CASE REPORT

CEREBRAL VENOUS SINUS THROMBOSIS

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ABSTRACT

Cerebral Venous Sinus Thrombosis (CVST) is an often under-diagnosed, life-threatening condition occurring with an incidence of 3-4 cases/million/year. The aim of this case report is to provide an example of how early suspicion of CVST, with appropriate imaging like MRV, is important for diagnosis.

INTRODUCTION

Cerebral venous sinus thrombosis (CVST) is characterized by the formation of a clot in the intracranial dural venous sinuses or cortical veins that drains blood from the brain and is less frequent than the thrombotic and embolic arterial infarctions [1, 2]. CVST is a rare condition affecting commonly young adults and children, primarily neonates [3-6]. Incidence in neonates accounts for approximately 7 cases per million people per year according to studies in USA, Canada and Brazil [3,4,7,8].

The variable and non-specific clinical presentation of CVST ranging from headache to focal neurologic deficits, altered sensorium and seizures, creates a diagnostic challenge for clinicians [2, 3, 7]. Many cases remain clinically undetected or misdiagnosed initially for other more common diseases, such as migraines, meningitis, sinusitis, ischemic or haemorrhagic stroke, thus consequently leading to complications and mortality [3, 5, 7, 9]. Outcome in CVST with early diagnosis with the use of highly sophisticated imaging as computer tomography (CT) scan of head and magnetic resonance venography [6,10, 11], and timely treatment with anticoagulation, carries better prognosis [2]. We are reporting a case of a female baby diagnosed with cerebral vein thrombosis and was managed in our hallelujah general hospital.

Case report

This is a 25 day old female neonate, referred from Addis Hiwot General Hospital. She is born to a 31 years old para III mother at a gestational age of 38 weeks from reliable last menstrual period. She had regular antenatal follow up (ANC) and the baseline investigations (HIV test, HbSag, VDRL) were negative and blood group and RH was B+ve. Delivery was by spontaneous vertex delivery after labour of 1 and 1/2 hours. Rupture of membranes was artificial and 03 hours prior to delivery. The birth outcome was a 2500 gms weighing female alive neonate who cried immediately after birth.

The mother had no history of fever, foul smelling vaginal discharge or abdominal pain. At the age around 3 weeks the neonate developed high grade intermittent fever for which she was taken to Addis Hiwot General Hospital and started on Ampicillin and Gentamycin IV after laboratory showed infection.

On the fourth day of antibiotics the neonate developed abnormal body movements; three episodes which involved the head and the left upper extremity. Suckling activity was normal.

On Physical examination, the positive findings were AHR= 163/MIN RR= 68/MIN T=35.7 SAO2 83% with atmospheric air and 94% with INO2 at 0.5L.

She was not using accessory muscles for breathing and there was good air entry bilaterally. On Neurological examination, all reflexes were intact with normal tone. With the assessment of term, late onset neonatal sepsis with meningitis, Neonatal seizure treatment continued but the seizure persisted. Laboratory tests were done to look for the cause of the persistent seizure including CSF analysis, electrolyte determination and RBS, but all were not revealing. After this, baby was investigated with MRI which showed hyper intensity of the blood vessels and recommended to do MRV which showed blocked blood vessel in the brain with a conclusion of Left side partial transverse & complete sigmoid sinus thrombosis. She was referred to Hallelujah General Hospital for further evaluation and management.

After being admitted to the NICU she was started on Antibiotics (Ampicillin and Cefotaxime, which was changed to Cefipime and Vancomycine after 48 hrs of admission). Phenobarbitone 7.5 mg po BID was started. Feeding with expressed breast milk continued because the mother was not around at the time of admission in our hospital. Direct breast feeding resumed after the mother was admitted in the same hospital.

During her stay in the NICU, consultation with pediatric haematologist was done and issue of starting anti-coagulant treatment was delayed and recommended to continue treatment with antibiotics because the baby was showing improvement with the antibiotic treatment.

CBC, CRP, PT, PTT and INR the following investigations were done as a baseline to have the results as:

