Risk factors for severe thrombocytopenia during continuous kidney replacement therapy in NICU

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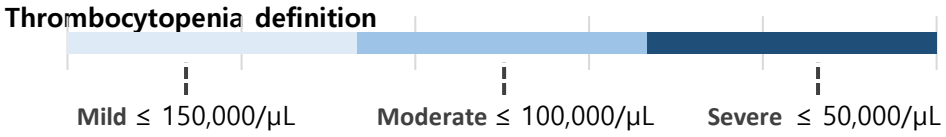
Introduction

- **Continuous renal replacement therapy** has been administered in patients for metabolic disorder, electrolyte imbalance, multiorgan dysfunction syndrome(MODS) and volume control, but its application in neonate and preterm infants is challenging.
- **The incidence of AKI** among neonates admitted to the neonatal intensive care unit was varies from 18-70%, and AKI patients had more than four times higher independent odds of death and longer independent hospital stays.
- While often lifesaving, **KRT sometimes poses significant risk** to the patients including vascular access and patency maintenance complications, Electrolytes and acid base disorders, hematological complications, hypothermia, normoglycemic ketoacidosis, volume related cardiac stunning.
- Particularly in neonates and premature infants, **thrombocytopenia** is commonly observed during continuous KRT (CKRT). Thrombocytopenia in critically ill patients undergoing CKRT is associated with increased mortality. In this study, We evaluated risk factors and outcomes related to thrombocytopenia in NICU.

Methods and Materials

This retrospective single-center study reviewed medical records of patients who underwent CKRT in our hospital's neonatal intensive care unit from June 2013 to October 2022.

Thrombocytopenia definition



Results

Table 1. Flow chart of the study

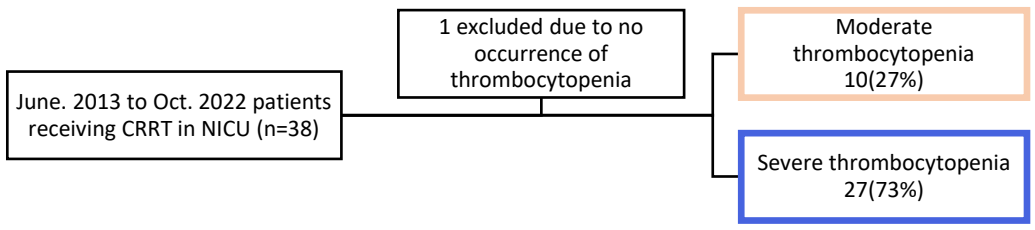


Table 2. Perinatal information and clinical features of patients

Characteristic, patients(n=37)	
Sex, No.(%)	
Male	21(56.8%)
Female	16(43.2%)
birth weight, No.(%)	
ELBW(<1000g)	1(2.7%)
VLBW(<1500g)	1(2.7%)
LBW(<2500g)	6(16.2%)
gestational age	
Preterm	8(21.6%)
Term	29(78.4%)
Age at the start of CKRT, mean(range)	30.1days(1-260days)
Indication for CKRT, No.(%)	
AKI along with oligouria	23(62%)
Hyperammonemia	8(21%)
electrolyte imbalance	3(8%)
volume overload	2(5%)
azotemia	2(5%)

Before CKRT

Median initial platelet count
- 176,000/μL (range: 34,000-547,000)/μL

Thrombocytopenia before CKRT initiation
- 19 patients (50%)

