

Cerebellar Staphylococcal Abscess Accompanied with High Alfa-Fetoprotein in a Young Infant

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Received: May 20, 2011; Final Revision: Feb 1, 2012; Accepted: Mar 10, 2012

Abstract

Background: Brain abscess in young infants is extremely rare and usually associated with a previous history of bacterial meningitis or septicemia.

Case Presentation: Here we report a cerebellar abscess mimicking brain tumor with atypical clinical and paraclinical presentations. A two-month old previously well-baby boy was referred to us with persistent vomiting, strabismus and developmental regression. The brain imaging showed a right cerebellar mass with multiple small cysts inside the lesion. Elevated serum alfa-fetoprotein associated with cystic and solid posterior fossa mass proposed the preoperative diagnosis of teratoma but tumor cells were not found inside the pathology specimen. The culture of the sample was positive for *staphylococcus aureus*.

Conclusion: The interest of this case lies in the atypical features of clinical and radiological evaluations in a young infant associated with an abnormal alfa-fetoprotein level of serum.

Iranian Journal of Pediatrics, Volume 22 (Number 4), December 2012, Pages: 539-542

Key Words: Brain Mass; Staphylococcus aureus; Infancy; Fetoprotein

Introduction

Intracranial mass lesion in early infancy is very rare which may include hemorrhage, infection (abscess), congenital or developmental disorder and brain tumors^[1,2]. Congenital intracranial tumors are rare too. Even rarer are those with prenatal manifestation. The most common intracranial tumors presenting at birth or early infancy are teratomas. Alfa fetoprotein (AFP) has an important role in the initial diagnostic evaluation as well as in the follow-up of these tumors^[3]. Brain abscess is a focal, intracerebral

infection that begins as a localized area of cerebritis and develops into the collection of pus surrounded by a well-vascularized capsule. Uncommonly in children, it occurs after infection of a contiguous structure, such as otitis, sinusitis and mastoiditis or as a result of hematogenous spread from a remote site, especially in children with cyanotic congenital heart disease or after meningitis^[4,5].

Here we report a rare cerebellar abscess in a very young infant which mimicked a tumor in laboratory and radiological investigations.

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Case Presentation

A 2-month old male infant was presented to Children's Medical Center with enlarging head circumference, persistent vomiting, strabismus and developmental regression since two weeks ago. He was the second child born from non-sanguineous parents by cesarean section due to being repeated. His mother had a normal pregnancy without any antenatal risk factors. He found two and four centimeters head enlargement during the first and second month of life respectively. At admission his vital signs were stable. He lost social smile and neck righting during the next two weeks. He had weight loss in this period due to persistent vomiting and poor feeding. The child was irritable with wide and tense fontanel and a setting sun eye was present. The anterior fontanel was 4×5cm wide and the posterior fontanel measured around 1 cm. He had no prior history of fever, skin infection, ear discharge, trauma or bleeding tendency. He had not received antibiotics so far.

Examination of central nervous system did not reveal any cranial nerve palsy or focal neurological deficit except for right side VIth nerve palsy and setting sun eye. Cardiovascular and respiratory system were within the normal limits except for small patent foramen ovale that was suggested to be managed conservatively. Hemoglobin was 12mg/100ml, white blood cells count were 12170/mm³ with 72% polymorphs, 1% band cells, and platelets 300,000/mm³. The sedimentation rate was 12 mm/h and C-reactive protein negative. Serum AFP was 629 μ gr/l (reference range for this age: 0-20 μ gram/l) and coagulation tests were normal. Cerebrospinal fluid (CSF) taken from ventricles was totally normal without high AFP level. Brain computed tomography scan revealed left cerebellar hypodense non-homogenous mass with severe hydrocephalus and periventricular edema. Magnetic resonance imaging (MRI) demonstrated a right cerebellar non homogenous mass, which occupied most part of the right cerebellum; it had cystic and solid components, isointense in T1-weighted and isointense to hyperintense in T₂-weighted images with patchy ring enhancement. The lesion was herniated from the foramen

magnum (Fig 1, 2). Chest X-ray and ultrasound of abdomen were completely normal.

A cerebellar tumor, most probably teratoma, was thought to be the most likely diagnosis. External ventricular drainage was inserted and midline suboccipital craniotomy performed to remove the mass. There was no adhesion between pia mater and dura mater. A purple gray mass was evident from the surface, no cerebellar cortex was found at the surface. The mass had different solid and cystic non-suctionable components with moderate hemorrhage. Some cysts contained yellow odorless thick fluid that was sent for

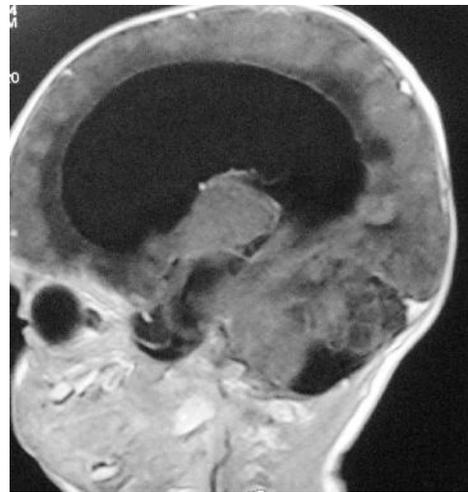


Fig. 1: Sagittal view, T1 weighted image reveals hypo to isointense cystic and solid mass of posterior fossa with hydrocephalus.

