

Focal Intracranial Suppuration: Clinical Features and Outcome of 21 Patients

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ABSTRACT

Background

Focal intracranial suppurations are localised infections of the intracranial compartment. Their incidence is decreasing worldwide, but they still pose enormous challenges in management. The objective of this study was to evaluate the clinical features and outcome of treatment in our series of patients with focal suppurations.

Methodology

This is a retrospective review of medical records, CT and ultrasound scans of cases of intracranial suppurations treated over a 5-year period. Patients admitted to the University of Port Harcourt Teaching Hospital with a diagnosis of intracranial suppuration between 2004 and 2008 were reviewed. The diagnosis was based on radiologic evidence of intracranial collection which was confirmed to be pus following burr hole placement or craniectomy.

Results

There were 21 cases of which 13 were males and 8 were females. Their ages ranged from 1 to 32 years. Impaired consciousness and seizure disorders were the commonest presenting features. Patients who were fully conscious at the time of operation had a better outcome. The mortalities were patients who were comatose at the time of surgical intervention.

Conclusion

Early operation is important in ensuring a favourable outcome.

Keywords: Clinical features; Diagnosis; Focal intracranial suppuration; Outcome

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well as appropriate manpower are relatively inadequate. In Africa, focal intracranial suppurations are reported to comprise about 2 to 5% of all intracranial space occupying lesions¹.

In this short report, the authors present a retrospective analysis of 21 cases of FIS seen over a period of 5 years at the University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria.

PATIENTS AND METHODS

Our study population included patients who were admitted between January 1, 2004 and December 31, 2008. All relevant patient information, including age, sex, presenting features, investigations that were performed, types of suppuration, treatments given and their outcome, were obtained from their medical records. Computerised tomography (CT) or ultrasound scans, where available, were reviewed.

None of the patients was on steroids or medications for any chronic systemic diseases; and none of them had any evidence of immunosuppression

The diagnosis of focal intracranial suppuration was based on positive CT findings or transfontanel ultrasound scan features indicating presence of an intracranial collection, which was subsequently confirmed to be pus at surgery.

All intracranial collections were evacuated by standard methods after placement of appropriate burr holes or following craniectomy. Intraoperatively, antibiotics were instilled into the cavity following removal of pus, and continued parenterally for at least 2 weeks after surgery. Specimens obtained at operation were subjected to culture and sensitivity tests.

RESULTS

A total of 21 patients with focal intracranial suppuration were treated during the period under review. Among these, 13 were males (61.9%) and 8 were females (38.1%) giving a male:female ratio of 1.6:1. Their ages ranged from 1 to 32 years (Mean = 6.1yrs).

Clinical features

INTRODUCTION

Focal intracranial suppurations (FIS) are localised infections within the intracranial compartment. They commonly occur as complications of a wide range of septic lesions of cranial or systemic origin. Sometimes, however, it is not possible to identify a primary source of infection. Even though there has been a gradual decline in their incidence worldwide, FIS continue to pose considerable diagnostic and therapeutic challenges to neurosurgery. This is particularly so in developing nations where facilities for diagnosis and treatment, as

The main features presented by the patients are as shown in Table 1. The most frequent complaint was convulsion, being present in 71.4% of patients. In some of them, it was the sole symptom. Headache and impairment of consciousness were found in 42.9% and 52.4% respectively. Three of the patients had been on treatment for what was thought to be cerebral malaria; but the correct diagnosis was arrived at following performance of brain CT scan on account of their failure to improve with conventional antimalaria treatment.

Types

Of the 21 patients, 13 (61.9%) were found to have brain abscess, 6 (28.6%) had subdural empyema and 2 (9.5%) had epidural abscess. 1 patient had both brain abscess and subdural empyema. In all cases, the collections were located in the supratentorial compartment.

Source of Infection

Chronic suppurative ear infection was the commonest source, being identified in 7 cases. In 8 patients, the primary source of infection could not be determined. See Table 2.

Bacteriology

In 9 patients, culture of the specimen obtained at surgery yielded no growth. The organisms isolated from the specimens of the remaining 12 patients are as shown on Table 3. Streptococcus species were the commonest organisms isolated. In 1 patient, *Pseudomonas aeruginosa* was isolated, but this was thought to be due to contamination during handling of the specimen.

