

# A Giant Calcified Subdural Empyema, a Complication of Ventriculo Peritoneal Shunt: Surgical Management and Revue of Literature

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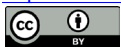
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## Abstract

Subdural empyema is not a usual complication of ventriculo peritoneal shunt and the discovery of his calcified form is much exceptional in young adults. We report the case of a female patient of 17 years old carrying a shunt since 16 years who was received for retro auricular suppuration facing the intra ventricular drain and whom cerebral CT-Scan shows a right hemispheric calcified empyema. A large craniotomy was realized in the same time than an external ventricular drain. Evolution was marked by minor right body motor troubles and seizures. Difficulties we have faced during the management are a reminder about morbidity due to the insertion of a ventriculo peritoneal shunt and the need of and long term follow up for the carriers.

## Keywords

Giant Calcified Empyema, Ventriculo Peritoneal Shunt

## 1. Introduction

Subdural empyema represents 13% to 25% of intracranial bacterial infection [1]. It realizes an extra cerebral suppurated collection which can be clinically expressed by seizures, focal neurological deficit and sometimes infectious syndrome [2]. If in most cases, it results from neighborhood infections through the emissary veins, it can be a brain surgery complication [3]. Ventriculo peritoneal shunt is the standard treatment in malformative hydrocephalus and realizes a communication between ventricles and peritoneal cavity. Infectious complications are found in between 2% and 10% of the case, however, empyema is a rare

complication of ventriculo peritoneal shunt [4]. Chronic calcified subdural empyemas are extremely rare [5]. Although it is difficult in anatomopathological, clinical and radiologic levels to differentiate them from subdural calcified hematomas, this work represents the second publication about chronic calcified empyema following a ventriculo peritoneal shunt in young adults.

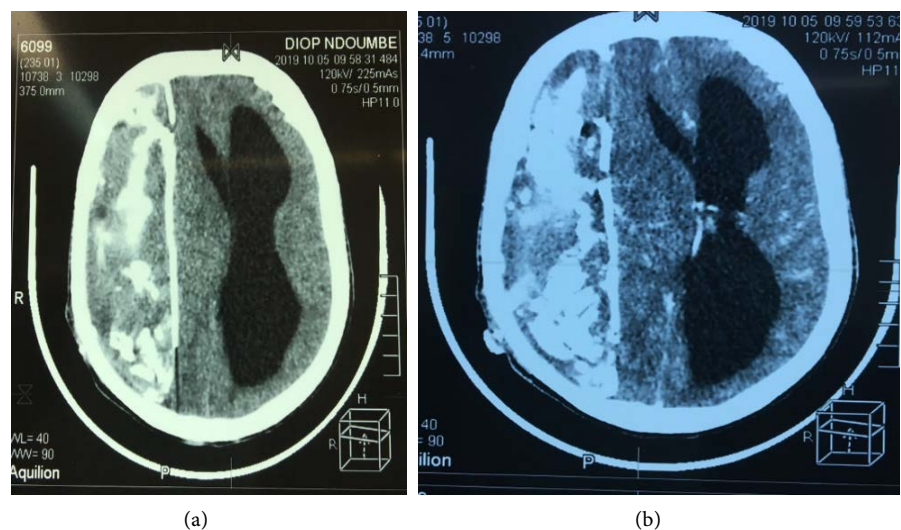
## 2. Case Presentation

A 17 years old female patient was seen on October 8<sup>th</sup> 2019 for right retro auricular suppuration evolving since one month. She was complaining for headaches vomiting and chills since 3 months without improvement under analgesic treatment. She carries a ventriculo peritoneal shunt since she is 7 months old for malformative hydrocephalus.

On examination she was conscious with light slowness, brisk deep tendon reflexes in all limbs. We notice 62 cm for head circumference and a suppurated retro auricular puncture wound facing ventricular drain. Furthermore the ventriculo peritoneal shunt reservoir was depressible.

