Disseminated intravascular coagulation in neonate with multiple risk factors

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Summary

A baby boy of 41 year old mother who had history of abruptio placenta with Disseminated intravascular coagulation (DIC) was admitted to neonatal unit of West Yangon General Hospital. He was born at 34 week gestation and experienced birth asphyxia, respiratory distress syndrome, sepsis and neonatal jaundice. He was treated with exchange transfusion for DIC, sepsis and hyper-bilirubinaemia. He also suffered prolonged neonatal jaundice caused by conjugated hyperbilirubinaemia due to congenital cytomegalovirus infection and treated with oral valganciclovir.

Introduction

DIC in neonatal period has high morbidity and mortality up to 60-80%.[1] It can be caused by many factors including maternal complications (60%), birth asphyxia (30%), hyaline membrane disease (62%) and sepsis (26%).[2] Maternal conditions such as pre-eclampsia, HELLP syndrome, placental abruption, placenta previa, sepsis and intrauterine infection all are risk factors of DIC in newborns.[3]

Case Presentation

A baby boy of 2.6 kg was delivered on 24.3.19 by emergency Caesarean section due to pre-eclampsia with abruptio placenta, with suspicious cardiotocography (CTG) at 34 week gestation. Mother is 41 year old, G1 P0 and has no known history of medical diseases and no history of fever with rash during pregnancy. She needed Total Abdominal Hysterectomy after delivery due to uncontrolled bleeding with DIC. She needed total 28 units of blood transfusion during and after operation.

Immediately after delivery, the baby had no spontaneous respiration and needed bag and mask ventilation with chest compression and intravenous adrenaline and parental fluid for resuscitation. Baby was admitted to neonatal unit as late preterm baby with birth asphyxia and respiratory distress syndrome. After admission, general condition is very ill with severe respiratory distress. So, Continuous positive airway pressure (CPAP) was put on for 4 days. On day 3 of age, coffee ground vomiting, passing of fresh blood per rectum and spontaneous mucocutaneous bleeding occurred due to deranged clotting functions and reduced platelet count. We corrected it by giving fresh frozen plasma and

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platelet concentrate. But DIC cannot be controlled and deep jaundice occurred on day 5 of age. So, exchange transfusion was done for both DIC and hyperbilirubinaemia. Bleeding manifestations were relieved after exchange transfusion but his bilirubin level did not reduce. So, we worked out for neonatal jaundice and found that it was due to conjugated hyperbilirubinaemia with congenital infection (CMV IgM +ve). Valganciclovir was given orally for 6 weeks. Patient was oxygen dependent up to day 15 and heart murmur was detected. So, echocardiogram was done to exclude cardiac cause but patent foramen ovale only was detected. Patient was discharged on day 20 of age.

Investigation Summary

	25.3.19 Day 1	26.3.19 Day 2	28.3.19 Day 4	30.3.19 Day 6	1.4.19 Day 8	4.4.19 Day 11	8.4.19 Day 15	30.4.19 Day 37
WBC	35.37		10.93	7.56	7.2	20.12		6.12
Hb	21.5		16.6	13.1	17	15.6		7.2
Plt	132		40	55	8	5		387
Na^+		130					135	
K^+		6.4					3.5	
Cl^-		99					101	
Urea							43	
Cr							23	
Ca^+		2.2						
Albumin		43						
PT			23.5			20.7	26.3	19.4
INR			2.14			1.86	2.32	1.53
D-dimer			98.4					1.13
Total Bilirubin			19	22.2			33	
Direct bilirubin				6.4			20.7	
T3							2.26	
T4							13.46	
TSH							0.52	
ALT							16	69
AST							50	175
ALP							96	352

29.3.19	Blood C & S	Klebsiella isolated
2.4.19	TORCH Screen	CMV IgM (+)ve
3.4.19	USG (Head and Abdomen)	No abnormally detected
5.4.19	ECHO	Patent foramen ovale
11.4.19	CT (Head)	Small ICHs in right parietal and occipital area
19.4.19	Urine C & S	Enterococcus faecum > 10^5 isolated

Treatment given

- IV Ampicillin, Gentamicin and Cefotaxime for 5 days followed by IV Tazolin for 5 days and then changed to IV CS1 and Amikacin according to C & S result.
- Fresh frozen plasma and platelet concentrate transfused
- Double volume exchange transfusion on day 5
- PO Valganciclovir 16 mg/kg/dose for 6 weeks

Discussion

DIC in neonates can be caused by both maternal and neonatal factors. Woods WG, *et al* studied 53 cases of DIC in newborn of which 60% was due to maternal complications.[2] In the study of Narayan S, *et al* done in 1994, 6 out of 20 neonates (30%) of severe pregnancy-induced hypertension (PIH) mother had DIC.[4] Xiaojuan Yin, *et al* (2018) studied 60 neonates with placental abruption compared with 60 neonates without placental abruption.[5] This study showed that neo-nates with placental abruption were more likely to develop birth asphyxia, intracranial haemorrhage, respiratory distress syndrome, DIC and hyperbilirubinaemia.

