International Journal of Medical Science and Health Research

Vol. 4, No. 05; 2020

ISSN: 2581-3366

Cerebral Abscesses Complicating Congenital Heart Disease: Report of 2 Cases in the Pediatric Ward of the Mali Hospital.

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Abstract

Introduction

Early diagnosis of congenital heart disease has a positive impact on its development. Brain abscess is a serious, late complication of cyanogenic congenital heart disease.

The authors report two cases of cerebral abscess complicating a tetralogy of Fallot in a 5-year-old child and an interventricular communication in an 11-year-old adolescent in the care of the Mali Hospital.

Clinical cases

Observation 1: He was a 5-year-old boy with a history of dyspnea, admitted with left hemiplegia. A brain scan revealed multiple abscesses. Cardiac ultrasound requested as part of the etiologic workup revealed a tetralogy of Fallot. Surgical drainage associated with sodium valproate: 10 mg/Kgs/12 hours slowly intravenous, ceftriaxone: 100 mg/Kgs/d once directly intravenous, metronidazol injection: 10 mg/Kgs/12 hours slowly intravenous for 15 days, gentamicin: 3 mg/Kgs/d slowly intravenous once for 3 days and motor physiotherapy. Relay was taken orally with ciprofloxacin, metronidazole for 1 month and sodium valproate for 2 years. The postoperative follow-up was simple with a progressive improvement of hemiplegia and persistence of hypoxia.

Observation 2: The patient was an 11-year-old adolescent with a history of ventricular septal defect, admitted with right hemiplegia. A brain scan showed multiple abscesses.

Surgical drainage including ceftriaxone-sulbactam combination: 75 mg/Kgs/d in 2 direct intravenous administrations, methyl prednisolone hemisuccinate 1mg/kg/d in 100 ml slow intravenous saline over 1 hour for 7 days. On the 15th day of hospitalization the abscess was

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operated. The operation was followed by an intracranial hemorrhage. It was detected the same day in a hemorrhagic shock picture.

Conclusion
Brain abscess is a serious and late complication of congenital heart disease in children. The brain scan essential for diagnosis should be routinely requested in hemiplegia in children with heart disease.

Keywords: congenital cardiac abscess-cardiopathies-Mali Hospital.

INTRODUCTION

Congenital heart diseases are malformations of the heart and/or large vessels developed during embryonic or fetal life [1].

Congenital heart disease is the most common congenital malformation. The incidence of 7 to 8 per 1000 births is generally retained, placing them at the top of the list of congenital malformations. This prevalence corresponds to 40% of all fetal malformations. Congenital heart disease is the cause of 50% of deaths in France of all malformations combined [2].

Improvements in prenatal diagnosis, advances in neonatal and lifelong medical and surgical management, and the performance of diagnostic tools such as ultrasound have influenced the current epidemiology of congenital heart disease [1].

Early diagnosis of congenital heart disease has a positive impact on its evolution. Indeed, if they are diagnosed late or untreated, they can become complicated. Depending on the type of heart disease, it can be heart failure, infectious endocarditis, severe polycythemia, stroke or brain abscess[3].

Brain abscess is a classic complication of cyanogenic congenital heart disease described since 1814. It occurs later on beyond the age of 2 years [3].

While Mali has well-equipped neurosurgery services capable of treating brain abscesses, it does not yet have a sufficiently equipped cardiac surgery service capable of treating congenital heart disease in children.

We report two cases of cerebral abscesses complicating a tetralogy of Fallot in a child of 5 years of age and an interventricular communication in an 11-year-old adolescent, diagnosed and treated at the Mali Hospital.

CLINICAL CASES

OBSERVATION 1

M.M. was a 5-year-old male child hospitalized for left hemiplegia. His parents had no known medical or surgical history. In his perinatal history, he was born of a pregnancy that was carried to term without major incidents. He had not been resuscitated at birth. In his medical history we

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ISSN: 2581-3366

noted the notion of stress dyspnea and staturo-ponderal delay. His psychomotor development was normal. MM was the 3rd child of a sibling group of 3 and his siblings were doing well.

