

# Incidence of Thrombocytopenia in Idiopathic Hyperbilirubinemic Newborns

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## Abstract

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**Key words:** newborn; hyperbilirubinemia; thrombocytopenia; incidence.

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**Competing Interests:** The authors have declared that no competing interests exist.

**Background:** Hyperbilirubinemia is the most common reason for admission during the neonatal period and may develop serious complications. Thrombocytopenia is defined as platelet count  $<150,000/\text{mm}^3$  and has not been conclusively reported as a complication of hyperbilirubinemia in any of the standard paediatric textbooks. The aim of this study was to find the incidence of thrombocytopenia in neonates with idiopathic jaundice and the relationship between hyperbilirubinaemia and platelet count.

**Methods:** This was a descriptive-analytic study accomplished on 878 newborns. After a detailed history, clinical examination and baseline investigations, 185 babies with idiopathic hyperbilirubinemia were tested for platelet counts and then categorized in two groups namely group A (n=65) and group B (n=120) showing the presence and absence of thrombocytopenia, respectively. Newborns data were recorded and Statistical analysis was carried out, using SPSS 11.5.

**Results:** The incidence of thrombocytopenia was seen in 65 (12%) newborns admitted due to jaundice. The mean serum bilirubin in group A and B was defined as  $19.7 (\pm 6)$  and  $20.4 (\pm 5)$ , respectively ( $P = 0.362$ ). There was no significant difference in Laboratory variables like TSH, T4, coombs test, reticulocyte count, serum sodium and hematocrit values between two groups.

**Conclusion:** This study determines higher rate of thrombocytopenia among idiopathic hyperbilirubinemic neonates (36%) and helps the practitioner to be aware of this association and avoid unnecessary investigations. We did not find a significant correlation between serum bilirubin values and thrombocytopenia.

## Introduction

Hyperbilirubinemia is a common and in most cases benign problem in first month of life which is often physiologic and intervention is not usually necessary.

Hyperbilirubinemia may increase in 8-11% of newborns to higher than 95% of percentile and evaluation and management might be required [1]. Bilirubin is the final product of hem catabolism and its serum level is determined by combination of bile production, hepatic conjugation and enterohepatic circulation [2]. Although mild increase in serum bilirubin has some advantageous effects but potential central nerves system toxicity may occur due to indirect bilirubin increase [3]. Jaundice is the most common reason for admission during the neonatal period. Multiple variables (maternal, infantile, during

labor and environmental factors) affect the course and severity of jaundice. Hyperbilirubinemia may develop serious complications like kernicterus and lifelong disability. Kernicterus causes 10 percent of death and 70 percent of disorders associated with hyperbilirubinemia. Asian ethnicity is more affected to kernicterus [4].

Thrombocytopenia is a common problem in the newborn. Previous studies report a prevalence of thrombocytopenia of 1–5% of all newborns and may develops in 18% to 35% of NICU patients [5, 6]. Thrombocytopenia is defined as platelet count  $<150,000/\text{mm}^3$  regardless of the gestational age. Thrombocytopenia as a side effect of phototherapy, which has not been described in the standard textbooks, although many authors did try to look into this particular side effect. Maurer et al and Pishwa et al observed in their studies that neonates exposed to

phototherapy had decreased platelet counts and increased platelet turnover [7, 8].

This study was done with an aim to find the incidence and cause of thrombocytopenia in neonates with jaundice and the relationship between hyperbilirubinaemia and platelet count.

## Subjects and Methods

This was a descriptive-analytic study accomplished on 878 newborns aged between 3 to 30 days with Clinical jaundice admitted to NICU, pediatric emergency room and clinic of neonatology during March 2008 to April 2012 at Ghaem Hospital in Mashhad, Iran. After a detailed history, clinical examination and baseline investigations, 185 babies with idiopathic hyperbilirubinemia were found eligible for the study. Neonates, who were preterm or low birth weight, had noncompliant parents, infants who were symptomatic (respiratory, distress syndrome, fever, congenital anomaly, renal insufficiency and etc), direct hyperbilirubinaemia, sepsis, anti-platelet drugs given to baby or mother, haemangioma were excluded. Platelet counts were performed at admission. Neonates who were included in this study then categorized in two groups namely group A (n=65) and group B (n=120) showing the presence and absence of thrombocytopenia (platelet count of less than  $150,000/\text{mm}^3$ ), respectively (Figure 1).

