

# Management of a large superficial brain abscess with repeated aspirations.

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## Abstract

Management of brain abscesses is still an issue of debate. Large superficial abscesses should be totally extirpated through a craniotomy. We present a case of a 66-year old man with a brain pyogenic abscess, without neurological symptoms and signs, without positive cultures, larger than 4cm in size, located superficially who was treated successfully by two repeated aspirations without intracavitary application of antibiotics. We conclude that it is effective to treat a large superficial in capsular stage brain abscess with repeated elective aspirations, since the clinical picture of the patient is mild.

## INTRODUCTION

By definition a brain abscess is an intraparenchymal collection of pus. The incidence of brain abscess varies from 1-2% of all intracranial space occupying lesions in developed countries, to 8% in the developing countries<sub>1</sub>. Development of a brain abscess requires inoculation of an organism into the brain parenchyma in an area of devitalized tissue or in a region with pure circulation. The lesion evolves from an early cerebritis to organization and capsule formation stage<sub>2</sub>. Predisposing causes are otitis media, congenital cyanotic heart disease and paranasal sinusitis<sub>3</sub>.

We present a case of a patient with a large superficial brain abscess without neurological deficits, who was treated with repeated aspirations.

## CASE PRESENTATION

A 66 year old man was admitted in our hospital because of headache, which was lasting for two years with worsening one week before the admission, due to a space-occupying lesion. Brain CT revealed a lesion in the right occipital lobe of 4-5cm in size with significant perifocal edema (Fig. 1). Brain MRI revealed a cystic hypodense with ring enhancement lesion. A-fetoprotein was elevated 14ng/ml (normal value 10ng/ml), CRP was not elevated while WBC was  $16,2 \times 10^3/\mu\text{l}$  (69,2% NE).

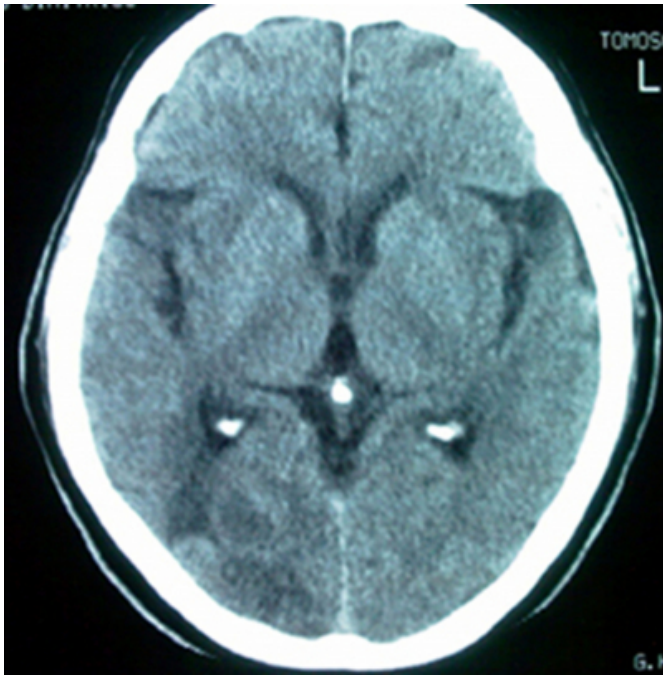
Free hand biopsy was performed in order to establish diagnosis. During the operation the first laboratory results

showed that the lesion was an abscess. Careful and gentle aspiration of the content was carried out. Cytological examination of the fluid revealed degenerated glial cells, extended necrosis, signs of inflammation and many serpedinous in shape proliferated capillary vessels without malignant cells. This abscess was of unknown origin and no primary inflammation focus was found. Following aspiration of the pus the patient made a rapid and full recovery without fever. He received general antibiotic therapy. Two days after aspiration the patient had no headaches. Two months later the patient was readmitted for a second aspiration of the brain abscess. After that at a follow up of six months the abscess had resolved.

Although the superficial localisation and the size of the abscess we decided to manage the patient with repeated aspirations because of the good laboratory values and his good general condition.

**Figure 1**

Figure 1: mass lesion in the right occipital lobe



## DISCUSSION

The diagnosis, treatment and prognosis of patients with brain abscess have improved during the last two decades because of technological advances in medicine like computerised tomographic scanning, refinements in microbiological techniques and the use of antibiotics, although antibiotics have not solved entirely the problem of brain abscess.