The onset of the disease was about 10 months ago, marked by headaches and intermittent fever. He was treated for malaria and typhoid fever in their referral health center without success. When he developed left hemiplegia, he was referred to us for treatment.

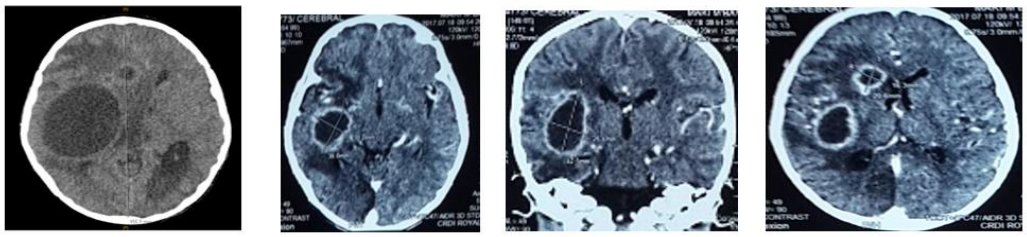
On admission the temperature was 36.2°C. He weighed 14 kg for a height of 112 cm with a body mass index of 11.2 (lower for his age). He had an anterior arch of the rib cage with a respiratory rate of 20 cycles/mn. Hemoglobin oxygen saturation was low (76% in air). Heart sounds were regular with an intense systolic murmur at the mitral site. He had a digital hippocratism.

Neurologically, he was conscious, well oriented and coherent. He presented a left hemiplegia with abolition of osteotendinous reflexes. His upper and lower incisors were decayed. The rest of the clinical examination did not reveal any major peculiarities.

To sum up, this was a 5 year old child who was hospitalized for chronic exertional dyspnea, staturo-weight retardation in whom the examination revealed an anterior arch of the rib cage, digital hippocratism, oxygen saturation at 76% under air, systolic murmur and left hemiplegia.

Two diagnostic hypotheses have been evoked, namely a brain abscess in congenital heart disease and stroke in sickle cell disease. In order to support the diagnosis, some additional tests were requested.

A brain scan was performed, as an emergency measure. It was done without and with injection of contrast product due to 1ml/Kg. Coronal and sagittal reconstructions were performed in a parenchymal window. It revealed straight-collected cerebral abscesses with perilesional edema (Figure 1 A, B, C, D).



Fiure 1 A B C D

Figure 1 A: Cerebral scanner: right temporoparietal hypodense process of oval shape with crown with a mass effect on the surrounding structures.

Figure 1 B: cerebral scan injected axial section showing a right temporal abscess with peri-lesional edema.

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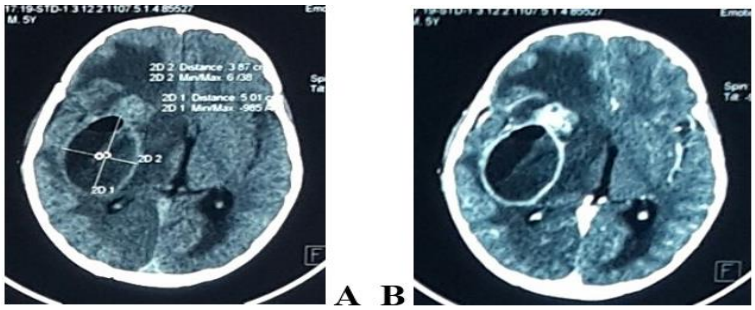
Figure 1 C: Cerebral CT scan with injected coronal section showing a right temporal brain abscess with peri-lesional edema.

Figure 1 D: cerebral scan, injected axial section showing two abscess foci: frontal and temporal right with peri-lesional edema and discrete subfactorial engagement.

The haemogram showed a polyglobulism at 15600000/mm3, a haemoglobin level of 14.4 g/dl and haematocrit at 42.9%. White blood cells were at 8000/mm3 and platelets at 248000/mm3. The C-reactive protein was positive at 96 mg/L. Hemoglobin electrophoresis was normal. Cytobacteriological examination of the fluid drained from the abscess was sterile.

