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Research Article

The Clinical and Laboratory Profiles of Neonatal Thrombocytopenia in a Tertiary Neonatal Intensive Care Unit in Baghdad, Iraq

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Abstract

Background: Neonatal Thrombocytopenia (NT) is defined as a platelet count of <150,000/microl and is classified as: Mild (platelet count 100,000- 149,000/microl), moderate (50,000- 99,000/microl), and Severe (<50,000/microl). It is classified according to the time of presentation as: Early NT (occurs within the first 72 hours of life) and Late NT (occurs after 72 hours).
Objectives: To study the clinical and laboratory profiles of neonatal thrombocytopenia in the Neonatal Intensive Care Unit of the Children Welfare Teaching Hospital, Baghdad.
Methods: This single-center case series observational study was conducted from 1st May 2022 to 30th April 2023, in the Neonatal Intensive Care Unit of the Children Welfare Teaching Hospital, Baghdad. Neonates with thrombocytopenia, defined as a platelet count <150,000/µl, were enrolled. Complete blood count, C-reactive protein, blood culture, and other investigations were performed as clinically indicated.
Results: Among the 1701 neonates admitted to the NICU, 107 (6.3%) developed neonatal thrombocytopenia. Mild thrombocytopenia was the most common category, occurring in 57 cases (53.3%), followed by moderate thrombocytopenia in 36 (33.6%) and severe thrombocytopenia in 14 (13.1%). Out of the total cases, there were more preterm 61 (57.0%) than full term neonates 46 (43.0%). Sepsis was the most common associated condition, identified in 53 cases (49.6%), followed by asphyxia in 11 cases (10.3%). Severe thrombocytopenia was significantly associated with hemoglobin <15 g/dL, bleeding from venipuncture and cannula sites, and death.
Conclusion: Neonatal thrombocytopenia was found to be common in this study cohort, with sepsis being the leading associated condition. Severe cases seem to be linked to bleeding manifestations, anemia, and mortality, which highlight the importance of careful monitoring of affected neonates.

Keywords: Bleeding; Neonatal Thrombocytopenia; Neonatal Intensive Care Unit; Platelet transfusion; Perinatal Asphyxia; Sepsis.

Introduction

Neonatal Thrombocytopenia (NT) is defined as a platelet count of <150,000/ microl and is classified as: Mild (platelet count 100,000 – 149,000/microl), moderate (50,000 - 99,000/microl), and Severe (<50,000/microl). It is classified according to the time of presentation as Early NT (occurs within the first 72 hours of life) and Late NT (occurs after 72 hours). The incidence of NT among neonates admitted to the neonatal intensive care unit (NICU) is high (18% - 35%) (1). The incidence is inversely proportional to gestational age and/or birth weight (2, 3). Thrombocytopenia is more common in preterm (20%–30%) than term (<1%) (1). Among 11281 NICU admissions, Severe NT was identified in 273 (2.4%) (4).

Causes of NT can be classified by several different methods including mode of acquisition, timing of presentation and mechanisms (5). Perinatally acquired infections (eg, cytomegalovirus, group B Streptococcus) and severe perinatal hypoxia are frequent culprits, often associated with disseminated intravascular coagulation (DIC), which typically cause NT within the first 72 hours of age. Postnatally acquired infections or complications such as Necrotizing enterocolitis (NEC) precipitate NT after 72 hours of age (6).

The management of NT depends mainly on the clinical condition of the infant, the severity of the disease and the platelet count. Most neonates need only observation and monitoring. The minority require platelet transfusions with or without intravenous immunoglobulin (IVIG) (7). NT associated with maternal autoimmune disease requires a supportive management approach; if there is severe NT or bleeding, IVIG and/or platelet transfusions may be needed (6). Managements may focus on the primary etiology (e.g. antibiotic therapy for sepsis), IVIG may be needed for neonates with immune-mediated NT. Platelet transfusion is the main general measure given to neonates with active bleeding or at high risk of significant bleeding (8).

Because of limited local data about NT and since this particular NICU received a significant proportion of neonates from different parts of Baghdad, this study aimed to identify the clinical and laboratory profiles of NT in the NICU of the Children Welfare Teaching Hospital, Baghdad.

