکی

کێمبیا پەڕێن خوینێ (هەژمارا پەڕێن خوینێ کێمتربیت ژ $150 \times 10^9/L$) دهیتە هەژمارتن ئێک ژنەخۆشیێن بەربەلاف دماوەیێ دوگیانیێ دا، ل پلەیا دووێ دهێت پشتی نەخۆشیا کیمخوینبیێ. ئارمانج ژ ڤی ڤەکۆلینێ گەریان بوویە ل فاکتەرێن دبیت کو پشکداربن دکێمکرنا هەژمارا پەڕێن خوینێ دا ل جەم ژنێن دوگیان بێن تووشبووی ب نەخۆشیا کێمبیا پەڕێن خوینێ د ماوەیێ زارۆکبوونێ دا و کارتێکرنا وێ ل سەر ئەنجامێن دوماهیێ بێن ساخلەمبیا دایکێ و زارۆکی.

شێواز و نەخوش

کۆموکا پێکهاتی ژ ٣٣٤٦٧ ژنێن دوگیان ب زارۆکەکی ل هولا زارۆکبوونێ ل نەخۆشخانا دهوک یا ژنان و زارۆکبوونێ هاتنە نڤاندن، دناڤبەرا ئەیارا ٢٠١٥ و کانونا دوێ ٢٠١٨ دا، د ماوێ دوگیانیی ٢٨ حەفتی و د سەر دا. هەژمارا پەڕێن خوینێ بێن هەر نەخوشەکێ هاتیە نڤاندن هاتنە هەلسەنگاندن. هەمیان ژی رەتکر کو دیرۆکەکا نۆشداری یان یا ژدایکبوونێ یا پەیوەندیدار هەبیت (بلندبوونا فشارا خوینێ یا بنەرەتی یان بلندبوونا فشارا خوینێ د ماوەیێ دوگیانیێ دا، تێکچوونا شانەیێن هەڤگرتی، کێمبیا پەڕێن بەرگریێ، نەخوەشیێن جەگەر و گولچیسکان، و کێمبوونا پەران ژ سەدەمێ بکارئینانا دەرمانان). ئەنجامێن دایک و زارۆکان هاتنە هەلسەنگاندن بۆ زانینا مەترسیێن ڤان ئاشکەراکرنێن ژنشکێڤە ل سەر ساخلەمبیا وان.

ئەنجام

ڤەکۆلینێ دیتییتە کو پرانیبا نەخۆشان پێدڤی ب ڤەگوهاستنا خوینی و پەڕێن خوینی نینن ب رێژەیێن759 (94.6 ٪) و788 (98.3٪) لدویڤ ئێک. کەس ژوان چ کارڤەدان لسەر ڤەگوهاستنا خوینی پەیدانەکرینە. ژمارەیا پەڕێن خوینێ کارتێکرن لسەر رێکا زارۆکبوونی نەبوویە، کو ژدایکبوون ل جەم پرانیبا وان ب رێیا سروشتی بوو572 (71٪)، دیسا ل جەم وانێن پێدڤی ب نشتەرگەریێ ژی بووین 230 (29٪)، دپرانینا جاراندا سەدەمین ژدایکبوونێ بوون سەرنەکەفتنا پێشڤەچوونا پرۆسیسا زارۆکبوونێ، تێکچوونا بارێ زارۆکی، کێمبیا سەرئاڤا زارۆی، زارۆکێ روینشتی، و هەبوونا پێتر ژ نشتەگەریەکی ل جەم دایکێ ل جهێ زارۆکبوونێ. پرانیا وان نەخۆشێن ئاریشەیبا کێمیا پەڕێن خوینێ هەین ب شێوەیەکێ مەزن (≤ 50 X109 / L) زارۆکێن خۆ بێن ژ نوو ژدایکبووین ل یەکەیا چاڤدێریا چر یا زارۆکان نڤاندینە، دیسا ئەوێن خوین یان پەڕێن خوینێ بۆ هاتیە ڤەگوهاستن پەڕێن خوینێ ل جەم وان ب شێوەیەکی بەرچاڤ یێ کێم بوو و کێشا زارۆکێن وان ژی یا کێم بوو.

