

Diagnosis of Space Occupying Lesions of Brain

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Space occupying lesions of the brain can be benign or malignant. Common benign lesions are abscesses (acute or chronic), cysts (arachnoid, parasitic, dermoid) and tumors (meningioma, acoustic neuroma). Common malignant lesions can be either primary or secondary brain tumors. Computerized tomograms (CT) of the brain have made life easy for the neurosurgeons but surely not for the histopathologists. There are various pathological lesions which produces similar radiological pictures (Fig. 1 & 2) on CT scan. Quite often it is not

possible to differentiate glioma and secondary brain tumors from benign lesions e.g. brain abscess and cerebral infarct. No patient should be allowed to die without the pathology being established.[1].

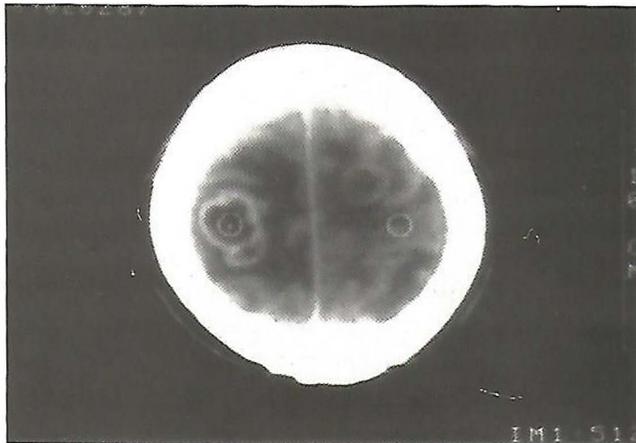


Fig. 1: C.T. Scan brain of first patient showing isodense foci with multiple ring enhancements after contrast.



Fig. 2: C.T. Scan brain of second patient showing isodense area with ring enhancements in posterior occipital fossa.

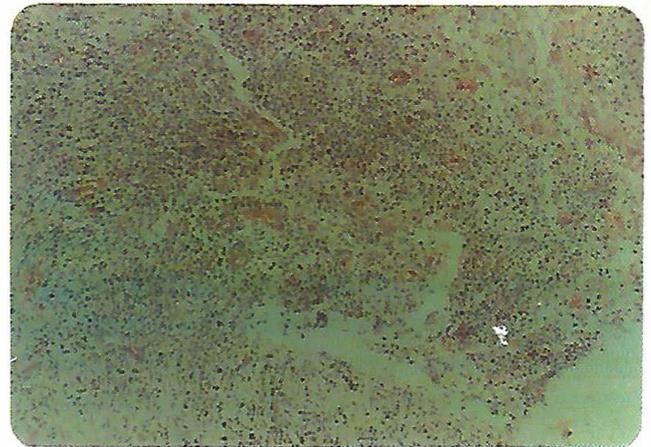


Fig. 3: Granulation tissue surrounded by chronic inflammation.

In the last three months we had a few patients in whom it was difficult to make a diagnosis on radiological findings. We would like to report two such cases.

Case No. 1

A patient aged 40 years presented to a physician at Shaikh Zayed Hospital with headache and vomiting. He also had chest symptoms for the last two months. He had bronchoscopy but this was of no diagnostic help. He was then sent to the neurosurgical out-patient department. He had symptoms of increased intracranial pressure with no detectable physical signs. His CT. scan of the brain showed an enhancing lesion with surrounding wet brain. The site and shape of this lesion was more of a glioma or of a metastatic tumor. A burrhole specimen from this patient was sent for frozen section. It consisted of multiple greyish white pieces of tissue approximately measuring 1.2 cm in aggregate.

Smears and frozen section showed reactive glial tissue with many reactive gemistocytes but no tumor cell was seen. A craniotomy specimen was later sent. This was composed of an irregular soft cystic tissue measuring 4x5x6 cm. On section, the cut surface showed a cystic cavity filled with necrotic reddish brown pus like material. Multiple sections were taken from the wall. Histology showed an abscess lined by granulation tissue which was surrounded by gliosis, chronic inflammatory cells and reactive gemistocytic astrocytes. No malignant cell was seen. This was reported as a chronic non-specific abscess (Fig 3,4).

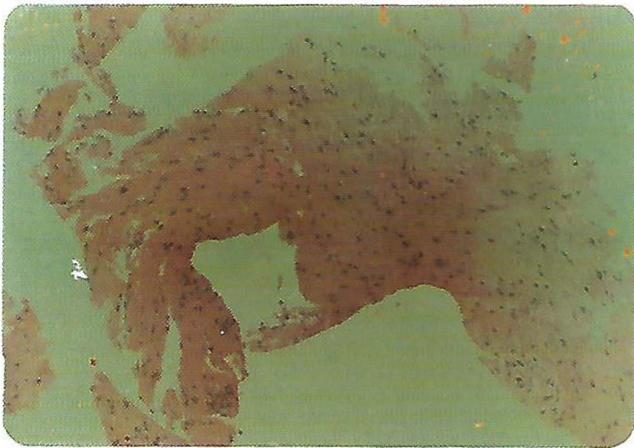


Fig. 4: Reactive brain tissue surrounding the lesion.