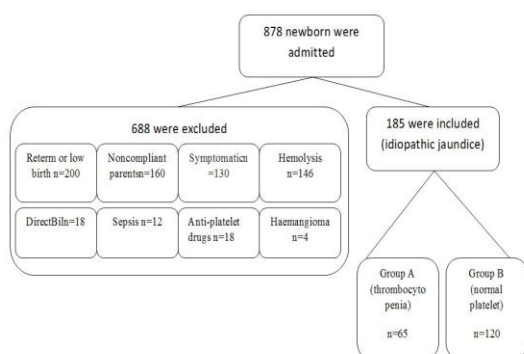


Figure 1: Chart of study.

Neonatal variables like sex, birth weight, gestational age, age at admission, duration of hospitalization, laboratory tests (indirect and direct bilirubin, coombs test, hematocrit, retic count, urea, creatinin, blood group, and in some cases and thyroid test) compared between two groups. Maternal data like age, type of delivery, duration of mother hospitalization after delivery, number of parturition, blood group and Rh were recorded and compared. Statistical analysis was carried out using SPSS 11.5. The Student T-test, Mann-Whitney and Chi-square

test were performed on quantitative and qualitative variables. P-value less than 0.05, was considered statistically significant.

The ethic committee of Mashhad University of Medical Science approved this study and all parents signed informed consent.

## Results

A total of 185 neonates with idiopathic jaundice were enrolled in current study. We found 65 babies with thrombocytopenia (group A) and 120 babies with normal platelet count (group B).

The incidence of thrombocytopenia was seen in 103 (12%) newborns admitted due to jaundice. In our study, the average initial platelet count in thrombocytopenia group was  $109 \pm 31 \times 10^3$  while the average initial platelet count in non-thrombocytopenia group was  $292 \pm 92 \times 10^3 / \text{mm}^3$ .

Majority of neonates (86.4%) had mild thrombocytopenia ( $100-150 \times 10^3$ ). Moderate and severe thrombocytopenia was seen in (14.6%) cases, respectively.

The current study shows idiopathic thrombocytopenia was the most common cause of thrombocytopenia among newborns (63%) and other disorders that decreased platelet count was defined such as ABO incompatibility, polycythemia, UTI, sepsis, infant of diabetic mother (IDM) and down syndrome and etc (Figure 2).

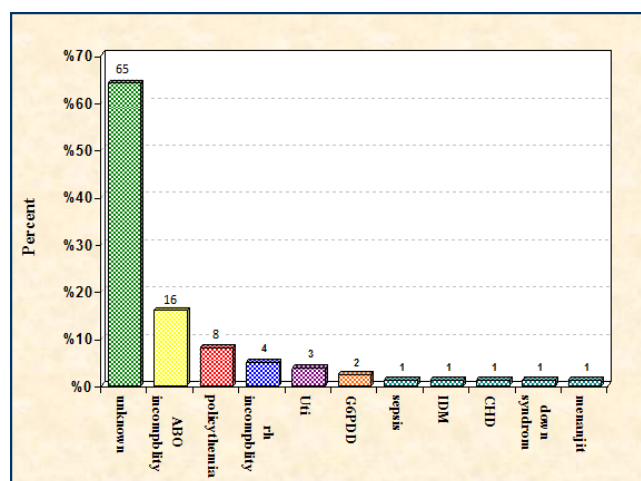


Figure 2: Probable causes of thrombocytopenia among hyperbilirubinemic newborns.

