

## A RARE CASE OF NEONATAL CEREBRAL VENOUS THROMBOSIS WITH HAEMORRHAGIC INFARCTION SECONDARY TO HYPERNATRAEMIC DEHYDRATION

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### PRESENTATION OF CASE

A 12-day old male neonate admitted to our neonatal intensive care unit with history of poor feeding, lethargy since 2 days and one episode of seizure 2 hours before coming to the hospital. The baby was first born male child to non-consanguineously married couple with insignificant perinatal history. The birth weight was 3.6 kg, both mother and baby were discharged on third day after delivery. At home, he was breastfeeding with appropriate latch on to the breast but with poor effort for 15 to 20 minutes on each breast every 3 to 4 hours.

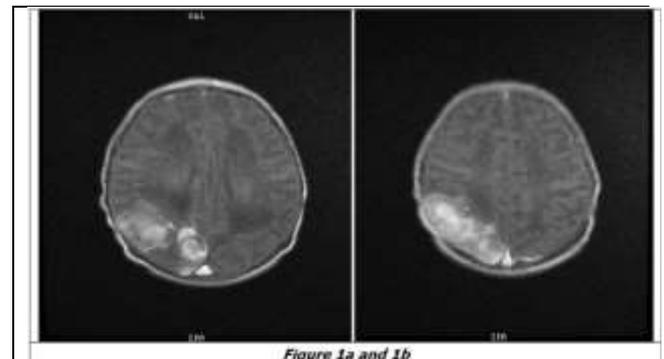
At admission baby was having active seizure which was managed as per protocol. On examination baby was lethargic with weight of 2.3 kg (28% weight loss) and the presence of signs of severe dehydration. Rest of the clinical examination was within normal limits. Initial laboratory value showed serum sodium of 173 meq/l, chloride of 134 meq/l, potassium of 5.6 meq/l, blood urea of 418, serum creatinine of 3.6, Hb of 15.7, TC 17800, platelet of 68000 with severe metabolic acidosis and deranged coagulation profile. Sepsis screen done was negative. Diagnosis of cerebral venous thrombosis was suspected after using cranial ultrasound and confirmed with MRI. MRI brain with MR venography done showed large early subacute venous haemorrhagic infarct in right parietal lobe with extensive thrombosis of right transverse sinus, sigmoid sinus confluence and superior sagittal sinus.

The baby was treated for severe hypernatraemic dehydration, metabolic acidosis and renal failure with appropriate intravenous fluids and electrolyte therapy. Serum sodium normalised after 72 hours of intravenous fluid therapy.

The low molecular weight heparin was started at the dose of 1.5 mg/kg/dose administered subcutaneously. Baby slowly recovered, by the end of third day electrolyte and creatinine concentration returns to normal. Serial MRI

showed resolving thrombus after anticoagulation treatment with low molecular weight heparin for 1 month.

Baby was discharged on day 22 of admission with daily dose of low molecular weight heparin, later switched over to oral anticoagulant. Repeat MRI done after one month showed no evidence of thrombus. Presently child is one and half year old with no neurological sequelae.



**Figure 1a and 1b. MRI Brain Showing Haemorrhagic Infarct of Right Parietal Lobe with Sinus Venous Thrombosis of Sagittal Sinus**

### DIFFERENTIAL DIAGNOSIS

Thrombophilic Disorders (AT-3, Protein-C and Protein-S Deficiency)

### PATHOLOGICAL DISCUSSION

Acute cerebral venous thrombosis with haemorrhagic infarct is an uncommon disorder in a neonate; however, it can be associated with serious clinical consequences. The diagnosis is very difficult and is missed in some cases because of the highly variable clinical presentation in neonate. Cerebral venous thrombosis with haemorrhagic infarct is relatively rare in severe neonatal hypernatraemic dehydration. There are only few reports on hypernatremia causing cerebral venous thrombosis and haemorrhage. We are reporting a 12-day old male neonate with cerebral venous thrombosis with infarcts and haemorrhage secondary to hypernatraemic dehydration.

