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Multiple skull base brain abscess: case report and literature review

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Summary:

Brain abscess is defined as an infectious intracranial suppuration developed from brain parenchyma. It is less frequent but can occur no matter patient's age. The contamination can proceed from ENT infection, through blood stream or via a local entry point. The deep location in infant is exceptional and the treatment is medical and surgical. The surgery aimed in pus evacuation and germ identification, on an emergency mode and usually performed many times. Case presentation: We report a case of an infant aged of 1 month who presented with an intermittent fever since neonatal period, irritability and anorexia. Physical examination finds progressive onset of intracranial hypertension and brain CT scan workup shows multiple skull base abscess with active hydrocephalus. He was treated with a bi antibiotherapy and a draining puncture of the abscess repeated a week later. The evolution was favorable with absence of intracranial hypertension signs in immediate post-surgical follow up. Conclusion: This observation had a double particularity: an infant abscess probably evolving since neonatal period, and his location at the level of skull base leading to hydrocephalus.

Key words: Abscess, skull base, infant, hydrocephalus, surgery

Introduction :

Brain abscess is an entity representing an infectious intracranial suppuration developed within brain parenchyma. Less frequently encountered but can occur no matter the age. It can originates from contiguity with a local infectious site or hematogen dissemination from a furthest infectious location, or direct inoculation of a germ during traumatism or surgery [1;2;3]. The care is medico-surgical. The aim of the surgery is to drain out the pus and to identify the germ. The surgery is done in emergency and can be performed many times as necessary. The onset of such infection during neonatal period is exceptional. The authors report here the case of an infant of one month old admitted in the neurosurgery department of Niamey National Hospital for progressive onset of intracranial hypertension syndrome on a long run feverish context during neonatal period.

Observation:

We report the case of a male infant, aged of one month on term of a poor managed pregnancy. The mother being hospitalized several times for anemia and fever. The delivery took place at home without healthcare assistance. The infant did not present with an updated immunization booklet as the Enlarged Program of Immunization (EPI) procedure. Few days after delivery the child presented an intermittent fever, incessant crying and vomiting, making the parents to seek attention of a healthcare provider in the health center of their locality. At two weeks old, the child presented convulsions more and more intense sometimes during fever. Looking at the clinical presentation he was referred to the neurosurgical department of Niamey National Hospital where he is admitted. On admission, physical examination finds an infant aged of one month with axial atony, 41 cm of skull circumference with a progressive onset, bulged anterior fontanel, vomiting, and hyperthermia of 39°C, convulsion and opisthotonos attitude.

A brain CT scan performed showed an intraparenchymal bilobed lesion respectively 24.5 and 19.4 mm of great axis surrounded with an important edema. This lesion had a peripheral enhancement after contrast. The content, homogenous, appeared hypodense and necrotic. We also noted a tetra-ventricular dilatation with trans ependymal resorption signs (figure 1). The full blood count noticed a hyperleukocytosis of 27,000 WBC/mL highly neutrophils, and an anemia at 7.5 g/dL microcytic and hypochromic. The C-reactive protein level was at 37 mg/L.

The diagnosis retained was skull bas brain abscess leading to an active acute hydrocephalus. An abscess drainage was indicated. After a blood transfusion of 75cc of full blood, the infant was prepared and transferred to the operative room. In the supine position under general anesthesia, we performed a left trans eyebrow incision, reclination of subcutaneous tissue, incision of the periosteum, setting of the autostatic retractors, trephination. Using a Cushing trocar, we punctured and drained out about 500 mls of thick and yellowish pus and then the closure of the operative site. The cytobacteriologic work up of the pus pointed out cocci gram + and a 3rd generation cephalosporin (ceftriaxone) was set at 100mg/kg coupled with metronidazole 40mg/kg for four weeks, and an aminosid (gentamycin) at 5mg/kg during 5 days. The evolution was favorable with the improvement of intracranial hypertension signs and the fontanel which was less tensed one week after surgery. At the end of fourth week, we noted the relapse of convulsions leading to a new brain CT scan work up. The later showed a remained part of the brain abscess at the skull base (figure 2). The staff

decided for another surgery and the patient was admitted to the operative room where a draining puncture was performed.

An enteral antibiotherapy made up of cefixime 8 mg/Kg/day and metronidazole 40 mg/Kg/day was put in place, added to Valproate Sodium 30 mg/Kg/day. Immediate follow up was favorably marked by a satisfactory weigh gain and the absence of convulsions. One year later, we had a good psychomotor development and no convulsion was reported by the parents.