Abscess puncture aspiration with saline injection (Figure 2 A,B) combined with medical treatment including sodium valproate: 10 mg/Kg/12 hours slowly intravenous, ceftriaxone:100 mg/Kg/day once directly intravenous, metronidazol injection: 10 mg/Kg/12 hours slowly intravenous for 15 days and gentamycin: 3 mg/Kg/day slowly intravenous once for 3 days was instituted. The relay was taken orally with ciprofloxacin, metronidazole for 1 month and sodium valproate for 2 years. Motor physiotherapy was started.



A B

Figure 2: Post-drainage brain scan axial section before and after injection of contrast material passing through the lateral ventricles and the 3rd ventricle showing a moderate decrease in the volume of the largest abscess with intracystic reshaping made of liquid level, liquid topped by a gaseous component secondary to the intracystic injection of physiological saline after aspiration.

The operation was simple with a progressive improvement of the hemiplegia and a persistence of hypoxia. The control brain scan showed small straight temporal and occipital porencephalic cavity with slight atrophy of the adjacent parenchyma (Figure 3). Our limited technical facilities did not allow us to do the tetralogy.

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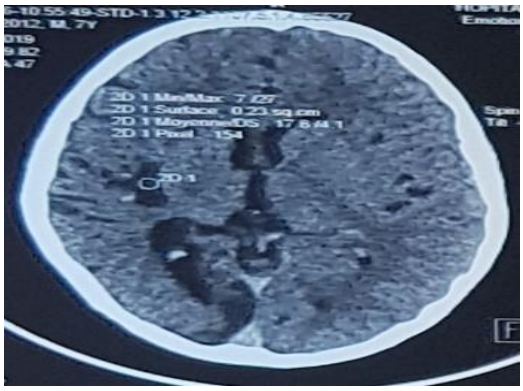

Figure 3: Cerebral CT scan axial section passing through the lateral ventricles and the 3rd ventricle after injection of contrast medium showing post abscess sequellae lesions.

OBSERVATION 2

N D was an 11-year-old male adolescent hospitalized for right hemiplegia. His parents were peasants, all with known hypertension. N D was the 8th child of a sibling of 10. Two brothers had died in early childhood in febrile convulsions. The other siblings were doing well. ND was a Koranic student with good psychomotor development. He had a history of ventricular septal defect communication diagnosed at 6 months of age. The onset of the illness was about 3 weeks ago and was marked by intermittent fever, left temporal headaches and gingivorrhagia. When right hemiplegia appeared, he was referred to us for better management.

At the entrance, he weighed 17.9 kg for a height of 136 cm and a body mass index of 9.5 (lower for his age). The temperature was 37.2°C. He had a digital hippocratism and an anterior thoracic arch. He had severe hypoxia with hemoglobin saturation at 66% under air. His respiratory rate was normal at 20 cycles/min. He had tachycardia at 108 beats/mn and intense systolic murmur at the mitral site. Neurologically, he was conscious, coherent and well oriented. He had right hemiplegia with retained tenderness. The osteotendinous reflexes were sharp on the right with the presence of Babinski's sign. Otorhinolaryngological and oral examinations were normal. The rest of the clinical examination was without major peculiarities.

In total, the patient was an 11-year-old adolescent with a history of ventricular septal defect who was admitted with headache fever and right hemiplegia. Two hypotheses were put forward:

- a cerebrovascular accident complicating endocarditis in the field of ventricular septal defect;

- a cerebral abscess complicating ventricular septal defect.

To support the diagnosis a cerebral CT scan without and with injection of contrast agent due to 1ml/Kg was urgently requested. Coronal and sagittal reconstructions were done in a parenchymal window. It revealed irregular coalescent and communicating star-shaped cystic images from the left thalamic region to the homolateral paramedian cortical parietal level accompanied by

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significant peri-lesional edema and moderate mass effect on adjacent structures and the midline (Figure 4 A, B, C, D) and (Figure 5 A, B).

