



**Comparative Study of Liberal versus
Restricted Platelet Transfusion in
Thrombocytopenic Neonates in Neonatal
Intensive Care Unit (NICU) of Ain Shams
University Children Hospital**

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

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List of Abbreviations

Abb.	Full term
<i>BFU-MK</i>	<i>Burst-forming unit-megakaryocyte</i>
<i>CBC</i>	<i>Complete blood count</i>
<i>CCI</i>	<i>Corrected count increment</i>
<i>CFU-MK</i>	<i>Colony-forming unit-megakaryocyte</i>
<i>CMV</i>	<i>Cytomegalovirus</i>
<i>CT</i>	<i>Closure times</i>
<i>DIC</i>	<i>Disseminated intravascular coagulation</i>
<i>ECM</i>	<i>Extracellular matrix</i>
<i>ELBW</i>	<i>Extremely low birth weight</i>
<i>ETT</i>	<i>Endotracheal tube</i>
<i>FNAIT</i>	<i>Fetal and neonatal alloimmune thrombocytopenia</i>
<i>FV</i>	<i>Factor V</i>
<i>G.A</i>	<i>Gestational age</i>
<i>GLH</i>	<i>Germinal layer hemorrhage</i>
<i>Hgb</i>	<i>Hemoglobin</i>
<i>HPA</i>	<i>Human platelet antigen</i>
<i>HSCs</i>	<i>Hematopoietic stem cells</i>
<i>ITP</i>	<i>Immune thrombocytopenic purpura</i>
<i>IUGR</i>	<i>Intrauterine growth restriction</i>
<i>IVH</i>	<i>Intraventricular hemorrhage</i>
<i>IVIG</i>	<i>Intravenous immunoglobulin</i>
<i>MK</i>	<i>Megakaryocyte</i>
<i>NAIT</i>	<i>Neonatal alloimmune thrombocytopenia</i>
<i>NEC</i>	<i>Necrotizing enterocolitis</i>
<i>NICUs</i>	<i>Neonatal intensive care units</i>
<i>PB</i>	<i>Peripheral blood</i>
<i>PC</i>	<i>Platelet concentrate</i>

List of Abbreviations cont...

Abb.	Full term
<i>PROM</i>	<i>Premature rupture of membrane</i>
<i>PRP</i>	<i>Platelet rich plasma</i>
<i>PS</i>	<i>Procoagulantphosphatidylserine</i>
<i>PTR</i>	<i>Platelet transfuse on refractoriness</i>
<i>RBCs</i>	<i>Red blood cells</i>
<i>SDA-PC</i>	<i>Single donar apharesis platelet concentrate</i>
<i>TAR</i>	<i>Thrombocytopenia absent radius</i>
<i>TPN</i>	<i>Total parentral nutrition</i>
<i>TPO</i>	<i>Thrombopoietin</i>
<i>VLBW</i>	<i>Very low birth weight</i>
<i>vWf</i>	<i>Von Willebrand factor</i>
<i>WB</i>	<i>Washed blood</i>
<i>WBCs</i>	<i>White blood cells</i>

INTRODUCTION

Thrombocytopenia is a very frequent problem among sick neonates, affecting up to 35% of all infants admitted to the NICU. Although multiple clinical conditions have been causally associated with neonatal thrombocytopenia, the cause of the thrombocytopenia is unclear in up to 60% of affected neonates and the risk of developing thrombocytopenia is inversely proportional to gestational age (GA) (*Sparger et al., 2015*).

Neonatal thrombocytopenia is generally defined as a platelet count below $100 \times 10^9/\text{L}$, and is defined as severe when it is below $50 \times 10^9/\text{L}$ (*Stanworth, 2012*).

In neonatal intensive care units, platelet count $<50 \times 10^9/\text{L}$ is reported in 5%-22% of neonates. Most of these cases have underlying causes such as prematurity, congenital infections, maternal immune thrombocytopenic purpura, or chronic fetal hypoxia (*Tiller et al., 2017*).

Normal platelet count for neonates is $150\text{--}400 \times 10^9/\text{L}$. Population-based studies on cord blood suggest 2% of term infants have a platelet count < 150 , and 0.2% have platelets < 50 (*Dixon, 2016*).

Thrombocytopenia should be investigated and may be a symptom of underlying disease. The commonest cause of a falsely low platelet count is a clot in the sample.

Repeat if in doubt especially if capillary sample or difficult peripheral venipuncture (**Dixon, 2016**).

In an otherwise well term infant, the commonest cause of thrombocytopenia is alloimmune thrombocytopenia. In a preterm or systemically unwell baby, the commonest cause is neonatal sepsis (**Dixon, 2016**).

The only readily available specific treatment for thrombocytopenia in neonates remains platelet transfusions. Two types of platelet products are available: pooled platelets, which are derived from whole-blood donations from donors, and apheresis platelets, which are collected by cell-separation techniques from donors (**Sparger et al., 2016**).

The assessment of bleeding is really the more clinically relevant measure of the effectiveness of platelet transfusions (**Sparger et al., 2016**).

No data to support exactly how much should be given for prophylaxis versus during a time of bleeding (**Josephson et al., 2008**)

Over past 10 years worldwide disparity in use of platelet transfusions in thrombocytopenic neonates (**Del Vecchio et al., 2001**).

Two key questions can be raised about platelet transfusions for neonates. First, do sound evidence-based

guidelines exist to decide when platelet transfusion should be given? The short answer is “no”. Second, when a platelet transfusion is prescribed, do we know how to select and transfuse the best available platelet product? Fortunately for this question, the answer is “yes” (***Ronald G Strauss, 2010***).

Further studies are needed to define platelet transfusion threshold in thrombocytopenic neonates in absence of bleeding.