An Atypical Presentation of a Huge Brain Abscess without Neurologic Sequalae in a 28 Days Old Infant

Abstract: Brain abscess constitutes a rare medical condition in the newborn period. This condition if present in the majority of cases is a complication of meningitis with high morbidity and mortality at short and long term. Many unusual bacterial pathogens were implicated in this condition like Proteus, Klebsiella, Citrobacter, Staphylococcus Aureus, MRSA, Staphylococcus Epidermidis and Enterococcus (1, 2, 3). In this article, we report a case of a 28 days old late preterm baby presented with a history of poor feeding and low grade fever, who was found to have Staphylococcus Epidermidis meningitis without any focal neurologic signs with a huge brain abscess of 10 cm without neither midline shift nor hydrocephalus. The baby received a full course of antibiotic therapy for total 4 weeks post drainage of abscess and was discharged home after documentation of radiological clearance in a repeated MRI without any neurologic sequelae.

Keywords: Brain abscess; Neonates; Coagulase negative Staphylococcus.

INTRODUCTION:

During the neonatal period, meningitis mainly that of bacterial origin is still considered one of the most devastating conditions, with a high morbidity rate ranging from 20% to 60% (Masand, R. et al., 2015). Brain abscess is a rare and uncommon complication of neonatal meningitis that occurs in 1%-4% of all cases (Singh, A. et al., 2016). The first report of brain abscess in a neonate was published 100 years ago in the literature (Masand, R. et al., 2015). Brain abscess is an uncommon intracranial suppuration that usually occurs as a complication of bacterial meningitis or septicemia. Many pathogens have been implicated in the pathogenesis of brain abscess, ranging from the most common ones like Citrobacter species; Pseudomonas Aeruginosa, Klebsiella Pneumonia and Enterobacteria such as Proteus Mirabilis and Serratia Marcescens; to the less common like Staphylococcus Aureus and Staphylococcus Epidermidis which has been described as the leading species of coagulase-negative Staphylococci (CONS), and the predominant pathogen of sepsis in preterm infants (Suárez, M. et al., 2015; Singh, A. et al., 2016; Dong, Y. et al., 2018). We report in this article a case of a huge brain abscess status post drainage and full course of 4 weeks antibiotic therapy due to coagulase negative staphylococcus meningitis with absent neurological deficit in a 28 days ex-preterm baby who presented with poor feeding and low grade fever.

CASE DESCRIPTION:

Our case is a 28 days old baby girl second member of twins, product of IVF and 34 weeks prematurity, born by cesarean section for scar pain to a 38 years old mother G1P2A0 of blood group B positive, B positive father, no consanguinity between parents. The mother TORCH status was negative, GBS negative, history of recurrent UTIs at the last trimester treated at home with Cefixime. At birth the baby was 1920 grams, 50 cm length and 35cm head circumference with an Apgar score of 8/1min, 9/5mins, and no neonatal resuscitation was done. Immediately after birth the evolution was marked by progressive respiratory distress beginning at 30 minutes post-delivery (subcostal retractions with grunting and nasal flaring), the baby was admitted to the ICN for respiratory distress, got intubated for a total of 3 days and received a total course of 7 days triple antibiotic therapy for early onset neonatal sepsis via a central access (umbilical venous line), then she was discharged home after documentation of negative blood culture with weight of
1900 grams. Newborn was referred to our hospital for history of poor feeding and low grade fever at day 28 of life, no lethargy or irritability, no abnormal movements or seizure. On physical examination, the baby was tonic, active, had normal reflexes, good sucking reflex, normotensive non bulging open anterior fontanel, no signs of respiratory distress, she had good oxygen saturation on room air, regular S1 and S2, no murmur, positive femoral pulses, and good peripheral perfusion, mildly dehydrated (delayed skin turgor). Weight 1900g, HC 36cm, length 50cm. Full sepsis work-up done showed WBC 13000, Neutrophils 41%, Lymphocytes 36%, with high CRP 42, CSF analysis showed WBC 308 (neutrophils 70%, lymphocytes 30%), RBC 2, glucose 54mg/dl, Protein 0.8g/L. PCR viral panel meningitis (Neuro9) were also ordered with urine analysis, culture and blood culture. The baby started on Ampicillin, Gentamycin and Cefotaxime as meningeal doses with IV hydration. 72 hours later, the CSF culture showed coagulase negative Staphylococcus sensitive to Clindamycin, Vancomycin, and Erythromycin and resistant to Benzyl penicillin, so the baby was shifted to Meropenem and Vancomycin, also meningeal doses, and MRI brain was requested. MRI brain showed cyst-like area (6.4 cm x 4cm x 3.6cm) with inflamed /infected thick contour and thick fluid content just above the left Sylvian fissure involving the left fronto-prietal region with peripheral contrast enhancement without neither midline shift nor hydrocephalus Figure 1 and Figure 2.