Discussion:

Neonatal onset of brain abscess is rare, C. Levavasseur [4] and al reported three cases over 10 years: The first one concerns a eutrophic child born at term presenting at the fifth day of life with a fever. Citrobacter diversus was found in the CSF work up. A left fronto-parieto-occipital abscess was diagnosed on day 16 through brain RMI. The abscess puncture drained out 60 mls of pus and the same germ was found after bacteriologic analysis. The second one was born at 32 WA of a twin pregnancy. At day 5 of life, the child had a septicemia due to Enterobacter cloacae. On the twentieth day, convulsions revealed a meningitis due to the same bacteria. On day 45, the brain CT-scan showed a ventricle dilatation with a left occipital abscess. The third one is about a child born at 37 WA with a birth weight of 2820 g. On the fifth day post of life, he presented with a fever. In the CSF work up they isolated Proteus mirabilis For these three cases reported by the author, diagnosis was done during neonatal period. Our patient was not able to access proper care early. So despite the early clinical signs he could get his imagery done at one month. He actually had progressive onset of cranial hypertension on an infectious context. In the literature, there is no specific permanent signs letting suspect such disease. The most expressive clinical presentation is the one with the cranial hypertension symptoms led by heavy headaches, general and/or local infectious signs and focal neurologic signs or convulsions [5]. For imagery work up, we performed only the brain CT-scan since the MRI is somehow difficult to execute because of its long procedure need be that the infant should be calm and immobile. Many authors performed the brain MRI with diffusion sequences coupled with spectroscopic work up to optimize the brain abscess diagnosis [6]. The brain CT-scan help to identify multiple lesions and to plan for the surgery procedure, also to follow up the patient on treatment and adjust the therapy if need be [7].

This pathology is a neurosurgical emergency looking at the random evolution and the mortality risk due to brain herniation or rupture in subarachnoid spaces or ventricles. However there is no consensus for the therapeutic procedure as far as this is concerned. The surgical technique could be limited to draining puncture [8, 9], which is the one we used for our patient. The choice for this procedure as guided by the accessibility of thee abscess through this simple technique. Chaoui and al. [10] also performed a simple puncture-drainage over 59.72% of his series. Evacuation through endonasal-transethoidal-sinusal approach of frontal abscesses is possible for intraparenchyma and epidural abscesses if they have a thick shell in contact with the skull base. It is a mini-invasive procedure relatively simple. This procedure allows a quick isolation of the pathogen and effective drainage of the pus [11]. Looking for the infectious gateway is systematic for the care of such patients. We need to know that the contamination of the nervous system uses three ways: hematogen, neural and contiguity[12].. The gateway identification is not always possible even the isolation of the pathogen [13, 14, 15]. For our patient, the lab isolated a gram positive cocci, and due to lack of antibiogram we did a probabilist antibiotherapy based on ceftriaxone,

metronidazole and aminosid. Other authors also used the same therapy combination [5].

Despite the quick favorable recovery of our patient, we instructed the parents about a regular and long follow up because intracranial infectious process is dreadful with a heavy short term mortality rate around 20%, and in a long run the occur of neurologic impairment and epileptic sequelae up to 35% with intelligence quotient less than 60 for about 30% [16, 17, 18].

Conclusion:

The case we present here reveals a double particularity, the infant abscess probably evolving from neonatal period and the skull base location responsible of hydrocephalus. Despite the deep location, the surgical technique adopted can be relatively simple consisting on simple puncture drainage.

Competing interests

The authors declare no competing interests.

Authors' contributions

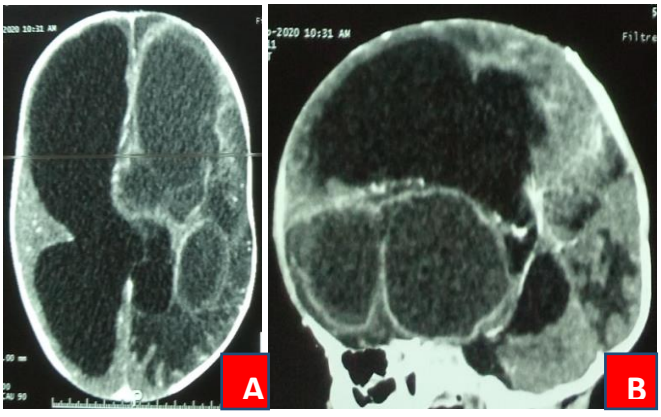
All the authors have read and agreed to the final manuscript.