Case No. 2

A male aged 35 years was admitted through emergency department with symptoms of increased intracranial pressure. He was drowsy but there was no motor or sensory deficit. The chest X-Ray showed consolidation. He had bronchoscopy twice in another hospital but no diagnosis could be made. CT scan of the brain showed lesion very similar to case No. 1. (Fig. 2) He had craniotomy and specimen from this case was sent for frozen section. This consisted of tiny greyish white pieces measuring 0.4 cm in aggregate. Smear and frozen section were reported as metastatic carcinoma. Tumor measuring 4 x 2 x 0.5 cm was then excised from the right parital lobe. Paraffin tissue examination confirmed it to be poorly differentiated squamous cell carcinoma (Figure 5,6).

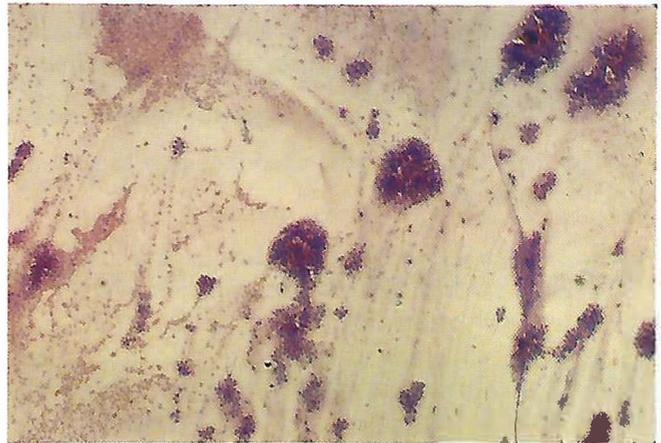


Fig. 5: Smear under low power showing malignant epithelial cells.

DISCUSSION

Brain abscesses fall within the definition of abscesses in general and are caused mostly by pyogenic bacteria[2,3] e.g Streptococcus pneumoniae, Staphylococci and anaerobic Streptococci. Causative organisms not infrequently may be diphtheroids, coliforms, M. tuberculosis, fungi etc. They reach the cerebral tissue, as in meningitis:-

- i) by direct spread following an open skull fracture or transgression of dura and bone from a previous head injury with fracture of the base of the skull.
- ii) Spread from an adjacent focus of suppuration (otitis, mastoiditis, sinusitis) either in direct continuity or through intermediary thrombophlebitis.

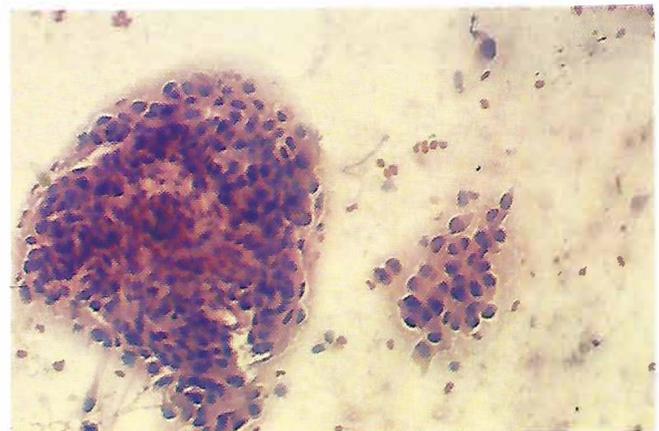


Fig. 6: Smear under high power showing malignant epithelial cells.

- iii) As a result of blood borne dissemination from a distant infective focus (lung, skin, genito-urinary tract).

The localization of brain abscesses may suggest a particular mode of origin.

- i) Post traumatic abscesses occur in situ (cranio-cerebral wounds, Neurosurgical operations etc.).
- ii) Abscesses caused by direct spread from an adjacent suppurative focus are usually situated in the temporal lobe or in the cerebellum where they are secondary to otitis media or mastoiditis. These account for 40% of all brain abscesses [4,5,6]. In the frontal lobe they are secondary to sinusitis or frontal fractures.
- iii) Haematogenous metastatic abscesses are usually multiple & deeply situated. They are most often secondary to bronchopulmonary suppuration, acute or chronic pelvic sepsis, dental abscesses, bacteraemia or suppuration elsewhere in the body [7]. These may be seen in congenital cyanotic heart disease especially in Fallot's tetrad. If the abscess is tuberculous, it is always secondary to tuberculosis elsewhere. Opportunistic fungal dissemination occurs in patients with Acquired Immune Deficiency Syndrome (AIDS) and patients on immunosuppressive drugs. This may give rise to cerebral abscess. The most common infection in such patients is *Toxoplasma gondii* [8] which produces CT. pictures similar to brain abscess.

The two major and most serious complications of brain abscess are:-

- i) Raised Intra-cranial pressure, with the risk of cerebral herniation.
- ii) Rupture of the abscess into a ventricle (ventricular empyema).

Brain abscess is a treatable disease although it involves high mortality and morbidity if treatment is delayed or is inappropriately undertaken [9]. The CT.scan of the brain produces very similar pictures in

brain abscess, infarction and malignant brain tumors. Treatment of the malignant brain tumor is not promising no matter which protocol is followed. If any patient has a lesion which appears to be an abscess, he should have immediate surgical intervention and histological diagnosis to reduce morbidity and mortality. In our first case where a burrhole and a needle biopsy were initially done no diagnosis could be made. A definitive diagnosis could be made only after the second operation. A definitive histological confirmation of the clinical diagnosis is extremely important. CT scan cannot be totally relied on, because benign treatable lesion can be easily mistaken for malignant tumors like glioma or metastasis. Moreover without histological diagnosis appropriate treatment may be delayed or missed altogether with serious consequences. If the patient is too ill or too old for surgical intervention then they should have vigorous medical management presuming the lesion to be an abscess (10).

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