Figure 1: MRI brain showing cyst-like area with inflamed /infected thick contour and thick fluid content with peripheral contrast enhancement without neither midline shift nor hydrocephalus

Figure 2: MRI brain showing cyst-like area just above the left Sylvian fissure involving the left fronto-prietal region with peripheral contrast enhancement

Neurosurgeon was consulted and the decision was to prepare the patient for craniotomy for drainage of abscess figure 3.
Cardiac echocardiography showed normal findings. Pre-operative laboratory data showed: CRP 13; WBC 8000 with Neutrophils 25% and Lymphocytes 45%; Hbg 8.3; thus 2 units of PRBCs were prepared. PCR viral meningitis panel revealed negative, blood culture and urine culture negative. Four weeks of Meropenem and Vancomycin post-op were considered according to the opinion of neurosurgeon and infectious diseases specialist. Pus drain specimen showed many neutrophils with no growth after 48 hrs, sections from soft gray tissue showed benign brain glial tissue with focal significant acute inflammation, no granuloma nor malignancy. Repeated CT scan of brain 1 week post-op showed significantly decreased collection/pus with few residual pockets, a left subdural collection with max thickness of 8 mm causing mild compressive effect with absence of neither midline shift nor hydrocephalus Figure 4.

CT scan of brain was followed by MRI brain 2 weeks later which showed a subcutaneous fluid collection (4cm*4cm*1.7cm) overlying the left craniotomy site with enhancing rim Figure 5.
Antibiotherapy were completed for more 2 weeks to achieve a total of 5 weeks post-operatively mainly in correlation with the subcutaneous collection which was decreased remarkably on physical examination of the skull. During her hospital stay, the baby retained a good PO intake, weight gain and a normal level of activity and tonicity, she had normal primitive reflexes, no focal deficit and follow-up labs showed negative CRP < 0.3 and WBC 9000, Neutrophils 40%, Hgb 12. The baby was discharged home with complete normal neurological exam and presented for follow-up at outside clinic.

**DISCUSSION:**

Despite the advances in the neuroimaging, neurosurgical and microbiological techniques, brain abscesses remains uncommon in infants and neonates with a prevalence ranging from 1.3 to 4% and with a significant rate of mortality and morbidity (Suárez, M. et al., 2017; & Anca, I. A. et al., 2009). Brain abscess in newborns constitutes an uncommon central nervous disease. It is described as a focal, intracerebral infection that begins by a localized area of cerebritis and develops into a collection of pus surrounded by a well vascularized capsule (Senapati, S. et al., 2015). Neonatal cerebral abscesses usually occur as a complication of bacterial meninitis or septicemia (Anca, I. A. et al., 2009). Rarely they can be a complication of head trauma, congenital heart disease, or shunt surgery. Multiple abscesses are more frequently reported in immunocompromised patients (Suárez, M. et al., 2017). Despite the initiation of intrapartum prophylaxis against GBS, it remains the most common cause of both meningitis and neonatal sepsis, with a high incidence of more than 40%, followed by E. coli especially in very low birth weight infants (Bundy, L. M., & Noor, A. 2019). For the late onset one, coagulase-negative *Staphylococcus* and *Staphylococcus Aureus* followed by *E. coli* and Klebsiella, Listeria, Pseudomonas Aeruginosa and methicillin-resistant *Staphylococcus Aureus* (Bundy, L. M., & Noor, A. 2019) are more common. The neonatal brain abscess is mainly caused by gram-negative microorganisms commonly *Citrobacter Diversus*, Proteus and Pseudomonas species which are characterized by their ability to invade the nervous tissue and cause necrotizing vasculitis. *Klebsiella Pneumonia* was isolated in a reported cases of brain abscess in the literature and was described as the most common organism causing neonatal sepsis in developing countries (Qureshi, U. A. et al., 2011; & Masand, R. et al., 2015; & Singh, A. et al., 2016). *Staphylococcus Aureus* and MRSA are described in the literature as rare causes of brain abscesses during the first months of life (Suárez, M. et al., 2015; & Russo, A. et al., 2013). The blood stream infection with invasion of the brain parenchyma constitutes the most common mechanism of formation of brain abscess followed by a direct invasion of CSF through a right to left shunt especially in premature newborns (Russo, A. et al., 2013; Masand, R. et al., 2015; & Bundy, L. M., & Noor, A. 2019). An intrauterine infection was reported in a case of an *E. Coli* large brain abscess in 7 days old boy in the literature (Senapati, S. et al., 2015). The clinical presentation was nonspecific and widely variable ranging from fever, poor feeding to irritability, vomiting, focal/multifocal seizures and hydrocephalus (Qureshi, U. A. et al., 2011; Russo, A. et al., 2013; & Singh, A. et al., 2016). Our case constitutes an unusual presentation of a large brain abscess measuring 10 cm approximately in a neonate with a rare and uncommon organism (coagulase negative *Staphylococcus*) treated with craniotomy for drainage associated with 5 weeks antibiotic therapy post craniotomy without any neurologic sequale.

**CONCLUSION:**

More attention must be paid to the silent sometimes uncharacteristic, silent pathway to a potentially devastating outcome in the late preterm and preterm babies which constitutes a vulnerable population. The development of a brain abscess in a well appearing premature newborn may be only detected on a routine ultrasound of brain or may be a result of colonization by an infrequent germ of the CSF or the bloodstream.

**REFERENCES:**

