ORIGINAL ARTICLE

PREDISPOSING FACTORS, CLINICAL PRESENTATION AND OUTCOME OF REPEATED ASPIRATION IN CEREBRAL ABSCESS THROUGH A DRAINAGE TUBE *IN SITU*

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Background: Cerebral abscess is a serious and life threatening complication of several diseases. Aspiration of the abscess cavity versus excision of capsule are still in debate for the capsulated, large, superficially located abscesses especially in patients with poor surgical fitness. The objective of this study was to look for the clinical presentation and outcome of patients with repeated aspiration in cerebral abscess through a drainage tube *in situ*. **Methods:** This prospective study was conducted in Department of Neurosurgery, Ayub Medical College, Abbottabad from Jan 2010 to Jun 2011. Twenty-three patients with age ranges 6–21 years who had large, solitary, capsulated, superficially located abscesses, were included in this study. These patients had poor American Society of Anaesthesiologists (ASA) grading (grade III and IV). After thorough clinical examination and workup, patients were subjected to operative procedure. The procedure included placement of 8 size nasogastric tube in the abscess cavity through a single burr hole. Under strict aseptic conditions, repeated aspiration of pus was done through the drain daily for 2–4 days consecutively at intervals of 24 hours. The demographic data, predisposing factors, clinical presentation, and outcome of patients with repeated aspiration through drain placed in abscess cavity were recorded. Postoperatively, gadolinium enhanced CT-scan was done twice in the first month at the span of two weeks each, later on monthly for next 3 months. The CT-scans were reviewed for recurrence or any other possible intracranial complications. Patients were followed for duration of 3 to 6 months. **Results:** The predisposing factors found were congenital heart disease in 7 (30.4%) patients, spread of contagious infections like mastoiditis/Chronic suppurative ottitis media in 5 (21.7%) patients, sinusitis in 2 (8.6%) patients, meningitis in 5 (21.7%) patients, septicemia in 3 (13.7%) patients, and penetrating cranial injury in 1 (4.34%) patients. In 16 (69.5%) patients presenting complaints were headache and vomiting, altered sensorium in 8 (34.7%) patients, hemiparesis in 9 (39.1) patients, aphasia in 3 (13.1%) patients, papillodema in 2 (8.7%) patients, and seizures in 1 (4.34%) patients. The abscess resolved in 19(82%) of patients, recurrence occurred in 2 (8.7%) of patients, and death occurred in 2 (8.7%). **Conclusion:** Cerebral abscess is a life threatening condition requiring aggressive management measures. Aspiration of cerebral abscess with repeated aspiration through a drainage tube is a life saving in patients with poor ASA grade with low recurrence of abscess formation and low mortality.

Keywords: Cerebral Abscess, brain abscess, aspiration of brain abscess**.**

INTRODUCTION

Brain abscess is an intraparenchymal collection of pus. Brain abscess accounts for about 8% of intracranial masses in developing countries, where as in the west the incidence is 1–2%.[1–3] Brain abscess usually results from spread of infection from contiguous non-neuronal tissue, haematogeneous seeding, and by direct introduction into the brain after trauma of surgery.[4,5] Development of the brain abscess requires inoculation of the organism into the brain parenchyma in an area of devitalised brain tissue or in a region with poor microcirculation. The lesion evolves from an early cerebritis stage to the stage of organisation and capsule formation.[6]

The basic principles of treatment are appropriate antibiotics with or without aspiration and treatment of sequel of brain abscess like hydrocephalus, seizures etc., with eradication or treatment of primary source of the infection if any. The choice between conservative versus operative treatment is influenced by age, neurological status, location, number, size and stage of abscess formation.[7] Currently, abscesses with diameters of more than 25 mm are being treated surgically followed by appropriate antibiotics; with systemic antibiotics given for 6–8 weeks or 2 weeks of intravenous antibiotics followed by up to 4 weeks of oral therapy.[8]

The present study was carried on patients with solitary, superficial, large abscesses, to see the predisposing factors, clinical presentation, and outcome of aspiration of brain abscesses with repeated aspiration through a drain placed in abscess cavity.

MATERIAL AND METHODS

This prospective descriptive study was conducted in the Department of Neurosurgery, Ayub Teaching Hospital

Abbottabad from January 2009 to June 2011. The inclusion criteria were: a) superficially located single brain abscesses, b) abscesses with diameters more than 25 mm, c) ring enhancement on contrast CT as an indication of capsule formation, and d) patients with ASA grade III and IV. Thorough clinical examination of the patients was performed and complete workup to evaluate the source of infection was done. The patients were subjected to the operative procedure after taking written informed consent about the procedure and inclusion of data for research purposes. The procedure included placement of 8 size nasogastric tube in the abscess cavity through a single burr hole. Drainage tube was fixed to the skin and kept under aseptic conditions. Under strict aseptic conditions, repeated aspiration of pus was done through the drain daily for 2–4 days consecutively at an interval of 24 hours. The data were recorded on a specially designed proforma. Patients were followed for 3–6 months. Postoperatively, gadolinium enhanced CT-scan was done twice in the first month at the span of two weeks each, later on monthly for next 3 months. CT were reviewed for recurrence or any other possible intracranial complications.