Patients & Methods

This single-center case series observational study was conducted from 1st May 2022 to 30th April 2023, in the Neonatal Intensive Care Unit of the Children Welfare Teaching Hospital, Baghdad. The study was approved by Ethical Committee of the Children Welfare Teaching Hospital (CWTH) on 1st April 2022 and verbal consents were taken from parents and the patients identity remains anonymous.

Neonates with thrombocytopenia, defined as a platelet count <150,000/µL, were enrolled. Neonate with platelet counts of more than 150,000/ µL, those with major congenital anomalies and with incomplete records were excluded.

The records of all mothers and their neonates who were admitted to the NICU during the study period were reviewed. A complete blood count (CBC) was done in the first 24 hours of admission to assess platelets count. A sample of 2 ml venous blood was drawn from patients and sent for the laboratory of CWTH that used laboratory medical devices (SIEMENS Dimension RXL Max, and Sysmex CA-600 series). Blood cultures were done by using the BACTALERT 3D machine available in laboratory of hospital.

Data collected for mothers and neonates included maternal age, gravidity and parity, antenatal care, gestational age at delivery, sex of the neonate, birth weight, mode of delivery, maternal history of (hypertension, diabetes mellites, urinary tract infection, autoimmune disease such as idiopathic thrombocytopenic purpura or systemic lupus erythematosus), prolonged rupture of membranes (=>18 hours), signs of chorioamnionitis, clinical feature of NT (petechia, purpuras, bleeding from different site of the body such as cannula, puncture or pulmonary hemorrhage, intraventricular hemorrhage by cranial ultrasound (U/S), cephalohematoma, laboratory investigations (white blood cells, hemoglobin, Platelets, mean platelet volume, C-reactive protein titer, blood culture), and other investigations were performed as indicated, duration of recovery in hospital, time of onset of NT as early (≤72hrs) or late (> 72hrs).

NT was classified into mild (platelet count between 100,000 to 149,000/ microl), moderate (50,000 to 99,999/microl), and severe (<50,000/microl) (9).

Data of the newborns were mainly taken from obstetrics and NICU records, which includes sex and GA in weeks (full term (≥37 weeks), moderate - late preterm (32-36 weeks), very preterm (28-31 weeks), or extremely preterm (≤27 weeks) (10). The birth weight was measured and taken in grams and classified as normal BWT (≥2500 g), low (1500-2499 g), very low (1000-1499 g), and extremely low (<1000 g) (11).

Statistical analysis: The data was analyzed using the statistical package of IBM SPSS-29 (IBM Statistical Packages for Social Sciences- version 29, Chicago, IL, USA). The Data were presented in the form of frequency, percentage, mean, standard deviation, and range (minimum-maximum values). The Pearson Chi-square test (χ^2-test) with the application of Yate's correction or Fisher Exact test whenever applicable was used to test the significance of associations of different variables. The P value of < 0.05 was considered as statistically significant.

Results

The total number of admissions to NICU during the study period was 1701 cases, of which 107 cases (6.3%) had NT, 89 (83.2%) were discharged alive and 18 (16.8%) died during hospitalization. Mild NT was found in 57 cases (53.3%), moderate in 36 (33.6%) and severe in 14 (13.1%). The mean gestational age at delivery was 34.7± 3.90 weeks, with 46 (43%) full term births, and 61 (57%) preterm births (two (1.9%) born before 28 weeks, 27 (25.2%) born between 28 – <32 weeks, and 32 (29.9%) born between 32 – <37 weeks.

Ten mothers (16.7%) had pre-eclampsia, 10 (16.7%) gestational hypertension, 8 (13.3%) idiopathic thrombocytopenic purpura, 8 (13.3%) polyhydramnios, 7 (11.7%) leaking liquor, 6 (10%) oligohydramnios, 6 (10%) Rh incompatibility, and 3 (5%) UTI. There were 85 cases (79.4%) delivered by Cesarean Section.