Neonatal cerebral venous thrombosis is a very rare disorder, which results in significant neurologic impairment or death in most of the cases.<sup>1</sup> Neonatal hypernatremia is an important electrolyte disorder that has very serious effects on CNS, including brain oedema, intracranial haemorrhage, haemorrhagic infarct and thrombosis.<sup>2</sup> Hypernatraemic dehydration in breastfed neonates has been

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described in the literature and it can cause significant complications which includes seizures, DIC, renal failure and permanent brain damage.<sup>3</sup>

We are reporting a 12-day old male breast-fed neonate with hypernatraemic dehydration causing cerebral venous thrombosis and haemorrhagic infarct.

### DISCUSSION OF MANAGEMENT

Neonatal thrombosis is a very serious illness, which can cause high morbidity and mortality. Neonates and infants account for the largest proportion of thrombotic event in paediatric age group.<sup>4</sup> Two neonatal registries from Canada and Germany have collected prospective data on incidence on incidence of neonatal thrombosis on unselected cases from multiple centres. Canadian registry showed an incidence of 2.4/1000 admission to NICU. Whereas German study, symptomatic thrombosis was 5.1/100000 births.<sup>5,6</sup>

The most common risk factor for the development of neonatal thrombosis in both studies was related to the use of intravascular catheters. Other common risk factors are birth asphyxia, septicaemia, dehydration and maternal diabetes. In our case hypernatraemic dehydration was responsible for the cause of haemorrhagic infarction and thrombosis.

Hypernatraemic dehydration was described in a literature more than 20 years ago.<sup>3</sup> The most important feature is profound weight loss, which averages between 24% and 37%.<sup>7</sup> There are very few case reports on hypernatraemic dehydration causing cerebral venous thrombosis and haemorrhagic infarction. The most common presentation of CVT in neonates are poor feeding, decreased level of consciousness and seizures with diffuse neurological signs. MRI and MR venography are imaging methods of choice and are more sensitive in detecting CVT than CT scan.<sup>8</sup>

The management of neonatal thrombosis is controversial and has no special guidelines. There are different approaches which vary depending on the location and extent of thrombus. The approach to an individual neonate should balance the risks and benefits. The reasonable strategy for the management of asymptomatic thrombosis is by close monitoring of the size of thrombus and providing supporting care.

Severe symptomatic thromboembolisms are typically treated with anticoagulants and/or fibrinolytic agents. Surgical thrombectomy is rarely performed in a neonate.

Many recommendations suggest that unfractionated heparin will be the most frequently used anticoagulant, although there is increasing use of low-molecular weight heparin in this age group. In our baby low molecular weight heparin for 30 days was sufficient for the recanalization of the sinus.

Cerebral venous thrombosis with haemorrhagic infarction is a rare but serious complication of hypernatraemic dehydration in neonates. Neonates and infants accounts for the largest proportion of thrombotic events in the paediatric age group. There should be high index of suspicion to diagnose cerebral venous thrombosis in a neonate with severe hypernatremia with diffuse neurological signs. MRI and MR venography are recommended investigations of choice. Treatment is mainly supportive care with anticoagulation and/or thrombolysis.

### FINAL DIAGNOSIS

Neonatal Cerebral Venous Thrombosis with Haemorrhagic Infarction Secondary to Hypernatraemic Dehydration.

### REFERENCES

- [1] Hashmi M, Wasay M. Caring for cerebral venous sinus thrombosis in children. *J Emerg Trauma Shock* 2011;4(3):389-394.
- [2] Conley SB. Hypernatremia. *Pediatr Clin North Am* 1990;37(2):365-372.
- [3] Clarke TA, Markarian M, Griswold W, et al. Hypernatremic dehydration resulting from inadequate breast feeding. *Pediatrics* 1979;63(6):931-932.
- [4] Seth T. Thrombosis in neonates and children. *E J Med* 2009;14:36-45.
- [5] Schmidt B, Andrew M. Neonatal thrombosis: report of a prospective Canadian and international registry. *Paediatrics* 1995;96(5 Pt 1):939-943.
- [6] Nowak-Gottl U, von Kries R, Gobel U. Neonatal symptomatic thromboembolism in Germany: two year survey. *Arch Dis Child Fetal Neonatal* 1997;76(3):163-167.
- [7] Heldrich FJ, Shaw SS. Case report and review of the literature: hypernatremia in breast-fed infants. *Md Medj* 1990;39:475-478.
- [8] Barron TF, Gusnard DA, Zimmerman RA, et al. Cerebral venous thrombosis in neonates and children. *Pediatr Neurol* 1992;8(2):112-116.