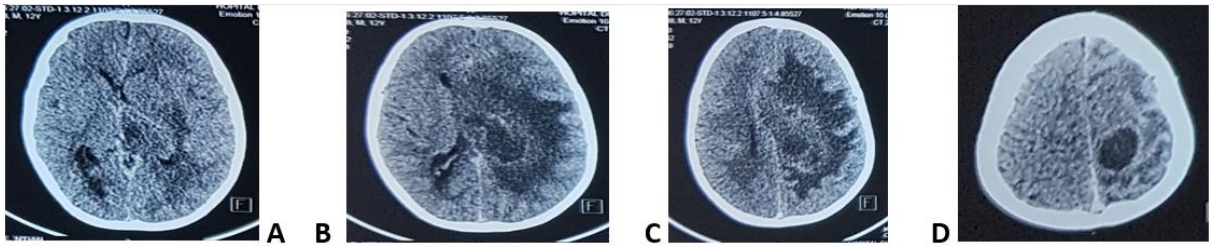

Figure 4: Axial section brain scan without injection showing spread coalescent and communicating irregular cystic images accompanied by significant peri-lesional edema.

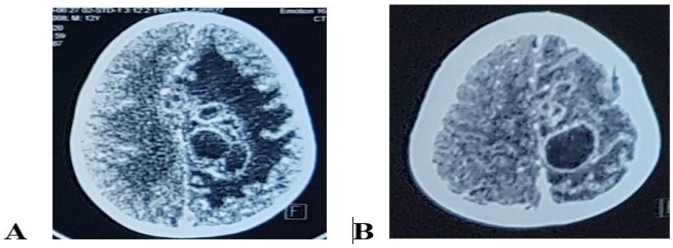

Figure 5: Brain scan axial sections after contrast medium show intense peripheral contrast of spread coalescing and communicating irregular cystic images.

The blood count showed anemia at 8.8g/dl normocyte normochrome. Blood cells were 92/mm3 and platelets were 100000/mm3. Prothrombin level 64.6%, activated partial thromboplastin time was 33.2 seconds, bleeding time was 35 seconds. Creatinemia was 37µmol/l, azotemia was 3.59 mmol/l. HIV serology was negative.

Cardiac ultrasound control showed a 16 mm ventricular septal defect with no significant valve disease and no thrombus or pulmonary arterial hypertension.

Medical treatment included the combination of cetriaxone/sulbactam 75 mg/kg/day direct intravenous in 2 administrations, methyl prednisolone hemisuccinate 1mg/kg/day in 100 ml of saline in slow intravenous serum over 1 hour for 7 days.

On the fifteenth day of hospitalization, he was operated on. The surgical technique performed was the aspiration of pus from the abscess. They removed 20 ml of pus. The postoperative course was complicated by meningeal hemorrhage (Figure 6). He died the same day in hemorrhagic shock.

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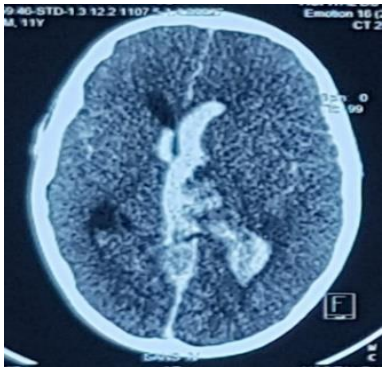

Figure 6: Cerebral CT scan axial section showing bilateral meningeal and subependymal hemorrhage of medium abundance with mild obstructive bi-ventricular hydrocephalus.

DISCUSSION

Congenital heart disease is a major public health issue in developing countries because, in addition to very high morbidity and mortality, it entails considerable financial and social costs in its management [4].

Their incidence is estimated at 7-8 per 1000 births, which places them at the forefront of congenital malformations [2,5]. Congenital heart diseases are characterized by their greatest polymorphism. Most of them are benign with either a septal defect (interventricular communication) or an isolated valvular malformation (aortic narrowing). Some heal spontaneously or after surgery. These heart diseases could be described as "simple"[2].