Complete Blood Count

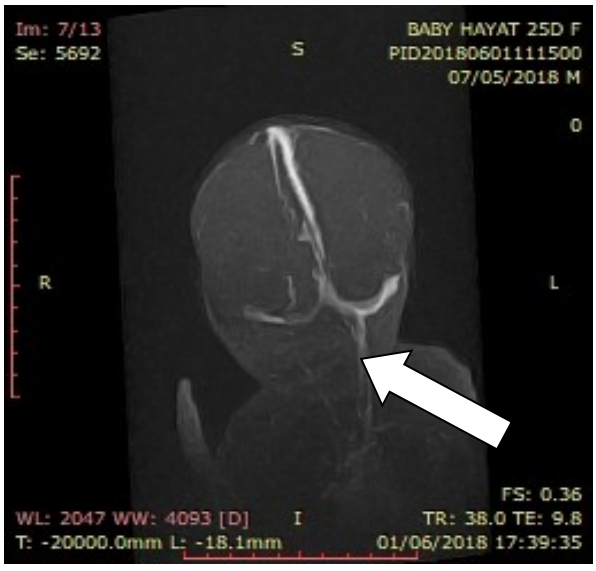
	01/06/2018	02/06/2018	04/06/2018	09/06/18	20/06/18
White Blood Cell	7200	8000	12410	13810	
Hemoglobin	11.8	9.82	12.3	11.52	
Hematocrit	30.0	33.52	34.2	30.02	
MCV	94	`94.9	103	92.3	
MCH	37.2	27.8	37	35.4	
MCHC	39.3	29.32	36	38.31	
Platelate	88,000	386	334	455	
Lymphocyte	54.1%	45.9%	52%	42.2%	
Granulocyte	29.3%	27.62%	28%	38.9%	
PT, PTT, INR	CLOTTED	CLOTTED			
CRP	NR			NR	
Blood Group	B+VE				
BUN					16
Creatinine					0.33

Summary of Radiological Findings:

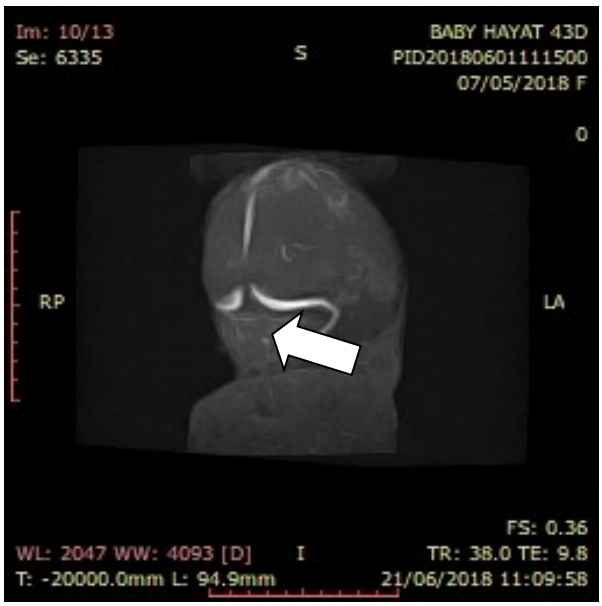
Imaging including Transfontanel Ultrasound and Echocardiography were normal. Cerebrospinal fluid analysis showed no microorganism on gram stain and no growth on culture.

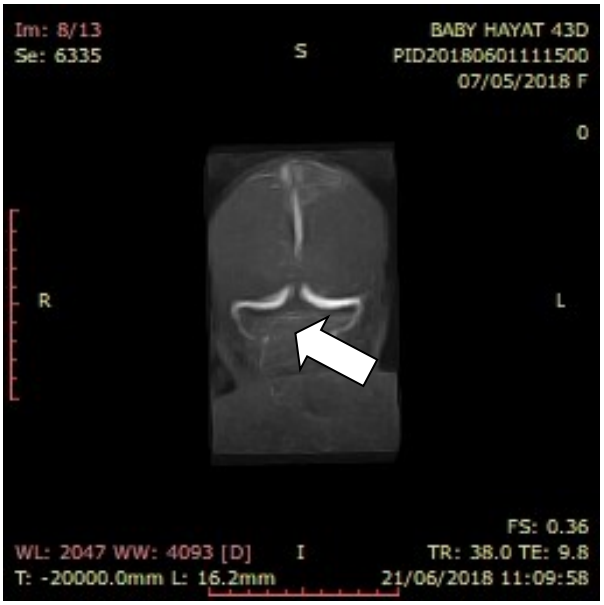
MRI/MRV

A. The following MRV images of the neonate before treatment (arrow) showing obstructed blood flow.



B. The following MRV image (arrows) taken after completing treatment show complete blood flow with no obstruction.





After completing 21 days of treatment, baby was discharged home at 45 days of age with normal vital signs and physical findings and a plan to continue follow up.

Discussion

Thromboembolic disease is rare in childhood [12]. The annual incidence in children is estimated at about 0.7 cases of venous thrombosis per 100,000 population, 1.0 of stroke and 0.1 of myocardial infarction, while in adults the incidence reported is 74.2, 45.4 and 175.6 cases respectively. The lower incidence of venous thromboembolic disease (VTE) in children compared to adults is mainly due to the integrity of the vessels and the enhanced anticoagulant activity of the endothelium, and additionally to the reduced capacity of thrombin generation, inactivation of thrombin by a2-macroglobulin, the increased concentration of which counterbalances the physiological deficiency of antithrombin and protein c / s, to the decreased levels of tissue factor in cord blood and concentration of eicosanoids and proteoglycans, depending on age [13,14]. The incidence of thromboembolic events (VTE) is higher in infants than in older children.

