

# Neonate Immune Thrombocytopenia

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# Thrombocytopenia in Newborns

- Platelet count  $<150 \times 10^9/L$
- High incidence in low-birth-weight infants (18-20%)
- Causes:
  - Impaired production
  - Increased destruction

# Neonate Immune Thrombocytopenia

- Neonatal alloimmune thrombocytopenia (NAIT)
- Neonatal autoimmune thrombocytopenia

# Neonatal Alloimmune Thrombocytopenia

- Result of feto-maternal platelet incompatibility, analogous to HDN, but first-born may be affected
- Sensitization of the mother to paternal antigens inherited by the fetus and present on fetal platelets

# Neonatal Alloimmune Thrombocytopenia

- Platelet antigens:
  - HLA Class I
  - Platelet Specific Antigen
    - HPA-1 (PLA1), in Caucasian populations, phenotype HLA-Dw52a
    - HPA-4 (PEN/YUK), in Asians
    - HPA-3A

Antigen System	Glycoprotein (GP) Location	Other Names	Antigens	Other Names	Phenotype Frequency (%)	
					White*	Japanese†
HPA-1	GPIIIa	Zw, PI <sup>A</sup>	HPA-1a	Zw <sup>a</sup> , PI <sup>A1</sup>	97.9	99.9
			HPA-1b	Zw <sup>b</sup> , PI <sup>A2</sup>	26.5	3.7
HPA-2	GPIb	Ko, Sib	HPA-2a	Ko <sup>b</sup>	99.3	NT <sup>‡</sup>
			HPA-2b	Ko <sup>a</sup> , Sib <sup>a</sup>	14.6	25.4
HPA-3	GPIIb	Bak, Lek	HPA-3a	Bak <sup>a</sup> , Lek <sup>a</sup>	87.7	78.9
			HPA-3b	Bak <sup>b</sup>	64.1	NT
HPA-4	GPIIIa	Pen, Yuk	HPA-4a	Pen <sup>a</sup> , Yuk <sup>b</sup>	99.9	99.9
			HPA-4b	Pen <sup>b</sup> , Yuk <sup>a</sup>	0.2	1.7
HPA-5	GPIa	Br, Hc, Zav	HPA-5a	Br <sup>b</sup> , Zav <sup>b</sup>	99.2	NT
			HPA-5b	Br <sup>a</sup> , Zav <sup>a</sup> , Hc <sup>a</sup>	20.6	NT

# Neonatal Alloimmune Thrombocytopenia

- Incidence of NAIT: 1 in 800 to 1600 pregnancies
  - PLA1 incompatibility: 1/42 pregnancies
  - NAIT occurs : 1/20-40 incompatible pregnancies

# Neonatal Consequence of NAIT

- Self-limited, persist < 3 weeks after delivery
- Progressive purpura
- Intracranial Hemorrhage
  - High incidence in preterm neonate when platelet count <  $30 \times 10^9 / L$



# Neonatal Alloimmune Thrombocytopenia

- Diagnosis
  - Platelet counts
  - Clinical correlation (r/o Sepsis, DIC, congenital disease, maternal ITP, etc)
  - Platelet antigen type for fetus, mother, father.
    - Antiglobulin consummation test
    - Immunoradiometric, IFA and ELISA
    - Monoclonal Antibody Specific Immobilization of platelet antigens (MAIPA) assays

# Treatment of NAIT

- IVIG / steroids to mother
- Neonatal platelet transfusion (Intrauterine / Post delivery)
  - Maternal platelet or HPA-1a negative platelet
  - Washed and irradiated
  - 1 unit/ 10 kg ( $3.0 \times 10^{11}$  / unit)

# Guideline For Platelet Transfusion Support of Neonates

## Prophylactic Platelet Transfusions

- Stable preterm neonates with platelet counts  $<30 \times 10^9/L$
- Stable term neonates with platelet counts  $<20 \times 10^9/L$
- Sick preterm neonates with platelet counts  $<50 \times 10^9/L$
- Sick term infants with platelet counts  $<30 \times 10^9/L$
- Preparation for an invasive procedure, e.g., lumbar puncture or minor surgery in neonates with platelet counts  $<50 \times 10^9/L$ , and for major surgery in neonates with platelet counts  $<100 \times 10^9/L$

## Platelet Transfusions in Neonates with Clinically Significant Bleeding

- Neonates with platelet counts  $<50 \times 10^9/L$
- Neonates with conditions that increase bleeding, e.g., DIC and platelet counts  $<100 \times 10^9/L$
- Neonates with documented significant platelet functional disorders (e.g., Glanzmann's thrombasthenia) irrespective of the circulating platelet count

# Evaluate Transfusion Efficacy

- Corrected Count Increment (CCI)

CCI at 1 hour =

(Platelet count post – Platelet count pre)

x Body Surface Area (m<sup>2</sup>)

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Number of units transfused

- CCI >4000-5000 suggests an adequate response

# Neonate Autoimmune Thrombocytopenia

- Transplacentally transferred antibody
  - directed to the platelet antigen shared by both mother and fetus
  - result of maternal immune thrombocytopenia

# Neonatal Consequences

- Fetal hemorrhage is rare
  - greatest possibility when mother presents active chronic ITP / acute ITP / refractory to splenectomy
- Neonatal thrombocytopenia is mild to moderate

# Management

- Vaginal delivery vs. Cesarean section
- IVIG treatment post delivery
- Platelet transfusion is ineffective
  - due to the antibodies are reactive against a wide range of platelet antigens

# Conclusion

- Definition of thrombocytopenia
- Neonatal alloimmune / autoimmune thrombocytopenia
  - Causes
  - Diagnosis
  - Treatment
  - Guidelines

