

OTITIC CEREBRAL ABSCESS

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Nagging has been defined as the "constant repetition of an unpleasant truth". This article has been written not to report anything new or spectacular but to emphasise the "unpleasant truth" that cerebral abscess secondary to ear disease is still with us in the twentieth century A.D. as it was in the time of Hippocrates in the fifth century B.C.

Here, in Singapore, we should be able to prevent the occurrence of this serious condition, and we have the means to diagnose and treat it early should the disease unfortunately occur.

Since, as the hackneyed quotation goes, "prevention is better than cure", the general public should be taught that ear infections are serious conditions and that ear discharges should be treated with respect. The medical profession, of course, need not be reminded of this. It is not uncommon for children and, for that matter, some adults in Singapore to go about with ear discharges for years. Early and adequate treatment of otitis media will prevent its handicapping sequelae, e.g. deafness, and its intracranial complications, e.g. brain abscess.

It has always been said that the first essential step in making a correct diagnosis is to think of it. And this is particularly so where brain abscesses are concerned. A full history, a complete physical examination and the judicious use of investigations, e.g. CSF examinations and cerebral arteriography, will in most cases lead to an early diagnosis.

Where treatment is concerned we have come a long way since the days of Hippocrates. Proper and adequate administration of antibiotics, advances in anaesthesia and surgical technique and blood transfusions have saved countless lives. The close co-operation of the E.N.T. Surgeon is absolutely necessary in the management of these cases.

Some cynic has said that "the diseases of the present have little in common with those of

the past save that we die of them". The following cases are presented to show that this is not always so — one disease of the past is still with us, but we need not die of it.

CASE 1. T.P.H. Male. 14 years old. Admitted on 1.3.1960.

HISTORY

1. Left ear discharge for 8 months, purulent, continuous. No constitutional symptoms. Treated with ear drops.
2. Right ear discharge for 2 weeks. Treated with ear drops and injections.
3. Fever and fits for one day. Associated with vomiting and altered consciousness. No previous history of fits.

PHYSICAL EXAMINATION ON ADMISSION

Temperature 103 degrees F.

Drowsy and irritable. Photophobia.

Head & Neck.

Marked neck rigidity. Kernig's sign positive.

Cardiovascular system. N.A.D.

Respiratory System. N.A.D.

Abdomen. N.A.D.

Central Nervous System.

Pupils dilated, react to light.

Fundi normal.

Reflexes +/+.

P.R. both sides extensor.

DIAGNOSIS

Meningitis secondary to Chronic Otitis Media.

INVESTIGATIONS

B.S.R. 55 mm. T.W. 11,900; D.C. P78, L18, E0, M4%. Hb 80%

Cerebrospinal fluid:

		Cells	Glucose mgm %	T. Pro. mgm %	Glob.	Chlor. mgm %	Smear (P = polys. L = lymph.)	
1.3.60	Turbid	4000	45	240	++	680	P ++++, L +,	No organisms.
2.3.60	Clear	1600	40	200	++	650	P ++++. L +,	No organisms.
4.3.60	Clear	30	50	60	Tr	700	P few, L +,	No organisms.
5.3.60	Clear	60	55	100	+	680	P few, L +.	No organisms.
7.3.60	Clear	850	50	70	+	680	P ++, L ++,	No organisms.
9.3.60	Clear	90	49	100	+	670	P few, L +,	No organisms.
10.3.60	Clear	130	50	70	+	650	P few, L +,	No organisms.
11.3.60	Clear	50	52	100	+	700	P few, L +,	No organisms.
12.3.60	Clear	500	46	120	+	690	P ++, L +,	No organisms.
14.3.60	Clear	140	48	70	+	670	P few, L ++,	No organisms.
16.3.60	Clear	60	46	70	+	680	P few, L ++,	No organisms.
18.3.60	Clear	800	30	80	+	630	P ++, L +,	No organisms.
21.3.60	Turbid	1800	18	120	+	620	P ++++, L +,	No organisms.

Culture of pus from ears: Right—B. Proteus. Sensitive only to Kantrex.

Left —B. Proteus. Sensitive to penicillin, chloromycetin and Kantrex.

Culture of Cerebrospinal fluid—no pathogenic organism grown.