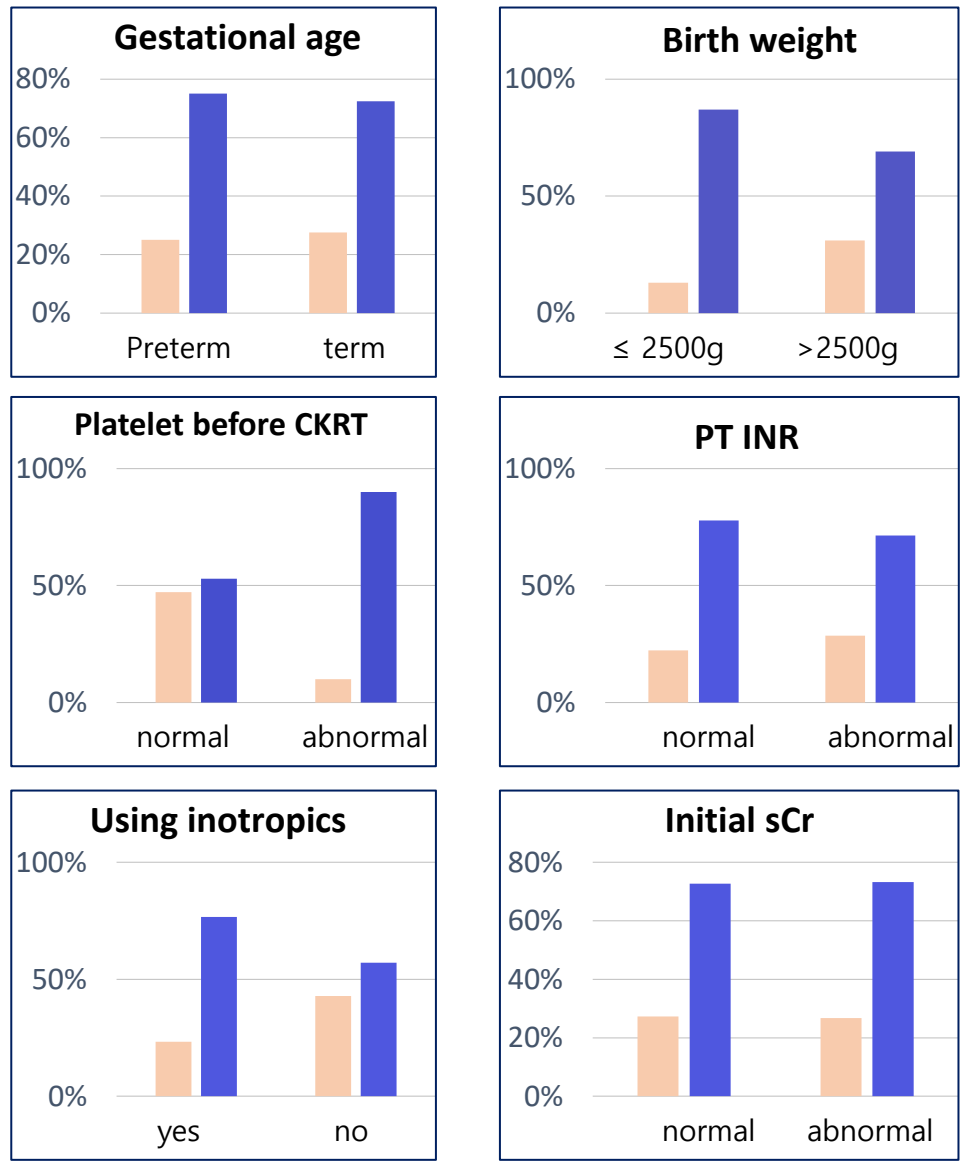
After CKRT

Median decrease from the baseline to platelet nadir : 76.5%(20.6-98.9%)

The time to reach nadir from onset
- Moderate thrombocytopenia : 15.1 hours
- Severe thrombocytopenia : 21.4 hours

Discontinuation of CRRT
- 12 patients(32.4%)
- Time until recovery from thrombocytopenia : 109.3hrs

- When comparing moderate and severe thrombocytopenia, there were no significant differences in birth weight, gestational age, presence of sepsis, bleeding tendency, use of anticoagulation, initial serum creatinine or use of inotropics, except for **platelet count before CKRT.**



- Survival rate after CRRT application

Discussion

- Thrombocytopenia complicated almost all cases(97%) of CKRT performed in NICU.
- When comparing moderate and severe thrombocytopenia, there were no significant differences in birth weight, gestational age, sepsis, bleeding tendency, use of anticoagulation, initial serum creatinine, pre-CRRT thrombocytopenia, use of inotropics, or concomitant use of ECMO.