RESULTS

Among the 23 patients included in the study, 13 were males and 10 were females. Age of the patients was in the range of 6–21 years, mean being 12.3 years. The predisposing factors found were congenital heart disease in 7 (30.4%) patients, spread of contiguous infections like mastoiditis/Chronic suppurative otitis media in 5 (21.7%) patients, sinusitis in 2 (8.6%) patients, meningitis in 5 (21.7%) patients, septicaemia in 3 (13.7%) patients, and penetrating cranial injury in 1 (4.34%) patients (Table-1).

Headache and vomiting was the predominant presenting complaint, found in 16 (69.5%) patients, altered sensorium in 8 (34.7%), hemiparesis in 9 (39.1%) patients, aphasia in 3 (13.1%) patients, papilledema in 2 (8.6%) patients, and seizures in 1 (4.34%) patients. Five (21.7%) patients presented in GCS <10, 3 (13.1%) patients were in GCS 10–14, and GCS of 15/15 was seen in 15 (65.2%) patients (Table-2). On CT scan, abscess were located in parietal lobe in 15 (65.2%), in frontal lobe in 5 (21.7%), in temporal lobe in 2 (8.6%), and in occipital lobe in 1 (4.3%) of patients (Table-3).

The abscess resolved in 19 (82.6%) of patients, recurrence occurred in 2 (8.7%) patients, and 2 (8.7%) patients succumbed to the ailment (Table-4). In one of the unfortunate patients there was intraventricular rupture/dissemination of the pus, and the other one died of septicaemia. Both patients died in first two weeks of the postoperative period.

Table-1: Predisposing factors

Predisposing Factors	Cases	Percentage
Congenital Heart Disease	7	30.4
Mastoiditis/CSOM	5	21.7
Sinusitis	2	8.6
Meningitis	5	21.7
Septicaemia	3	13.7
Penetrating Cranial Injury	1	4.3%

Table-2: Clinical features

Clinical Features	Cases	Percentage
Headache/Vomiting	16	69.5
Hemiparesis	9	39.1
Altered Sensorium	8	34.7
Aphasia	3	13.1
Papillodema	2	8.6
Seizures	1	4.3

Table-3: Location of cerebral abscess

Location of Abscess	Patients	Percentage
Parietal Lobe	15	65.2
Frontal Lobe	5	21.7
Temporal Lobe	2	8.6
Occipital Lobe	1	4.3

Table-4: Resolution and recurrence of abscess

	Patients	Percentage
Resolved Abscess	19	82.6
Recurrence	2	8.7
Mortality	2	8.7

DISCUSSION

Cerebral abscess is a serious and life threatening condition affecting the brain parenchyma. Contiguous spread occurring from the middle ear, mastoid, and sinus is the most common cause of brain abscess in children.[9] Prognosis of patients with brain abscess depends on the anatomic location, number and size of abscesses, stage of abscess formation, age of the patient, and neurological status of the patient. The prognosis is worse for patients with intraventricular rupture, associated meningitis, ependymitis or empyema, presence of hydrocephalus, metastatic abscess, neonates and infants, multiple deep-seated abscesses, and/or congenital cyanotic heart disease.[10–12]

Mehnaz A, *et al*[4] showed in her study that the most common predisposing factor in patients with cerebral abscess is untreated congenital heart diseases, approximately accounting for 24–46% of cases, our study showed the somewhat similar results with 30.4% of patients with cerebral abscess were having congenital heart diseases. Fischer *et al*[15] reviewed 94 cases of pyogenic brain abscesses in children and found congenital heart diseases and otitis media as main sources of infection in children.

Current treatment includes aspiration, appropriate antibiotics, treatment of the sequel and eradicating primary source. Small abscesses <3 Cm in diameter, deeply located ones and patients with poor surgical risk with diagnosis firmly confirmed by the CT scans should be treated medically. Encapsulated abscesses more than 1 Cm, presence of significant neurodeficit or mass effect or in setting when there is

doubt in diagnosis, such cases 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.[13]

Surgical management of cerebral abscess has been revolutionalised significantly in recent decades because of advances in neuro-anaesthesiology and the development of more precise and less invasive surgical techniques. Surgical treatment can either be aspiration of abscess cavity or excision of the capsule. The choice of procedure has been the subject of controversy and debate. In one series of 140 patients, patients underwent repeated aspiration, capsule excision and medical treatment only and mortality did not differ among different treatment groups.[14] In the literature, there is no prospective, randomised study to compare the efficacy and the cost-effectiveness of repeated aspiration of the abscess cavity versus excision of the abscess capsule.

The mortality in our series was 8.7%, which closely relates to the mortality showed by Babu ML *et al*[13] who showed in his study that mortality is 11%. High mortality could be due to moribund condition of our patients at the time of admission. Duma *et al*[16] 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.[17]

Since repeated aspiration is a procedure that has low mortality and morbidity. It can be used as primary line of treatment for pyogenic brain abscess; reserving excision for selected cases. Especially in the cases where abscess is situated in an eloquent area of the brain, the abscess is unilocular, with high intracranial pressure and co-morbid conditions, operative decompression is necessary to save life, and in these instances it is usually advisable to put in a drain.

CONCLUSION

Cerebral abscess is a life threatening condition requiring aggressive management measures. Aspiration of cerebral abscess with repeated aspiration through a drainage tube, though a life saving measure in patients with poor ASA grade, has low recurrence of abscess formation and low mortality. No hard and fast rules can be laid down since our sample size is low. Each case must be individualised till large randomised control trials are available.

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