There were more male neonates 69 (64.5%) than females in the study group. NT presented during first week of life in 70 cases (65.4%) with a mean age at presentation of 7.7±0.73 days (range 1-27). The mean birthweight was 2313.8±86.06 gm, with a normal weight of >2500gm in 60 patients (56.1%). The mean hemoglobin level 13.4±0.31 g/dL with a range of (6.6-19.3) and mostly less than 15 g/dl in 62 cases (57.9%). The mean platelet count was 95.500±3.5400 (16,000-149,000), with mild NT present in 57 cases (53.3%) **(Table 1).**

Table 1: Demographic and laboratory characteristics of the study group

Variable	Category	No. (%)
Age (weeks)	Week 1	70 (65.4)
	Week 2	14 (13.1)
	Week 3	15 (14.0)
	Week 4	8 (7.5)
Sex	Male	69 (64.5)
	Female	38 (35.5)
Birth weight (gm)	<1000 (ELBW)	6 (5.6)
	1000–1499 (VLBW)	24 (22.4)
	1500–2499 (LBW)	17 (15.9)
	≥2500 (Normal)	60 (56.1)
Hemoglobin (g/dL)	<15	62 (57.9)
	15–20	45 (42.1)
	>20	0 (0)
WBC (×10³/µL)	<5 (Leukopenia)	29 (27.1)
	5–30 (Normal)	78 (72.9)
MPV (fL)	<7 (Low)	2 (1.6)
	7–11 (Normal)	95 (88.8)
	≥12 (High)	10 (9.3)
Platelet count (/µL)	<50,000 (Severe)	14 (13.1)
	50,000–99,000 (Moderate)	36 (33.6)
	100,000–150,000 (Mild)	57 (53.3)
CRP	Positive	30 (28.0)
	Negative	77 (72.0)

The blood culture was positive in 53 cases (49.6%), with the most common microorganism being *Acinetobacter boumanii* in 13 cases followed by *Coagulase negative staphylococci* (CONS) in 11, *Staphylococcus aureus in* 9, *Klebsiella pneumoniae* in 7, *Group B streptococci* (GBS) in 5, and 3 for each of *Pseudomonas aeruginosa* and *Enterobacter species*. In addition, 5 cases of *Cytomegalovirus* (CMV) and 2 cases of *Herpes simplex virus* (HSV) were detected by PCR.

The most common clinical finding in the NT cases was sepsis in 53 cases (49.5%), followed by asphyxia 11 (10.3%), autoimmune NT 9 (8.4%) and NEC and congenital infections 8 (7.5%) each. Fifty-Seven cases (53.3%) were symptomatic, whereas 50 (46.7%) were asymptomatic and accidently discovered. Thirty cases (28%) had puncture and cannula bleeding as presenting symptom, 21 (19.6%) had IVH by cranial US, 13 (12.1%) had pulmonary hemorrhage, 12 (11.2%) had purpura, 6 (5.6%) had petechiae, 2 (1.8%) had GIT bleeding and one case each had umbilical and wound bleeding (0.9%). Early onset NT was found in 44 cases (41.1%) of the cases.

Platelet transfusion was given to 19 cases (17.8%), while 88 (82.2%) needed only follow up and monitoring, with a mean duration of recovery of 5.5±0.28 days with a range of 2-7 days. There was a significant association between low hemoglobin <15g/dl and severe NT ($p = 0.04$), but there were no statistically significant associations between age of patients, weight and sex and the severity of NT, or between WBC, MPV, CRP, blood culture results and causes of NT with severity of NT, (Table 2).

Table 2: Distribution of the severity of neonatal thrombocytopenia according to demographic/laboratory variables