X'ray skull—N.A.D.

TREATMENT

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|---|---|
| <ol style="list-style-type: none"> 1. Inj. penicillin 1 mega units stat and six-hourly. 2. Tah. sulphadiazine 2 Gm six-hourly. 3. Intra-theal penicillin 10,000 units. | <ol style="list-style-type: none"> 4. Chloromycetin caps. 250 mgm six-hourly. 5. Inj. Kantrex 0.5 Gm B.D. 6. E.N.T. opinion. |
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PROGRESS

	Temp.	Mental State.	Neck rigidity	Kernig's Sign	Head-ache	Vomit-ing	P.	R.	Remarks
1.3.60	103	Irritable	+	+		+	↓ ↓		No localising signs.
2.3.60	104.4	„	+	+		+	..		No localising signs.
3.3.60	100	„	+	+		+	..		No localising signs.
4.3.60	100	Conscious	+	+		
5.3.60	100	„	+	+		
6.3.60	101	„	+ +	+		
7.3.60	100	„	+	+		
8.3.60	100	„	+	+		
9.3.60	100	„	+	+		
10.3.60	100	„	+	+		
11.3.60	101	„	+	+	+	+
12.3.60	101	„	+	+	+	
13.3.60	99	Drowsy	+	+	+		? ↑ ↓		..
14.3.60	99	„	+	+	+	+	↑ ↑		..
15.3.60	100	„	+	+	+	
16.3.60	102	„	+	+	+		↑ ↑		? Right facial palsy.
17.3.60	101	Comatose	+	+			— —		
18.3.60	101	„	+	+			↑ ↑		
19.3.60	104	„	+	+			..		
20.3.60	103	„	+	+			..		
21.3.60	104	Comatose	+	+			..		
22.3.60	100	„	+	+			..		
23.3.60	102	„	+	+			..		Died.

NECROPSY

(Dr. Ho Kok Kheong, B.A., M.B., B.CHIR.).

Skull. Purulent discharge from both middle ears.
Left middle cranial fossa immediately lateral to tegmen shows an area of softening with erosion of bone 2 x 1 cm.

Meninges. Dura mater over the above softened area showed a patch of thickened yellowish-red infected granulation tissue.

Brain. Weight 1550 Gm. Grossly oedematous and congested.
Left temporal lobe grossly softened and enlarged, containing thick greenish pus. Flakes of pus may be seen scattered over both cerebral hemispheres.

Cause of death. Cerebral abscess with septic meningitis.

Culture of pus from abscess. *B. proteus* grown.

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CASE 2. T.S.C. Male. 11 years old. Admitted on 10.2.1960.

HISTORY

1. Left ear discharge, purulent, for 8 months. Operation advised by E.N.T. Surgeon but refused.
2. Fever for 20 days.
3. Headache and drowsiness for 10 days.

PHYSICAL EXAMINATION ON ADMISSION

Temperature 101 degrees F.

Drowsy and irritable.

Head & Neck. Marked neck rigidity.
Purulent discharge from left ear.

Cardiovascular system. N.A.D.

Respiratory system. N.A.D.

Abdomen. N.A.D.

Central nervous system. Pupils normal.
Fundi—bilateral papilloedema, more marked on the left side.
Right hemiparesis.
P.R. ↑ | ↓

DIAGNOSIS

Cerebral abscess and meningitis secondary to left Chronic Otitis Media.

INVESTIGATIONS

B.S.R. 63 mm. T.R. 3 million. Hb 56% T.W. 15,000. D.C. P88, L10, M2, E0%.

Cerebrospinal fluid:

