SUMMARY

Brain abscess is a localized suppurative process within the brain parynchyma caused by wide variety of bacteria, fungi, parasites and protozoa.

Brain abscess appear to be increasing in frequency because the growing number of modern and multiple techniques of detection of the intracranial lesions and the growing number of immunocompromised patients caused by opportunistic infections.

The pathogenesis of solitary brain abscess differs from multiple brain abscesses, it is thought that solitary lesions are often the result of an infected parameningeal focus as paranasal sinuses, middle ear or thrombosed venous sinuses and from direct incubation of the brain in trauma and postoperatively, incontrast multiple brain abscesses are more common with systemic infections which are often spread haematogenously, frontal, ethmoidal, sphenoidal sinusitis can cause brain abscess by retrograde thrombophlebitis via valveless veins, however the incidence of brain abscess secondary to, infected parameningeal focus appear to be decreased with more effective treatment with modern era. of antibiotics.

Trauma is a well known predisposing factor for the development of brain abscess, in order to prevent brain abscess as a result of penetrating scalp injuries, perfect debridment of necrotic brain tissue, bone fragments, and other foreign bodies must be done soon after injury, the intracranial abscesses caused by haematogenous spread of infection from distant septic foci such as chronic pulmonary suppuration distant osteomyelitis, bacterial endocarditis, congenital heart disease, pulmonary arteriovenous malformation with right to left shunt, and infected prosthetic devices represent the most frequent primary causes of brain abscess caused by haematogenous spread, however abdominal or pelvic sepsis are very occasionally source of brain abscess.

The organisms responsible for intracranial infection in the immuno-compromised host often differ from organisms none commonly recovered from brain abscesses, there is an increase in so called opportunistic organisms "fungi, parasites and unusual bacteria" that are normally of low virulence and pathogenicity for humans, the central nervous system is vulnerable to destruction by infectious processes and is incapable of mounting a significant defense, brain abscess caused by pyogenic bacterial infection was divided into four stages based on histological criteria, 1st stage "early cerebritis 1-4 days" is the initial response with localized

inflammatory infiltrate with polymorphonuclear leukocytes, lymphocytes and plasma cells which migrate from the peripheral blood circulation, begining in the first day and increasing dramatically by day 3, inflammatory cells appear in the adventitial sheaths of the blood vessels which surround the developing area of infected necrosis, the 2nd stage "late crebritis days 4-9" the most significant histoloigical changes occur during this time, the necrotic centre enlarges because of an increase in the cellular debris and the formation of pus caused by release of enzymes from inflammatory cells at the periphery of necrotic centre, the brain abscess reach the largest size during this stage, the 3rd stage an "early capsule formation days 10-13" in this stage the necrotic centre start to decrease in size and development of the capsule and additional new blood vessels from out side the developing capsule with reactive astrocytes begin to increase in the surrounding brain. From above the fully developed brain abscess have 5 distinct histological zones which are, zone "1" well formed necrotic centre, zone "2" peripheral zone of inflammatory cells, zone "3" dense collagen capsule, zone "4" a layer of neovascular development outside the capsule and zone "5" reactive astrocytosis, gliosis and cerebral edema external to the capsule.

The majority of brain abscesses occur in the first two decades of life because of the congenital heart disease, middle ear and sinus infections are the most common predisposing factors in this age group, in one study 72% of cases between 5-15 years with slightly male predominant, male to femal "2:1".

The presentation of patients with brain abscess vary little whether there are solitary or multiple lesions, the most common clinical symptoms and signs which include seizures, altered mental function, focal neurological deficits or signs of increased intracranial pressure indicate the presence of an intracranial mass lesion, about half of the pt. have a low grade fever.

In the following conditions one should be alert to the possibility of brain abscess, purulent infection especially sinusitis, mastoiditis, chronic otitis media, penetrating scalp injures, nasal or occipital dermal sinus tract and cyanotic heart disease.