Prematurity is also a risk factor of DIC in neonates. A study done in 2017 by Swarnim S, *et al* stated that premature infants had a higher incidence of bleeding (18.57%).[6] This study also showed that septicaemia with DIC contributed 65.22% of cases of death in neonates. Birth asphyxia can also cause DIC in neonates. Forman KF, *et al* (2014) reported that the incidence of bleeding is 54% in asphyxiated babies.[7] Infants with intrauterine infections should be suspected of developing manifestations of DIC. In the study done by William EH, *et al* (1969), three of 19 neonates (15.7%) with DIC had severe intrauterine infections (rubella, CMV and herpes simplex viruses).[8]

In the present case, the baby had many risk factors for DIC. Mother had history of pre-eclampsia and abruptio placenta with DIC, all of which can cause DIC in newborn. The baby experienced prematurity, birth asphyxia, respiratory distress syndrome, sepsis and hyperbilirubinaemia with CMV infection in his neonatal period. All these factors predisposed to develop DIC.

Follow up

On follow up, the baby was 33 days old and general condition was active but deep jaundice was still present. Body weight was static with breastfeeding and supplementary

spoon feeding. Clotting functions returned to near normal but liver enzymes became slightly raised. Anaemia was present with no signs of heart failure. We have planned for close follow up to assess his general condition, development, liver functions and side effects of valganciclovir.

Take home message

- DIC has high mortality in neonates. Therefore, it should be awared in the presence of risk factors in mother or baby or both and should be treated effectively in time.
- Exchange transfusion is one of the options for the treatment of DIC and should be considered if replacement therapy cannot control DIC and in the presence of volume overload.[9]
- Conjugated hyperbilirubinaemia should be considered even in early days of life if hyperbilirubinaemia does not respond to phototherapy and exchange transfusion.

References

1. Trotter L. Disseminated intravascular Coagulation in the neonatal period. *Newborn and Infant Nursing Reviews*, 2004; **4 (4)**: 12-14.
2. Woods WG, Luban NL, Hilgartner MW and Miller DR. Disseminated intravascular coagulation in the newborn. *Am J Dis Child*, 1979; **133 (1)**: 44-46.
3. Thachil J and Toh CH. Disseminated intravascular coagulation in obstetric disorders and its acute management. *Blood Reviews*, 2009; **23**: 167-176.
4. Narayan S, Kumari S, Mangwana S, Logani KB and Kabra M. Consumption coagulopathy in neonates born to mother with pregnancy induced hypertension. *Indian Pediatrics*, 1994; **31**: 840-842.
5. Xiaojuan Yin, Zhu Chen, Lu Yang, Qiaoyi Shao, Changchun Chen and Zhichun Feng. Coagulation function and placental pathology in neonates with placental abruption. *Int J Clin Exp Patho*, 2018; **11 (2)**: 604-613.
6. Swarnim S, Brajesh Kumar Rai, Divya M and Kripanath M. A prospective study of bleeding neonates: Clinical presentation, aetiological profile, immediate outcome and short term follow up. *Curr Pediatr Res*, 2017; **21 (3)**: 416-419.
7. Forman KR, Diab Y, Wong ECC, Baumgart S, Luban NLC and Massaro AN. Coagulopathy in newborns with hypoxic ischaemic encephalopathy (HIE) treated with therapeutic hypothermia: a retrospective case-control study. *BMC Paediatrics*, 2014; **14**: 277.
8. William EH, Marilyn MM and Giselle SP. Disseminated intravascular coagulation in the newborn. *Pediatrics*, 1969; **43 (2)**: 233-240.
9. Michael DW, Elizabeth AC and Brenda ESG. The investigation and management of neonatal haemostasis and thrombosis. *British Journal of haematology*, 2002; **119 (2)**: 295-309.