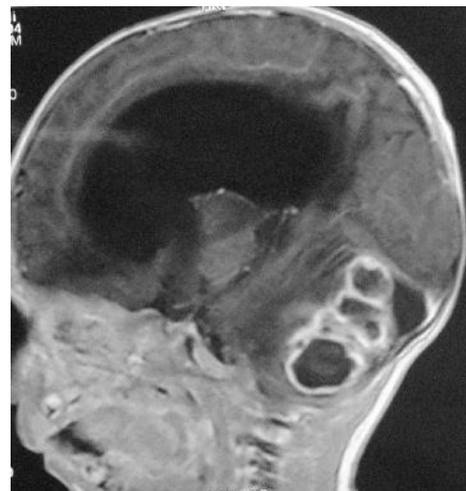


Fig. 2: Sagittal view after gadolinium injection shows irregular ring enhancement of the cystic part

culture. The mass destroyed all right cerebellar tissue except for the superior surface and extended to the lateral wall of fourth ventricle. It was removed totally. Postoperative period was unremarkable except for partial right facial nerve paresis and occasional fever that recovered after one week with antibiotics. *Staphylococcus aureus* was cultured from the cyst material that was sensitive to vancomycin and amikacin. Treatment was carried out with vancomycin 60 mg/kg in four divided doses and amikacin 15 mg/kg in three divided doses for 4 weeks. Pathological examination revealed granulation tissue, fibrosis, inflammatory infiltration and gliosis without any tumor cells inside the specimen. HIV Elisa and assessment of cellular and humoral immunity to rule out immunodeficiency were normal. Serum AFP became unremarkable after three weeks. Follow-up MRI six months after surgery was free of disease.

Discussion

We have reported a young infant with staphylococcal cerebellar abscess that mimicked tumor according to elevated serum AFP and neuroimaging. Ring-enhancing lesion in the cerebellum can be inflammatory or neoplastic process which should be differentiated due to different treatment and prognosis.

Alfa-fetoprotein is a glycoprotein produced in the embryonic liver, intestine and yolk sac. It is not produced after birth. The normal half-life of AFP is around 4-6 days, disappears rapidly after birth and approaches to adult level after about the 10th month of life. An elevated serum AFP strongly suggests the presence of primary liver cancer or germ cell tumor^[2,3].

Brain abscesses include 2-5% of intracranial mass lesions, mostly located in the cerebrum but involve cerebellum uncommonly. Intracranial abscesses occur very rare in neonates and young infants. The most common causative organisms are gram-negative bacteria (*Proteus*, *Klebsiella*, *Citrobacter*) in the first months of life while *Staphylococcus aureus* is rare^[3-6]. Usually infant's status is not good and in spite of all evolution in

the diagnosis and treatment the morbidity and mortality are still significant in this age group^[6]. Bacteria can reach to the intracranial space through hematogenous spread, meningitis, penetrating trauma, surgery, or local spread from the paranasal sinuses, mastoid air cells or emissary veins^[4,5].

Cerebellar abscess in the children is seen mostly subsequent to otogenic diseases with high mortality and morbidity due to inability to control the infection and posterior fossa compression. Meningitis, cyanotic heart diseases are the other common predisposing factors^[5,7]. Cerebellar symptoms and neurological problems of intracranial hypertension due to 4th ventricle compression are expected signs and symptoms of cerebellar abscess but young infants and neonates may not exhibit these neurological symptoms.

The child was a well baby since two weeks before admission without any history of infection. The abscess in this patient was an established lesion with severe damage to adjacent cerebellum that could show a long standing infective process and suggest hematogenous spreading of infection at first days of life or even from placenta in the prenatal period. It can be proposed that bacteria find access to intracranial space through patent foramen ovale. Although it is suggested that in young infants breast milk can be a source for staphylococcus related infections^[8].

AFP levels 4 or more orders of magnitude above normal range in young infants^[2] but the level was more than 10 order of magnitude in this patient. It is suggested that the AFP half life can be longer than normal in some persons specially in low-birth-weight infants which cause higher level of AFP in these infants^[2]. High AFP has not been reported in abscess yet. Our patient was a well developed baby from birth time. There was no history of liver disease or low birth weight and the level of AFP decreased significantly after surgery. So we do not have any explanation for this high level of AFP in this rare case of cerebellar abscess.

Conclusion

A young infant with staphylococcus cerebellar

abscess is reported which mimicked tumor due to elevated serum AFP and neuroimaging. High AFP has not been reported in abscess nevertheless and there is no reason for this high level of AFP in this rare case of cerebellar abscess. To find an explanation for this association we propose evaluation of AFP in young children with brain abscess. If this association is justified AFP can be considered as a marker to follow the course of the disease.

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