The mode of management of brain abscess continues to be under discussion<sup>4</sup>. There are many therapeutic approaches for brain abscess management with the goal to eradicate the pus collection. Successful non-surgical management of brain abscess is being reported<sup>5</sup>. Surgical management include: craniotomy with primary extirpation and resection of the abscess membrane<sup>6</sup>, burr hole craniotomy and aspiration of pus with or without insertion of a drain<sup>6</sup>, stereotactic aspiration<sup>6</sup>, ultrasound-guided aspiration<sup>7</sup>, endoscopic aspiration<sup>8</sup> and stereotactic endoscopic aspiration<sup>9</sup>.

The operative management of intracerebral abscesses remains controversial, with both primary radical excision and repeated aspiration having their advocates. Primary excision was first reported by Sargent in 1928. Black et al advocated surgery especially in larger brain abscesses because of the failure of non surgical management<sup>10</sup>. At open operation the abscess is widely incised, all pus removed from within the capsule as well as any daughter loculi. Maurice Williams believes that open evacuation is the safest

and most satisfactory way of treating the majority of cases of brain abscess<sup>11</sup>, since it offers immediate and adequate cerebral decompression. However, simple therapeutic approaches like twist drill/burrhole aspiration with or without insertion of a drain are also quite effective.

The mortality reported after operation for brain abscess is still as high as over 40%, and the survivors may be left with disabling neurological deficits<sup>12,13</sup>, due to the tentacular extensions of the capsule into the surrounding edematous white matter, which can cause extensive damage to cerebral tissue.

Aspiration involves a much smaller initial operation. It can be carried out under local anaesthesia if the patient is in a poor general condition. It may do little to lessen the mass effect of the abscess, especially if the pus is thick. Even if the pus is watery, much may be left behind after aspiration. At best, aspiration requires repeated procedures<sup>14</sup>. Aspiration alone is associated with a risk of late recurrence of the abscess in up to 8% of cases<sup>15</sup>.

Rupture of abscess cavity into the ventricles due to delay in repeat aspiration and increase in the surrounding edema leading to abrupt herniation were the main causes of death in most of the series<sup>16</sup>. Epilepsy is a possible complication that necessitates treatment and medical attention. Seizures have been reported in up to 50% of the cases<sup>3</sup>. The proliferation of bacteria within the central core of necrotic material is said to be one of the causes of increase in the surrounding edema<sup>17</sup>. Boviatsis et al.<sup>18</sup> have observed recurrence in 8.33% cases after CT-guided stereotactic aspiration. Kaplan et al.<sup>19</sup> have observed that bleeding in brain abscess can occur due to inflammation or damage of the fragile neovasculature of the abscess wall.

In our case both the risks were eliminated by performing repeated elective aspiration of abscess. Follow up CT scan showed reduction in the size of abscess cavity, fragmentation of the capsule and decrease in the surrounding edema.

Yamamoto et al.<sup>20</sup> stated that multiple dose administration of antibiotics and prior drainage of pus significantly increased the antibiotic concentration within the abscess cavity.

Stereotactic aspiration is appropriate for small, deep seated abscesses or those located in eloquent regions of the brain, because it provides a direct and rapid access to the abscess through a predetermined route. Endoscopic method has the

advantage of allowing direct visualization of abscess cavity. Fritsch et al.<sup>8</sup> have suggested that the neuro-endoscopic treatment of brain abscesses has additional advantages as compared to stereotactic aspiration. It allows more complete drainage and lavage. Gajdhar and Yadav<sup>21</sup> have stressed out that the direct visualization of abscess cavity is possible and the completeness of evacuation can be assessed. Although conventional burrhole aspiration or twist drill aspiration and lavage are very effective in the management of brain abscesses, endoscopic aspiration appears to be a safe and effective alternative method of treatment.

Hellwig et al.<sup>22</sup> concluded that the results of endoscopic stereotaxy in brain abscess were encouraging as compared to the conventional microsurgical techniques and pure stereotactic techniques.

Excision is required in large superficial abscesses resistant to multiple aspirations, post-traumatic abscess with a foreign body or fistula and multiloculated abscess of nocardia or actinomycotic etiology.<sup>6</sup>

Confirmation of diagnosis and monitoring of treatment response with magnetic resonance spectroscopy may allow greater number of patients to be managed with medical treatment in future.<sup>6</sup>

From our case we suggest that repeated elective aspiration of pus and multiple dose oral administration of antibiotics are effective for the management of large capsulated superficial abscesses in patients with mild neurological picture.

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