Successful management of patients with brain abscess require, early detection, correct time of treatment, detection of predisposing factors and proper follow up.

The following neuroradiological studies are used to be done when brain abscess is suspected.

1-Plan X-ray skull: the common finding in relation to Plan X-ray skull are, fractures, osteomyelitis, bone defect, gas formation and shift of calcified pineal body.

2-Computed tomography : with the advent of C.T. it has become possible to both localize and determine the stage of evolution of the abscess formation.

In a fully developed brain abscess on C.T. scan the capsule is represented by a ring of contrast enhancement surrounded by focal brain edema, a typical ringenhancement usually appear in pyogenic bacterial brain abscess, nodular enhancement associated with a solid granuloma or a small brain abscess. Low density lesions with varying degrees of contrast enhancement corresponding to meningoencephalitis or encephalitis.

3.Magnetic Resonance Imaging M.R.I.. is superior to C.T.scan because it allows earlier detection of the disease, M.R.I. is useful in delineating small multicentric lesions which might otherwise be missed by C.T., it is more sensetive for detection of crebritis stage, the edema of inflammation is seen as high signal intensity on T2 weighted images, however T1 weighted M.R.I. shows the capsule an isointense ring separating the central low intensity abscess cavity and surrounding edema, on the T2 weighted images the pus of the central abscess cavity is seen as very high

intensity separated from the surrounding edema by the hypointense capsule.

Routine laboratory tests are usually not helpful in diagnosing a brain abscess, E.S.R. is elevated in 75 to 90% of cases, W.B.C. usually abnormal in 60 to 70 percent of cases.

The management strategies for patients with brain abscess depend on several important factors. The clinical circumstances of the pt. illness, the location of the lesion and the number of lesions. The aim of treatment of brain abscess is based on eliminating the infectious process while reducing the mass effect caused both by necrosis of brain tissue and by the surrounding cerebral edema, the infection process is eliminated in the majority of cases by surgical interference whether aspiration or excision and by medical treatment in the form of antibiotic therapy. Surgical management consists of excision or aspiration, aspiration is recommended in deeply seated solitary or multiple lesions, bad general condition of the patient, lesions in critical area of the brain and abscess in cerebritis stage.

There is four methods of aspiration, free hand aspiration which recently has little place after the development of stereotactic technique and ultrasound guided aspiration which is was found to

be a simple, quick and low cost method that give reliable results, during the last decade a few reports were published that recommended stereotactic techniques for abscess aspiration, the stereotactic technique seems to have poor mortality rates ranging from 0 to 23%. Stereotactic endoscopy combines the best of both possible worlds, the accuracy of stereotactic guidance and the ability to see the brain.

Excision means craniotomy with excision of the entire abscess is used for, cerebellar abscesses, large superficial well encapsulated, solitary abscess, traumatic brain abscess with foreign material " bone fragments, metalic fragments or other debris" that must be removed to prevent recurrence and fungal brain abscess because the resistance of many fungi to antibiotic treatment.

Although the definitive treatment of brain abscess is operative, it has been suggested that selected patients who are not in imminent danger from increased intracranial pressure may qualify for a trial of non operative therapy however the increasing number of reported nonopertive cures of brain abscesses should not be interpreted as an indication that brain abscesses are a nonoperative disease, because the primary advantage of nonoperative treatment of brain abscesses has been that it avoids the risks of operation and anesthesia. However modern stereotactic

aspiration procedures guided by computed tomography or ultrasound imaging can be performed under local anesthesia so the role of nonoperative treatment is too limited. Follow up of the patient, with serial C.T. scan in the postoperative period should be obtained until resolution of the abscess is documented, in case of aspiration C.T. scan is don 1 to 2 days after aspiration, in nonoperative treatment C.T. scan is done weekly. However ring enhancement disapper 4 weeks after completion of antibiotic therapy, urgent C.T. scan must be done if the patient deteriorates at any time of the course of management.