		Cells	Glucose mgm %	T. Plo. mgm %	Glob.	Chlor. mgm %		Smear (P = polys. L = lymph.)
10.2.60	Turbid	4800	16	300	++	680	P +++, L +,	No organisms.
13.2.60	Clear	2160	0	560	++	650	P ++, L +,	Gram +ve diplococci
17.2.60	Clear	800	20	200	+	680	P ++, L +,	No organisms.
21.2.60	Clear	460	24	240	++	710	P few, L +,	No organisms.
25.2.60	Clear	80	45	300	++	700	P few, L +,	No organisms.
28.2.60	Clear	180	34	400	++	700	P few, L +,	No organisms.
2.3.60	Clear	180	45	140	+	720	P few, L +.	No organisms.
3.3.60	Clear	100	50	100	+	720	P few, L +,	No organisms.
4.3.60	Clear	80	50	160	+	700	P few, L +,	No organisms.
8.3.60	Clear	130	54	120	+	710	P few, L +,	No organisms.
9.3.60	Clear	140	54	80	+	710	P few, L +,	No organisms.
4.4.60	Clear	15	56	60	Tr	740	P few, L +,	No organisms.
19.4.60	Clear	1	+	40	0	750	Few lymph.	No organisms.

Culture of pus from the ear—*Streptococci* (10.2.1960)

Culture of C.S.F.—*Streptococcus pyogenes* (10.2.1960) Subsequent specimens were sterile.

X-rays—Cranium—N.A.D.

Mastoids—Right normal. Left somewhat dense with poor definition of cells. Appearance can go with sclerosing mastoiditis.

PROGRESS

- 10.2.60 E.N.T. Surgeon (Mr. L.J. Seow) consulted immediately after patient's admission. Systemic and intra-theal penicillin and oral sulphadiazine prescribed. For operation when the intracranial infection is under control.
- 11.2.60 Very irritable. Right limbs flaccid with right facial palsy. S.A.R. diminished on the right side. PR extensor on right side.
- 13.2.60 Drowsy and irritable. Temp. 101 degrees F. Right side still flaccid. P. R.
- 17.2.60 I.S.Q. Temp. 102 degrees F.
- 21.2.60 Still irritable. Complaining of headache. Temp. 99 degrees F. P. R.
- 25.2.60 Conscious. Cheerful. Temp. 99 degrees F. P. R.
- 28.2.60 Complaining of headache. Temp. normal.
- 2.3.60 Drowsy. Temp. normal.
- 3.3.60 Brighter but still complaining of headache. Temp. Normal.
- 4.3.60 More alert. No headache. Temp. normal.
- 8.3.60 Conscious. Right side still flaccid. Fundi—right side no papilloedema; left side disc margins still blurred.
- 9.3.60 Same.
- 16.3.60 Transferred to E.N.T. Ward.
- 23.3.60 Aspiration of left temporal lobe abscess and left incomplete mastoidectomy.
- 19.4.60 Well. Able to walk.
- 11.5.60 Completion of left mastoidectomy.
- 24.6.60 Discharged.
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- CASE 3. C.K.P. Female. 11 years old. Admitted on 26.2.1960.
- HISTORY
1. Right ear discharge for 2 years, off and on.
 2. Right earache for 2 weeks.
 3. Fever, rigors and vomiting for 2 weeks. Was treated with ear drops and injections.
 4. Inability to walk for one day.
- PHYSICAL EXAMINATION ON ADMISSION
- Temperature 100 degrees F.
- Conscious.
- Head & Neck. Neck rigid. Whitish discharge from right ear.
- Cardiovascular system. N.A.D.
- Respiratory system. N.A.D.
- Abdomen. N.A.D.
- Central nervous system.
- Pupils and fundi normal.
- Decreased tone in left limbs. Reflexes +/+
- P.R. extensor response on left side.
- DIAGNOSIS
- Cerebral abscess secondary to chronic otitis media.

INVESTIGATIONS

B.S.R. 33 mm. T.W. 11.300. D.C. P66, L21, E9, M4%.

Cerebrospinal fluid:

		Celis	Glucose mgm %	T. Pro. mgm %	Glob.	Chlor. mgm %		Smear (P = polys. L = lymph.)
26.2.60	Clear	145	45	40	Tr	740	P few. L +.	No organisms.
29.2.60	Clear	40		80			P few. L +.	No organisms.
6.3.60	Clear	5	+	30	Tr	720	P few. L +.	No organisms.
10.3.60	Clear	2	+	30	0	760	Few L.	No organisms.
16.4.60	Clear	4	+	30	0	760	Few L.	No organisms.
17.5.60	Clear	1	+	30	0	740	Few L.	No organisms.

X-rays—Chronic O.M. involving right petrous bone and mastoid with suggestion of perforation of roof.