Variable	Category	Severe (n=14) No. (%)	Moderate (n=36) No. (%)	Mild (n=57) No. (%)	*P* value
Age (weeks)	Week 1	9 (12.9)	24 (34.3)	37 (52.9)	0.90
	Week 2	2 (14.3)	5 (35.7)	7 (50)	
	Week 3	2 (13.3)	5 (33.3)	8 (62.5)	
	Week 4	1 (12.5)	2 (25)	5 (8.8)	
Sex	Male	8 (11.6)	22 (31.9)	39 (56.5)	0.60
	Female	6 (15.8)	14 (36.8)	18 (47.4)	
Birth weight (g)	<1000	3 (50)	1 (16.7)	2 (33.3)	0.07
	1000–1499	4 (16.7)	10 (41.7)	10 (41.7)	
	1500–2499	3 (17.6)	4 (23.5)	10 (58.8)	
	≥2500	4 (6.7)	21 (35)	35 (58.3)	
Hemoglobin (g/dL)	<15	12 (19.4)	17 (27.4)	33 (53.2)	0.04
	15–20	2 (4.4)	19 (42.2)	24 (53.3)	
WBC (×10³/µL)	<5	4 (13.8%)	10 (34.5%)	15 (51.7%)	0.90
	5–30	10 (12.8%)	26 (33.3%)	42 (53.8%)	
MPV (fL)	<7	1 (50.0%)	0 (0.0%)	1 (50.0%)	0.10
	7–11	13 (13.7%)	30 (31.6%)	52 (54.7%)	
	≥12	0 (0.0%)	6 (60.0%)	4 (40.0%)	
CRP	Positive	3 (10.0%)	12 (40.0%)	15 (50.0%)	0.60
	Negative	11 (14.3%)	24 (31.2%)	42 (54.5%)	
Blood culture	Positive	11 (78.6)	18 (50.0)	29 (50.9)	0.10
	Negative	3 (21.4)	18 (50.0)	28 (49.1)	
Neonatal Clinical variables	Sepsis	11 (20.8%)	16 (30.2%)	26 (49.1%)	0.40
	Asphyxia	1 (9.1%)	3 (27.3%)	7 (63.6%)	
	Neonatal immune Thrombocytopenia	1 (11.1%)	5 (55.6%)	3 (33.3%)	
	NEC	0 (0.0%)	4 (50.0%)	4 (50.0%)	
	Congenital infections (TORCH)	0 (0.0%)	2 (25.0%)	6 (75.0%)	
	Congenital syndromes	0 (0.0%)	1 (14.3%)	6 (85.7%)	
	Exchange transfusion	0 (0.0%)	3 (50.0%)	3 (50.0%)	
	Postoperative DIC	1 (20.0%)	2 (40.0%)	2 (40.0%)	

There were statistically significant associations between being symptomatic (P = 0.0001), between bleeding from puncture and cannula sites (P = 0.03) between IVH (P = 0.0001) and any bleeding (P = 0.0001) with the severity of NT, (Table 3).

Table 3: Distribution of the severity of neonatal thrombocytopenia by clinical features

Variable	Severe (n=14) No. (%)	Moderate (n=36) No. (%)	Mild (n=57) No. (%)	*P* value
Symptomatic	14 (100)	25 (69.4)	18 (31.6)	0.0001
Bleeding from puncture sites	6 (42.9)	14 (38.9)	10 (17.5)	0.03
Intraventricular hemorrhage (IVH)	9 (64.3)	8 (22.2)	4 (7.0)	0.0001
Petechiae	1 (7.1)	1 (2.8)	4 (7.0)	0.60
Purpura	3 (21.4)	5 (13.9)	4 (7.0)	0.20
Any bleeding	13 (92.9)	24 (66.7)	15 (26.3)	0.0001
Bleeding sites				
Cannula	3 (23.1)	15 (62.5)	11 (73.3)	0.09
Pulmonary hemorrhage	7 (53.8)	4 (16.7)	2 (13.3)	
Gastrointestinal bleeding	0 (0)	2 (8.3)	0 (0)	
Umbilical bleeding	0 (0)	1 (4.2)	0 (0)	
Wound bleeding	1 (7.7)	0 (0)	0 (0)	

There were significant associations between the type of management and the outcome and the severity of NT, but no significant association between time of onset of NT, and severity of NT, (Table 4).

Table 4: Distribution of the severity of thrombocytopenia by the time of onset, type of treatment and outcome

Variable	Category	Severe (n=14) No. (%)	Moderate (n=36) No. (%)	Mild (n=57) No. (%)	P value
Time of onset	Early (<72 h)	5 (11.4%)	17 (38.6%)	22 (50.0%)	0.646
	Late (≥72 h)	9 (14.3%)	19 (30.2%)	35 (55.6%)	
Management	Platelet transfusion	12 (85.7)	4 (11.1)	3 (5.3)	0.0001
	Observation only	2 (14.3)	32 (88.9)	54 (94.7)	
Outcome	Death	9 (64.3)	5 (13.9)	4 (7.0)	0.0001
	Alive	5 (35.7)	31 (86.1)	53 (93.0)	

Discussion

The frequency of NT in this NICU (6.3%) is higher than that reported by Ulusoy *et al*. (12), Kusumasari *et al*. (13) and Eltawel *et al*. (14), possibly due to a high incidence of sepsis. The finding that there was a male

predominance among the NT cases agrees with Eltawel *et al*. study (14).

The high frequency of mild NT cases in the current study agrees with the findings of Saber *et al*. (15) and Sheeja J *et al*. (16). In very preterm infants, most major bleeds occurred without severe NT, linking bleeding risks with prematurity (17). The differences in the incidence of NT might reflect the NICU infection control measures and higher sepsis rates in low–middle income countries, also may be due to the difference in the study sample, and the performance of the NICU.