Outcome

11 patients (52.4%) recovered fully and had no residual disability at the time of discharge from hospital. There were 3 mortalities (14.3%) a 1-year-old infant with intracerebral abscess, and two children with subdural empyema (one 7-year-old boy and one 13-year-old girl). All the patients were deeply comatose before surgery and none of them regained consciousness after the procedure. 1 patient had mild residual disability at the time of discharge and 2 had severe disability. It is worth

Table 1. Clinical features

| PRESENTING FEATURES | NO. OF CASES | PERCENTAGE |
|---------------------|--------------|------------|
| Altered sensorium | 11 | 52.4 |
| Convulsion | 15 | 71.4 |
| Fever | 6 | 28.6 |
| Headache | 9 | 42.9 |
| Meningism | 5 | 23.8 |
| Vomiting | 4 | 19.0 |
| Hemiparesis | 7 | 33.0 |

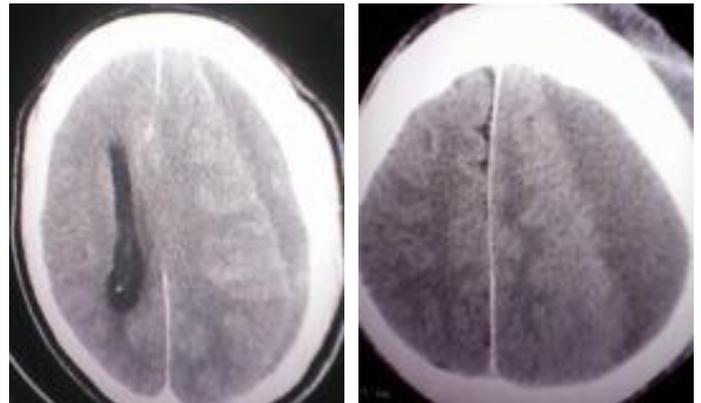
Table 2. Sources of infection in 13 patients with FIS

| Source of infection | Number of cases | Percentage |
|------------------------|-----------------|------------|
| Otogenic | 7 | 53.8 |
| Maxillary sinusitis | 2 | 15.4 |
| Orbital cellulitis | 3 | 23.1 |
| Facial skin infections | 1 | .7 |

Table 3. Causative organisms in 12 cases of focal intracranial suppuration

| Organism | Number of cases | Percentage |
|-------------------------------|-----------------|------------|
| Streptococcus spp. | 7 | 58.3 |
| Staphylococcus aureus | 2 | 9.5 |
| Mixed | 2 | 9.5 |
| <i>Pseudomonas aeruginosa</i> | 1 | 4.7 |

Fig. 1. Brain CT scan (plain) of patient with subdural empyema



Note left fronto-parieto-occipital low density with midline shift and effacement of left lateral ventricle.

noting that all the patients that survived were either fully conscious at the time of operation or they only had mildly impaired sensorium.

DISCUSSION

Suppurative infections of the intracranial compartment including meningitis, cerebral abscess, epidural abscess, subdural empyema, cavernous sinus thrombosis and thrombosis of other dural sinuses, commonly occur as sequelae of otogenic infections, paranasal sinusitis and other infections of cranial or systemic origin. A high index of suspicion is required to recognise these serious complications which are particularly prone to occur in immunocompromised subjects. FIS has also been reported in leukemic patients² and following viral infections³. In Africa and other developing parts of the world, their occurrence may not be unrelated to the level of malnutrition which is so prevalent in these regions and which itself has direct relationship with the

immune response.

Despite the current availability of potent antibiotics and greatly improved techniques for isolation of the aetiological agents and the tremendous advances in neuroimaging, these lesions still carry significant morbidity and mortality⁴.

Brain abscess has been the most frequently reported among the focal suppurations, with subdural empyema and epidural abscess occurring less frequently. This has also been the experience in this series. The presenting features in patients with focal intracranial suppuration depend on the location, size, as well as associated pathologies. They include those of raised intracranial pressure (ICP), focal deficits, convulsion, meningism and altered sensorium. In our series, seizures, altered sensorium and headache were the most common presenting features. There was also a predominance of male patients.

It is worth noting that the 2 patients that died in the series were unconscious at the time of admission and surgical intervention. This is also in agreement with the findings of other workers who have shown that the prognosis is poorer in patients with impaired level of

consciousness preoperatively⁵.

CONCLUSION

This study underscores the importance of appropriate investigation and early surgical intervention in helping to ensure positive outcome in patients with focal intracranial suppuration.

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