Basic and clinical findings including sex, birth weight, mode of delivery, time of jaundice appearance, parturition number, and age of admission and hospitalization period in both groups were recorded and compared (Table 1). We did not find significant differences between two groups ( $p > 0.05$ ).

**Table 1: Basic and clinical findings of newborns in two groups.**

| Group                            | A                  | B                 | Chi-Square Value | P-Value |
|----------------------------------|--------------------|-------------------|------------------|---------|
| <b>Clinical Findings</b>         | (thrombocytopenia) | (normal platelet) |                  |         |
| Sex (m/f)                        | 39/26              | 62/58             | 1.285            | 0.257   |
| Mode of delivery (NVD/CS)        | 34/31              | 44/35             | 0.047            | 0.829   |
| Multiparity/Primiparity          | 26/24              | 28/37             | 6.228            | 0.285   |
| Group                            | A                  | B                 | t-test Value     | P-Value |
| <b>Clinical Findings</b>         | (thrombocytopenia) | (normal platelet) |                  |         |
| Mean Birth weight $\pm$ STD (gr) | 2.85 $\pm$ 765     | 3070 $\pm$ 605    | -1.745           | 0.083   |
| Jaundice appearance (day)        | 3                  | 3.6               | 0.501            | 0.133   |
| Hospitalization period (day)     | 2.6                | 3.4               | -1.068           | 0.065   |

The mean serum bilirubin in group A and B was defined as 19.7 ( $\pm$  6) and 20.4 ( $\pm$  5), respectively ( $P=0.362$ , Table 2). There was no significant difference in Laboratory variables like TSH, T4, coombs test, reticulocyte count, serum sodium and hematocrit values between two groups ( $P>0.05$ , Table 3).

**Table 2: Bilirubin values among two groups.**

| Group                                  | A                  | B                 | t-test Value | P-Value |
|--|--------------------|-------------------|--------------|---------|
|  | (thrombocytopenia) | (normal platelet) |              |         |
| Mean Serum bilirubin $\pm$ std.(mg/dl) | 19.7 $\pm$ 6       | 20.4 $\pm$ 5      | -0.913       | 0.362   |

Although hematocrit values were lower among thrombocytopenic group but the differences was not significant ( $P>0.05$ , Figure 3).

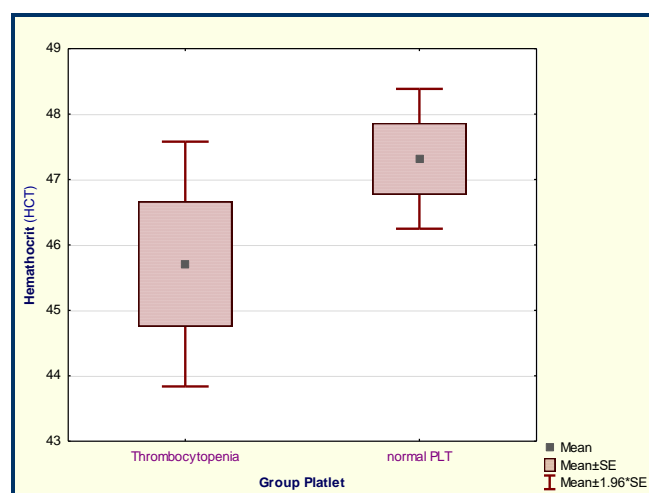
**Table 3: Laboratory values among two groups.**

| Group                      | A                  | B                 | P-Value |
|----------------------------|--------------------|-------------------|---------|
| <b>laboratory findings</b> | (thrombocytopenia) | (normal platelet) |         |
| TSH                        | 4.06               | 6.36              | 0.202   |
| T4                         | 11                 | 9.7               | 0.35    |
| Retic count (%)            | 1.28               | 0.93              | 0.183   |
| Hematocrit                 | 45.7               | 47.3              | 0.145   |
| Sodium (mg/dl)             | 142                | 140               | 0.296   |

## Discussion

In our study, the incidence of thrombocytopenia among newborns admitted with hyperbilirubinemia was 12%. The incidence of thrombocytopenia varies by population. In the well newborn population, the incidence is less than 5%. In the neonatal intensive care unit (NICU), however, the incidence of thrombocytopenia is much higher and may develop in 18% to 35% of NICU patients. Lower prevalence rate reported in this study may be explained by admission of some newborns in clinic and neonatal ward which was apart from NICU.