One study reported that severe NT was found in 170 out of 5819 neonatal in-patients, with many cases occurring within the first three days of life. Mortality was higher among neonates who experienced bleeding compared to those who did not (18). Baer *et al*. found severe thrombocytopenia in a small fraction of cases, with numerous bleeding episodes, primarily involving cutaneous bleeding (4).

The current study found NT to be more frequent in preterm infants (57%), in consistence with Sheeja J *et al (58%)*. (16), but in disagreement with Eltawel *et al*. (14) and Ulusoy *et al*. (12). The NT rates typically decreased with greater gestational age and birth weight (19). Furthermore, NT in these infants is often linked to conditions like placental insufficiency, congenital infections, or systemic diseases such as sepsis or NEC (8). One research found that NT is more prevalent in newborns with fetal weights below the fifth percentile, implying lower weight as a risk factor for reduced platelet counts (22).

The current study found most NT cases in infants with normal birth weight and full-term which agrees with Eltawel *et al*. (14) and Abate *et al* results (20). Tirupathi *et al*. (21) and sheeja J *et al*. (16) noted more NT cases among low-birth-weight infants.

Pre-eclampsia was the most frequent maternal risk factor for NT, which is consistent with the results of Kusumasari *et al*. (13) and Eltawel *et al*. (14). Chronic exposure to high levels of erythropoietin in the fetus secondary to fetal hypoxia in preeclampsia may also lead to NT by suppression of the megakaryocytic cell line causing decreased production of platelets (23).

Sepsis was the most common associated risk factor of NT, which is similar to the findings of Resch *et al*., (24), Saber *et al* (15) and Faraj *et al* (25). Sepsis increases the risk of NT through the destruction and consumption of platelets and decreasing platelet synthesis in the bone marrow (20). Sepsis, DIC, NEC and birth asphyxia directly influence the severity of NT and death (26). In preterm neonates, Sepsis was the most common risk factor associated with severe and late onset NT. Severe NT required more platelet transfusions, was associated with major bleeding manifestations, and had a higher mortality rate, when compared to mild and moderate NT (27). To decrease the occurrence of NT, we need to pay priority to neonates with the diagnosis of sepsis, perinatal asphyxia, NEC, and mothers who had severe pre-eclampsia (20).

There was statistically significant association between severity of NT and symptomatology which aligns with those of Saber *et al*. (15). Bleeding from puncture sites and intraventricular hemorrhage were common in severe NT, which agrees with Eltawel *et al*. (14).

Early-onset NT is generally associated with milder forms due to placental insufficiency, as noted by Eltawel *et al*. (14). Patil *et al*. (28) observed early onset NT, primarily in moderate severity. Conversely, late-onset NT is often linked to sepsis or metabolic diseases and tends to be more severe, requiring extended recovery (1, 29).

NT outcomes depend on the severity, platelet count, and factors like birth weight and gestational age (14). There were significant associations between death and severe NT.

The management of NT varies according to the severity as mild cases often resolve with monitoring, while moderate and severe NT frequently need platelet transfusions, as reported by Eltawel *et al*. (14) and Saber *et al*. (15). Platelet transfusion is the main line of managing NT, which can be given during bleeding or more commonly for preventing bleeding (30-32). The approach to use platelet transfusions differs regionally; U.S. neonatologists tend to use higher thresholds, reflecting guidelines from entities like the WHO (33). For extremely preterm infants, transfusions can heighten the risk of adverse outcomes (34). Infants randomized to a higher platelet transfusion threshold of 50000/microl compared with 25000/microl had a higher rate of death or significant neurodevelopmental impairment and also had a significantly higher rate of death or major bleeding within 28 days (35, 36). Restrictive platelet transfusion strategies decrease the adverse reactions, platelet shortages, and costs (37). Future research is recommended to focus on understanding the exact mechanisms of the harmful effects of platelet transfusions (38).

Limitations of study included a single center and being a descriptive study.

Conclusions: Neonatal thrombocytopenia was found to be common in this study cohort, with sepsis being the leading associated condition. Severe cases seem to be linked to bleeding manifestations, anemia, and mortality, which highlight the importance of careful monitoring of affected neonates.