The cerebral CT-Scan sequence without contrast was showing a right hemispheric isodense image with internal and peripheral hyperdensity corresponding to calcification and the sequence with contrast almost shown the same lesions. However we notice an important mass effect on median structures and intraventricular catheter presence (**Figure 1**). The blood test found an inflammatory syndrome with raised C-reactive protein elevated at 14.2 mg/L.

The diagnosis of a right hemispheric giant calcified empyema which complicates a ventriculo peritoneal shunt was made and a large craniotomy associated with an extra ventricular drain after ventriculo peritoneal shunt removal was then performed.



**Figure 1.** Preoperative without contrast CT scan (a) showing an isodense right hemispheric lesion with internal hyperdensity and midline shift with right hemisphere displacement (b).

Craniotomy concerned the right hemisphere and discovered a thickened dura mater covered in his internal face by calcareous deposits. His opening shows a pasty greenish yellow pus which hardly come by suction. It finally remains a thickened calcareous wall pressed against the external surface of the brain. We hardly take off by fragmentation.

Even though the drain tip culture and pus was sterile a double antibiotherapy based on Third Generation Cephalosporin and imidazole was initiated for 3 weeks.

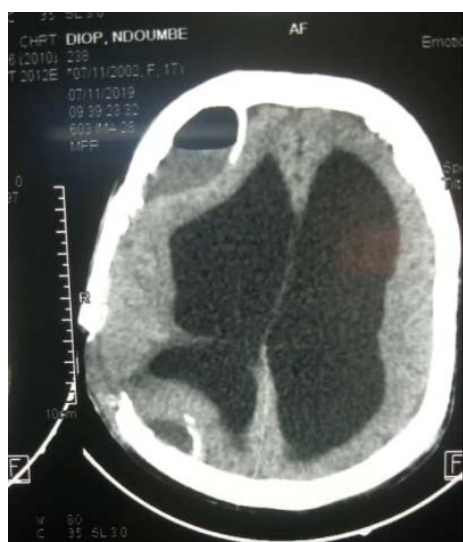
Immediately in postoperative, the patient presented right hemiparesis (estimated to 4/5 on Medical Research Council scale) and seizures which require physical therapy and phenobarbital prescription that lead to complete deficit resolution and seizures regression a month after surgery.

Control CT-Scan realized 8 days after surgery show right hemispheric reexpansion and mass effect reduction (**Figure 2**).

### 3. Discussion

Subdural giant calcified empyema due to a ventriculo peritoneal shunt realized 16 years ago is exceptional. Its etiopathogenesis is not totally mastered. We related it to bloodshed during the ventriculo peritoneal shunt placement contaminated by subclinical meningitidis. The only similar case was described ten years ago in India by Kasliwal and Al in a female patient of 17 years old who carries a ventriculo peritoneal shunt since 10 years with the same etiopathogenesis [6]. The infection secondary progress to the scalp by contiguity.

Process of calcification in subdural empyema as in subdural hematoma isn't well known. This process takes 3 to 12 month after pus constitution and is influenced by local factor as blood stase associated to venous drainage default [7]. Boyd and Merrel think in addition that it exist metabolic predisposition to



**Figure 2.** Post operative CT scan showing brain volume reexpansion.

calcification correlate to connective tissue thickness [8].

The contrast between imagery results and the relative conserved clinical state testimony of the insidious character of this complication and present a therapeutic issue. Indeed after the ossification stage, those lesions stop to grow and some author discuss the necessity of surgery [9] [10]. Surgery was motivated by intracranial hypertension sign and dermal suppuration.

Partial right hemiparesis deficit and seizures are linked to cortical irritation during surgery.

#### 4. Conclusion

The cause of giant subdural calcified empyema as complication of ventriculo peritoneal shunt is not totally mastered. It has a slow and insidious evolution that can hide the gravity of brain damage. Seizure and motor disorders can complicate its removal surgery.

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#### Conflicts of Interest

On behalf of all author, the corresponding author states that there is no conflict of interest.

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