Figures

Figure 1: Axial A and sagittal B brain CT scan before surgery showing multiple brain abscesses.

Figure 2: . Axial A and sagittal B brain CT-scan post-surgery showing remaining of the abscess

Figure 3: Surgery images showing trans eyebrow approach A and the puncture procedure



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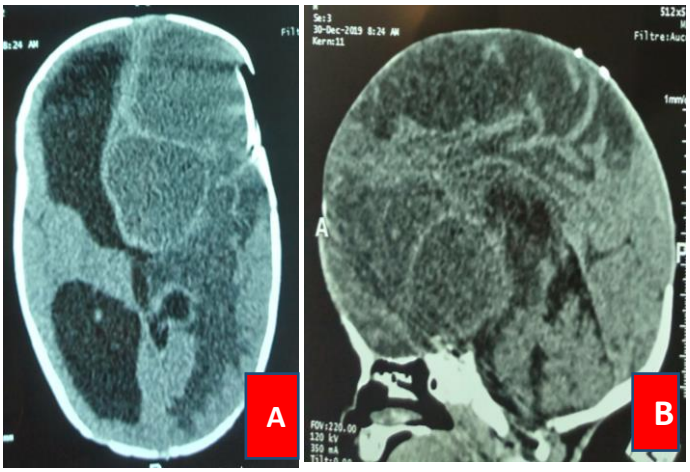

Figure 2: . Axial A and sagittal B brain CT-scan post-surgery showing remaining of the abscess.

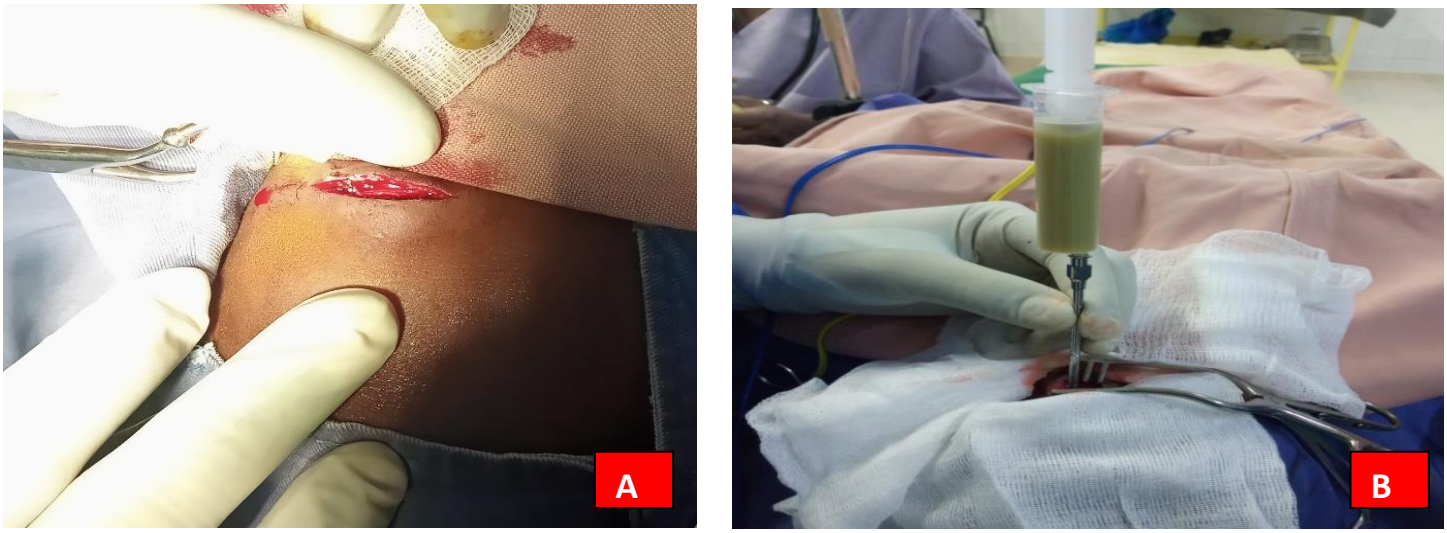

Figure 3: Surgery images showing trans eyebrow approach A and the puncture procedure

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