About 10% of VTE occur in the first four weeks of life, frequently in critically ill neonates (2.4 symptomatic VTE cases per 1000 admissions in neonatal intensive care units-NICU). The incidence of symptomatic venous thrombosis (VTE) in newborns is 5.1/100,000 live births [15]. Although it is considered that the thromboembolic events are under diagnosed, newborns are nearly 40 times more likely to suffer a VTE than during the entire childhood, but certainly the above probability is significantly less than that referred in adults [16, 17].

The hemostatic system both in preterm and full-term newborns differs significantly from

that of older children and much more than that of adults, however, normally in newborns there is a balance in between bleeding or thrombosis diathesis. The increased incidence of VTE in critically ill infants is attributed to the derangement of equilibrium of the hemostatic mechanism, because of the lower concentrations of natural inhibitors and impaired fibrinolytic activity and also due to elevated levels of factor von willebrand [18]. The combination of the above with both the high viscosity of blood due to the high hematocrit and the small vascular diameter of newborns results in low capillary flow, especially on coexistence of dehydration or hypercoagulable state because of infection or prematurity. Furthermore, the use of venous or arterial catheters is one of the major risk factors for thrombosis in neonatal period. Nowadays, 15% of infants in NICU and at least 50% of preterm infants of birth weight < 1000 gm have catheter in umbilical vein.

Thrombosis in children is a multifactorial event and the result of acquired (> 90% of cases) or congenital risk factors. For the manifestation of VTE in neonates, several coincidental risk factors (variety of underlying diseases or triggering events of the child or maternal) are required. Studies so far, have not revealed thrombophilic factors contributing to the occurrence of asymptomatic or symptomatic VTE [19]. Genetic factors are related to the risk of VTE in children and newborns but no causal relationship is established for most of them [20].

In several studies the frequency of presence of thrombophilic factors in children with VTE is reported 13-79%. The huge discrepancy is attributed mainly to variation in the design of the trials, the difficulty in the definition of related prothrombotic disorders, and also to the small number and different patient populations.

Regarding thromboembolic events of central venous system (CVS) [21], and although the high frequency of idiopathic arterial ischemic events (AIS) [22], the prevalence of thrombophilic factors varies in different studies from 20 to 50%, while increased appears the possibility of the presence of congenital thrombophilia in neonates with renal, hepatic or portal vein thrombosis [23]. Furthermore, maternal thrombophilia has been associated with the occurrence of perinatal AIS, venous sinus thrombosis or renal vein thrombosis [24]. However, in neonates there is scepticism about the interpretation of results of the various studies due to the complexity of the mechanism of hemostasis and the interaction of several acquired factors. Thrombosis in neonates is generally a multifactorial process [25]. Future studies may clarify both causative background and therapeutic choices in this group of patients.

Spread of infection from a contiguous site is a well-known cause of dural sinus thrombosis. Particularly important sources are mastoidits and other middle-ear infections as well as ethmoid and frontal sinusitis. For these infections, leading to septic dural sinus

thrombosis, high-dose antibiotics are the mainstay of treatment. Additionally, local collections of pus at these sites may have to be drained. Anticoagulation is not well studied but has been used particularly in cavernous sinus thrombosis with good results [26, 27]. For lateral and superior sagittal sinus thrombosis, the data is even more sparse with mixed results [28, 29]. Therefore, till more evidence is available, the physician will have to balance the risk of benefit of anticoagulation with the risk of hemorrhage in septic dural sinus thrombosis.

Conclusion

Neonatal SVT is a multi-factorial disease with a significant risk of serious adverse neurological sequelae. The unique features of neonatal haemostasis make the diagnosis, monitoring and management of thrombosis more challenging than at any other time of life.

Therefore when we treat neonates with late onset neonatal sepsis, in addition to considering meningitis, we also have to keep in mind the possibility of complications like thrombosis, especially in conditions where neonatal seizures occur and possible causes of neonatal seizures turned out to be inconclusive.

Acknowledgement

I would like to thank Khalid Asrat, MD, MPH, and Consultant in Pediatrics and child health for taking interest in the case and giving the appropriate feedback, Dr. Mesfin Tsigie, MD, Expert Radiologist for taking the time to comment on the MRI and MRV images of the neonate. I also would like to extend my gratitude to Ms Solome Mesfin for her assistance in obtaining and organizing the records for this case report.

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