دەرئەنجام

ڤێ ڤەکۆلینێ دیارکریە کو ئەو ژنێن ئاریشەیبا کێماتییەکا مەزن د هەژمارا پەڕێن خوینا وان دا هەی پێتر بەرهەلستی مترسیێ دبن، داخوازیا ڤەگوهاستنا خوینێ و بەرهەمێن خوینێ ل جەم وان زێدەدبیت، د پرانیبا جاران ژی دا زارۆکێن ب کێسەکا کێم پەیدابوونە.

الخلاصة

قلة الصفيحات الدموية أثناء الحمل: وعواقبها لدى الأمهات والأجنة في دهوك

خلفية البحث

قلة الصفيحات الدموية (عدد الصفائح الدموية أقل من 150×10^9/لتر) يشكل عرضاً شائعًا أثناء الحمل و يأتي في المرتبة الثانية بعد فقر الدم. كان الهدف من هذه الدراسة هو فحص العوامل المساهمة المحتملة في انخفاض عدد الصفيحات الدموية عند النساء الحوامل المصابات بنقص الصفيحات الدموية أثناء الولادة والعواقب الأمومية والجنينية المتوقعة.

المرضى وطرق البحث

تم إدخال ما مجموعه 33476 امرأة ذات حمل منفرد إلى جناح المخاض في مستشفى أمراض النساء والتوليد في دهوك ما بين مايو 2015 ويناير 2018 ، ممن تراوح عمرحملهن من الأسبوع الثامن والعشرون وما بعده. تم تقدير عدد الصفيحات الدموية لكل أمراة حامل تم إشراكها في الدراسة. نفوا جميعاً أي تاريخ طبي أو توليدي مرتبط سابقًا (أمراض ارتفاع ضغط الدم أثناء الحمل، واضطرابات الأنسجة الضامة، ونقص الصفيحات المناعي، وأمراض الكبد أو الكلى، ونقص الصفيحات الناجم عن الأدوية). تم تقييم نتائج العواقب لدى الأم والجنين لمعرفة ما إذا كانت هنالك أية مخاطر لهذه المخرجات على صحتهم.

النتائج

ووجدت الدراسة أن معظم المرضى لا يحتاجون إلى نقل الدم أو الصفيحات الدموية، 759 (94.6٪) و788 (98.3٪) على التوالي. لم تصب أي منهن بأية ردود أفعال تجاه عمليات نقل الدم. لم يؤثر عدد الصفيحات الدموية على طريقة الولادة حيث أن معظم ولاداتهن كانت ولادات مهبلية 572 (71٪)، وإن من احتجن منخن إلى إجراء عملية قيصرية 230 (29٪)، كانت الأسباب لديهن أساسًا أسباباً توليدية (فشل تقدم المخاض، الضائقة الجنينية ، قلة السائل السلوي، عرض الحوض وأكثر من ندبة سابقة في المخاض). معظم المرضى الذين يعانون من انخفاض ملحوظ في عدد الصفائح الدموية ($\geq50\times109$ /L) تم إدخال أطفالهن حديثي الولادة إلى وحدة العناية المركزة لحديثي الولادة (NICU)، وكان أولئك الذين تلقوا المزيد من عمليات نقل الدم أو الصفائح الدموية لديهم عدد أقل بكثير من الصفيحات الدموية وأوزان أقل عند الولادة.

الاستنتاجات

أظهرت هذه الدراسة أن النساء اللاتي يعانين من انخفاض ملحوظ في عدد الصفيحات الدموية أكثر عرضة للخطر وأن الطلب على عمليات نقل الدم ومشتقاته يزداد كثيرًا في هذه الحالات وأنهن في الغالب يلدن المزيد من الأطفال منخفضي الوزن عند الولادة.