We found higher rate of thrombocytopenia among male sex and multiparous mother, however these associations were not statistically significant. Our results were in agreement with Maj et al study [9].

**Figure 3: Mean values of hematocrit among two groups.**

None of the neonates with thrombocytopenia (group A), in our as well as the other study, had clinical manifestations of bleeding. Our explanation for the same could be the fact that thrombocytopenia was transient and rarely found to be severe in babies with idiopathic hyperbilirubinemia. This study establishes higher rate of thrombocytopenia among idiopathic hyperbilirubinemic neonates (36%) that might be related to incomplete investigation to find out causes of hyperbilirubinemia, so as with improvement in diagnostic tools and complete evaluation of jaundice in future studies, this rate would be declined.

Duration of hospitalization between both groups did not show any significant differences ( $P>0.05$ ) and suggest thrombocytopenia was not related to any significant underline disease.

The mean serum bilirubin in group A and B did not show any significant differences ( $P>0.05$ ). With respect to the bivariate correlations, we did not find a significant correlation between serum bilirubin values and thrombocytopenia. We believe larger multicenter trials preferably with Measurement of plasma Tpo may provide valuable diagnostic information in infants with thrombocytopenia in the future.

To conclude, this study establishes higher rate of thrombocytopenia among idiopathic hyperbilirubinaemic neonates (36%) and helps the practitioner to be aware of this association and avoid unnecessary investigations, as thrombocytopenia was mild and transient. Though the incidence of thrombocytopenia is substantial, yet we did not find a significant correlation between serum bilirubin values and thrombocytopenia.

## Reference

1. Boskabadi H, Maamouri G, Mafinejad S. The Effect of Traditional Remedies (Camel's Thorn, Flixweed and Sugar Water) on Idiopathic Neonatal Jaundice. Iranian Journal of Pediatrics. 2011;21(3):325-30.

2. Bartoletti AL, Stevenson DK, Ostrander CR, et al. Pulmonary excretion of carbon monoxide in the human infant as an index of bilirubin production. Effects of gestational age and postnatal age and some common neonatal abnormalities. *J Pediatr.* 1979;94:952-5.
3. Vitek L, Jirsa M, Brodanova M, Kalab M, et al. Gilbert syndrome and ischemic heart disease: a protective effect of elevated bilirubin levels. *Atherosclerosis.* 2002; 29: 410-21.
4. Boskabadi H, Maamouri GA, Mafinejad SH, Rezagholizadeh F. Clinical Course and Prognosis of Hemolytic Jaundice in Neonates in North East of Iran. *Maced J Med Sci.* 2011;4(4):403-7.
5. Sola-Visner M, Saxonhouse MA, Brown RE. Neonatal thrombocytopenia—What we do and don't know? *Early Hum Dev.* 2008;84:499–506.
6. Roberts IAG, Murray NA. Neonatal thrombocytopenia. *Current Opinion Pediatrics.* 2001;13:16–21.
7. Maurer HM, Fratkin M, McWilliams NB, et al. Effects of phototherapy on platelet counts in low-birthweight infants and on platelet production and life span in rabbits. *Pediatrics.* 1976;57:506–512.
8. Pishva N, Pishva H. Incidence of thrombocytopenia in hyperbilirubinemic neonates during phototherapy. *Acta Medica Iranica.* 2000;38:7–9.
9. Khera MS, Gupta CR. Incidence of thrombocytopenia following phototherapy in hyperbilirubinemic neonates. *MJAFI.* 2011;4:329-32.