2] Others, on the contrary, are qualified as "complex" because they are accompanied by major changes in the cardiac architecture. It may be an association of several anomalies such as Falot's tetralogy which associates interventricular communication with pulmonary stenosis, dextroposition of the aorta and hypertrophy of the right ventricle [2].

These malformations are serious and life-threatening, requiring one or more surgical interventions sometimes resulting in severe disability [2].

Today, a greater number of these congenital heart defects are accessible for antenatal diagnosis [1,6,7].

Radiological imaging plays a fundamental role in the diagnosis of these malformations. It is ultrasound coupled with Doppler, which provides the most precise information and is the key examination for morphological analysis [2].

Congenital heart disease, whether diagnosed late or untreated, can be complicated. Depending on the type of heart disease, it may be heart failure, infectious endocarditis, severe polycythemia, stroke or brain abscess. The brain abscess in particular is a collection of pus in the cerebral parenchyma. It is a classic complication of cyanogenic congenital heart disease [3].

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Polyglobulia and hypoxia are risk factors. The starting point is often a small site of softening. Any fever with headache, even in the absence of neurological signs, should be investigated for brain abscess. The absence of a pulmonary filter is probably a contributing factor [8].

The diagnosis is confirmed by transfontanel ultrasound in newborns and infants and especially by brain CT and MRI scans. In case of abscess by contiguity or of pulmonary or unknown origin, streptococcus, aerobic, anaerobic are found in 30-50% of cases, enterobacteria (10-15%), bacteroides (10-15%), fusobacterium (5-15%), Haemophilus (5%). In case of cutaneous, post-traumatic, post-surgical entry proteins the main causes are staphylococcus aureus and enterobacteria. In 5-10% of cases there are several bacterial agents involved and in 20-30% of cases no infectious agent is isolated [9].

The treatment is based on prolonged intravenous antibiotic therapy specific for the responsible germ(s) and with good cerebral diffusion associated with puncture aspiration of the abscess [10,11]. Symptomatic treatment is essential it is based on water restriction at the beginning between 40-60 ml/Kg/d. Anti-epileptic treatment is systematic for many authors. Phenobarbital or intravenous dihydan at the beginning to have an effective serum level for a short period of time if there is no epileptic seizure [9].

The evolution of the brain abscess remains severe with 2% death, 50-60% severe sequelae among the survivors (hydrocephalus, motor deficits, epilepsy, severe cognitive deficits) [9].

We report 2 observations on cerebral abscesses complicating congenital heart disease. These were a 7 year old child with a tetralogy of Fallot revealed by brain abscesses and an 11 year old adolescent with isolated interventricular communication which was discovered at the age of 6 months. These modes of discovery have been described in the literature by Iselin [2] and some authors, notably Cohen-S [1]. Cerebral abscess is a serious and late complication of congenital heart disease that has become rare in developed countries because most congenital heart disease is diagnosed antenatally and operated on early [3,8]. While brain abscess complicates the tetralogy of Fallot at about 2 years of age [8,12,13], it has been described as a complication in adult ventricular septal defects by A. Chantepie [14]. The diagnosis of brain abscess was made in our 2 patients with headache, fever and hemiplegia. It was confirmed by the cerebral angioscanner which showed multiple abscesses. Multiple cerebral abscesses most often result in an alteration of consciousness masking the classic signs of the disease (headache, motor deficit) [9]. Our patients had no altered consciousness. The abscess operation was favorable in the child who had a tetralogy of Fallot, it was fatal for the one who had interventricular communication. Our technical platform did not allow us to operate on their cardiopathies.

CONCLUSION

Brain abscess is a serious and late complication of congenital heart disease. Its diagnosis must be evoked in front of headache and fever in children suffering from cyanogenic heart disease and confirmed by medical imaging, which is now very efficient. This improves the prognosis of these brain abscesses, which remain serious.

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