

Pyogenic Brain Abscess and its Management

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Abstract

Forty-five cases of Brain abscess diagnosed were treated by elective aspiration through a burr hole and intra-cavitary application of antibiotic. Repeated aspiration was needed in 30 cases and in only 05 cases surgical excision of abscess along with capsule was done. Mortality in our series was around 11%. Cases with otogenic/sinusitis as causative factors did better than those cases, which were due to haematogenous spread. Corticosteroids were not used in the management protocol. Five cases needed care in ICU with ventilatory support, 03 of which died.

Key Words

Brain abscess, Aspiration, Antibiotics.

Introduction

Brain abscess prevalence is estimated to be between 0.18-1.3% based on the autopsy studies in USA.(1) Brain abscesses account for 1 in 10,000 hospital admissions. 10-50% patients are having multiple abscesses.(1) The diagnosis, treatment and prognosis of patients with brain abscess have drastically improved in the last two decades because of technical advances. Surgical management varies from aspiration to excision of abscess.

Material and Methods

During a span of over 5 years (June 1995 to August 2001), 45 cases of pyogenic brain abscess were treated. In all these cases a detailed clinical examination was done. (Table III) Relevant investigations were done to find out the source of infection. CT scan showed abscesses in various stages, a stage of cerebritis to complete capsule formation. On the same day, abscess was aspirated through an appropriately placed burr hole. After aspiration, 1:10 solution of Gentamycin 3ml was put in the abscess cavity. Repeat aspiration was needed

in 30 cases out of 45, after doing their serial CT scans. Antibiotics were given according to culture sensitivity. In cases where no growth was detected, Ceftriaxone with Gentamycin or Amikacin were given in antimeningitic doses. Injectable antibiotics were given initially for two weeks, later to be followed by oral therapy for 4 weeks.

Additionally patients were given anticonvulsants and Mannitol as decongestant therapy. Corticosteroids were not used. Only 05 cases needed surgical excision of the abscess. (Table IV) 05 cases needed ICU care with ventilatory support. Three of these cases ultimately died. The patients were discharged after 2-3 weeks and reviewed on monthly basis in OPD. Cases with Otogenic/Sinusitis as source of infection were sent back to ENT specialist for treatment of the source.

Results

In 60% of cases abscess developed after contiguous spread of infection. Foci included otitis media/mastoiditis

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in 40% cases, sinusitis in 20% and in 20% no source of infection was identified (Table II). In 2 cases traumatic introduction of bacteria caused abscess. In 15.6% cases there was haematogenous spread of infection from lungs, congenital heart disease and pelvic infection. Most of the patients were in the age group of 30-40 years with exception in congenital heart disease cases (<4 years of age). Out of 45 cases, 05 were having multiple abscesses. Microbiological pattern of 45 cases in the study group is shown in Table I.

Table I : Showing type and percentage of bacteria

Type of Bacteria	Percentage of cases
Staph aureus	15%
Enterobacteria	10%
Streptococci	50%
Bacteroids	10%
No organism detected	15%

Table II : Source and site of infection with their percentage

Source of infection	Site of infection	Percentage
Otitis media/mastoiditis	Temporal lobe/ cerebellum	40%
Sinusitis	Frontal lobe	20%
Penetrating cranial trauma	Related to wound	4.4%
Congenital heart disease/ Lung infection/Pelvic infection	MCA Distribution	15.6%
Not known		20%

Table III : Showing clinical presentation of the patients

Symptoms/Signs	Percentage
Headache	70%
Fever	55%
Focal Neurodeficit	40%
Nausea/vomiting	30%
Seizures	50%
Nuchal rigidity	25%
Papilloedema	40%

Table IV: Various modes of treatment in the study group

Mode of treatment	Number of cases
Single or two Aspirations	10
Repeat Aspiration	30
Excision	05

There was no clinical deterioration after aspiration. Follow up scan showed shrinkage of the abscess cavity with decrease in surrounding oedema. The follow up period varied from 03 months to 06 months. After 03 months there was no clinical or CT evidence of abscess. On follow up, 80% cases had no neurological deficit. Mild to moderate focal deficit continued in 20% cases. Incapacitating deficit was seen in 01 case. The mortality was around 11%, as we lost 05 patients.

Discussion

The mode of management of brain abscess continues to be under discussion. Successful non-surgical management of brain abscess is currently being reported.(2,3) Rosenblum and Black *et. al.* (4) advocated surgery especially in large brain abscesses. Various surgical procedures have been advocated for the management of brain abscesses with variable results. (6-8) Current treatment includes aspiration, appropriate antibiotics, treatment of the sequelae and eradicating primary source. Small abscesses (<3cm), deeply located, poor surgical risk patients, patients with diagnosis firmly confirmed by the CT scans should be treated medically. Encapsulated abscesses more than 3 cm, presence of significant neurodeficit or mass effect, doubt in diagnosis are best treated with aspiration. Excision is required in large superficial abscesses resistant to multiple aspirations, post-traumatic abscesses with foreign bodies and multi-loculated abscesses. Stereotactic aspiration is being tried in deep-seated abscesses.

Srinivasan *et al* (9) reported 37 cases of capsular stage of brain abscess treated with the repeated aspiration and intra-cavitary application of antibiotics. Grigonades *et al* (10) reported a mortality of 35% in the brain abscess due to streptococci pneumoniae. Cacko & Chandy (11) reported stereotactic aspiration of multiple brain abscesses. Sharma *et al* (12) reported 38 cases with multiple brain abscesses, out of which 12 needed surgical excision with an overall mortality rate of 32%. Kim *et. al.* (13) reported ability to differentiate brain abscess

from cystic or necrotic brain tumors with MR spectroscopy. Haines et al (14) reviewed MR imaging and CT scan of 14 patients with surgically verified pyogenic brain abscesses. Fischer *et. al.* (15) reviewed 94 cases of pyogenic brain abscesses in children and found CHD, otitis media as main sources of infection in children. Bansal *et. al.* (16) reported a child with right parieto-occipital Astrocytoma capped by a large abscess with a flimsy capsule. Rajshekhar *et. al.* (17) reported successful stereotactic management of brain stem abscess. Despite various modalities of treatment, we are contented with aspiration of the abscess as a first line of treatment except in a traumatic brain abscess with a foreign body inside.

The mortality in our series was 11%. High mortality could be due to moribund condition of our patients at the time of admission. Duma *et. al.* (6) reported 0% mortality in their series treated by image guided stereotactic aspiration. Rupture of abscess in the ventricles, delay in treatment and increase in surrounding oedema are main causes of death in most of the series.(18) Proliferation of bacteria within central core of necrotic material is said to be one of the causes of increase in surrounding oedema.(19) Our study also supports the report by Kala *et. al.* (20) that local application of antibiotics within the abscess cavity has beneficial effects. Yamamoto *et. al.* (21) states that multiple dose administration of antibiotics and prior drainage of pus significantly increases antibiotic concentration in the abscess cavity.

Since aspiration as a procedure has low mortality and morbidity, it is recommended as primary line of treatment for pyogenic brain abscess; reserving excision for select cases.

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