Authors' declaration

We confirm that all the Figures and Tables in the manuscript belong to the current study. Authors sign on ethical consideration's Approval-Ethical Clearance: The project was approved by the local ethical committee in Department of Pediatrics, College of Medicine University of Baghdad according to the code number 142 on (01/ 04/ 2022).

Conflict of Insert: None

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Data availability: Upon reasonable request, the corresponding author will make the data sets generated and/or analyzed during the current work available.

AI Declaration

No artificial intelligence tools were used in the design, analysis, or writing of this manuscript.

Authors' Contributions

Study conception and design: NNH, MKI; data collection: MKI; analysis and interpretation of results: NNH, MKI; draft manuscript preparation: NNH, MKI, SAF; finalization and submission: NNH, SAF. Correction of revisions: NNH, SAF.

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السمات السريرية والمخبرية لنقص الصفيحات الدموية عند حديثي الولادة في وحدة العناية المركزة لحديثي الولادة في بغداد، العراق

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الخلاصة

الخلفية: يُعرف نقص الصفيحات الوليدي بأنه انخفاض عدد الصفائح الدموية إلى أقل من 150,000/ ميكرولتر، ويُصنف حسب عدد الصفائح الدموية إلى خفيف (149,000–100,000 ميكرولتر)، متوسط (99,000–50,000/ميكرولتر)، وشديد (<50,000/ميكرولتر). يرتبط حدوث نقص الصفيحات الوليدي عكسياً بعمر الحمل و/أو وزن الوليد عند الولادة. وتم تصنيف نقص الصفيحات الوليدي حسب توقيت ظهوره إلى نقص الصفيحات المبكر (خلال أول 72 ساعة من الحياة) والمتأخر (يحدث بعد 72 ساعة).

الأهداف: دراسة السمات السريرية والمخبرية لنقص الصفيحات الوليدي في وحدة العناية المركزة لحديثي الولادة في مستشفى حماية الأطفال التعليمي، بغداد، العراق.

المنهجية: أُجريت هذه الدراسة لسلسلة حالات رصدية في مركز واحد من 1 مايس 2022 إلى 30 نيسان 2023، في وحدة العناية المركزة لحديثي الولادة بمستشفى رعاية الأطفال التعليمي، بغداد. تم تسجيل المواليد الذين يعانون من نقص الصفيحات الدموية، والمعرّف على أنه عدد الصفائح الدموية أقل من 150,000/ميكرولتر. تم إجراء عد دم كامل، بروتين سي التفاعلي، زراعة الدم، وفحوصات أخرى حسب الحاجة السريرية.

النتائج: من بين 1701 مولودًا تم إدخالهم إلى وحدة العناية المركزة لحديثي الولادة، وجدت حالة قلة الصفيحات الدموية لدى 107 منهم، مما أعطى نسبة حدوث 6.3٪. كانت قلة الصفيحات الدموية الخفيفة هي الفئة الأكثر شيوعًا، حيث ظهرت في 57 حالة (53.3٪)، تليها قلة الصفيحات الدموية المتوسطة في 36 حالة (33.6٪) وقلة الصفيحات الدموية الشديدة في 14 حالة (13.1٪). تأثر الخدج أكثر من المواليد المكتملين [61 (57.0٪) مقابل 46 (43%)]. كان الإنتان الدموي الحالة المرتبطة الأكثر شيوعًا، وتم التعرف عليها في 53 حالة (49.6٪)، تلاها الاختناق في 11 حالة (10.3٪). كانت قلة الصفيحات الدموية الحادة مرتبطة بشكل كبير بهيموغلوبين أقل من 15 جم/دل، والنزيف من مواقع سحب الدم والقنيات، والوفاة

الإستنتاجات: تبين أن نقص الصفيحات الدموية لدى حديثي الولادة شائع في هذه المجموعة الدراسية، وأن الإنتان الدموي هو الحالة المرضية الأكثر ارتباطاً به. ويبدو أن الحالات الشديدة مرتبطة بمظاهر النزيف وفقر الدم والوفيات، مما يسلط الضوء على أهمية المراقبة الدقيقة لحديثي الولادة المصابين.

الكلمات المفتاحية: نقص الصفائح الدموية عند حديثي الولادة؛ وحدة العناية المركزة لحديثي الولادة؛ النزيف؛ نقل الصفائح الدموية، الإنتان، الاختناق الولادي.