PROGRESS

- 27.2.60 Drowsy. Temp. 103 degrees F. Diminished tone left side. P.R. extensor both sides.
- 29.2.60 Conscious. Neck not rigid. Temp. 101 degrees F. P.R.
- 3.3.60 Conscious. Temp. normal. P.R.
- 8.3.60 Seen by the E.N.T. Surgeon (Mr. L.J. Seow). For radical mastoidectomy. To continue Systemic and intra-theccal penicillin.
- 27.3.60 Right incomplete mastoidectomy and drainage of extradural perisinus abscess. Recovery uneventful.
- 23.5.60 Right radical mastoidectomy.
- 24.6.60 Discharged.

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The condition of chronic otitis media results from acute otitis which has failed to resolve.

The outstanding symptom is discharge, which may vary from a thin mucopurulent discharge to a thick foul secretion. Deafness is usually present to some degree, but may vary from slight impairment to complete absence of hearing.

Other symptoms may be present, such as vertigo, vomiting or headache, but these are symptomatic of complications, and are produced by the extension of the disease into neighbouring structures.

Complications of otitis media occur:

- (a) as a direct extension of a primary acute otitis media, or
- (b) as the result of an acute exacerbation of a chronic otitis media.

The intracranial complications are perisinus abscess, lateral sinus thrombosis, cavernous sinus thrombosis, extra-dural abscess, brain abscess, meningitis, labyrinthitis and petrositis.

We are here concerned with brain abscesses. By direct extension of infection, the disease may reach the middle or the posterior fossa. There an abscess may be formed which may be extradural. An extradural abscess is rarely diagnosed prior to operation. Abscesses of otitic origin are usually situated in the temporal lobe or in the cerebellum, the former situation being about twice as common as the latter. Much more rarely such abscesses occur in the pons, frontal or parietal lobes.

A cerebral abscess constitutes a foreign body within the skull. Death may result from the effects of continually increasing intracranial pressure and wide interference with cerebral function, or from the spread of the infection from the abscess to the meninges and general subarachnoid space.

The history of the development of the symptoms of an intracranial abscess may be of greater diagnostic importance than the physical signs, which are often slight at the stage at which treatment is most likely to be effective. The history is particularly important when the abscess is secondary to otitis media or mastoiditis. The onset is usually insidious and is apt to be overshadowed by those of the preceding disease.

The onset may be

(a) acute or subacute. After an exacerbation of a pre-existing otitis media, or a temporary suppression of aural discharge, the patient rapidly develops symptoms.

(b) In other cases there is a "latent interval" which may last months before the signs of abscess appear. The existence of symptoms during this period may suggest that all is not well. There may be attacks of headache, loss of appetite and weight, constipation, occasional unexplained pyrexia and a change in temperament.

The symptoms may be divided into the following four groups:

1. Symptoms of local cerebral infection and suppuration.

The severity of the general symptoms is usually proportionate to the acuteness of the abscess.

2. Symptoms of increased intracranial pressure.

(a) **Headache**, is usually present. It is the earliest and most constant symptom. It is paroxysmal, is increased by stooping, coughing, sneezing or exertion. In more acute cases headache may be persistent and very severe until drowsiness begins to dim its severity.

(b) **Vomiting** is a common early symptom. It usually occurs with headache but, especially in cases of cerebellar abscess, it may occur in the absence of any other symptom.

(c) **Mental changes** are common. These vary from slight lassitude, irritability to drowsiness and ultimately coma.

- (d) **Papilloedema** is a late sign and is often absent or slight. When present it is usually more marked on the side of the lesion.
- (e) **Diplopia** may be complained of, and is usually intermittent.
- (f) **Bradycardia** is not common.

3. **Focal Symptoms.** Signs of focal disturbance of the nervous system are less constant and usually later in occurrence than the symptoms of general intracranial disorder. Due to clouding of consciousness and general irritability these signs may not be elicited.

(a) **Temporal Lobe abscess.**

Aphasia—if the abscess is situated in left side in a right-handed person.

Defect in visual fields—a valuable localising sign, usually a homonymous upper quadrantic defect on the opposite side.

Pyramidal tract involvement is slight. Weakness is most marked in the face and tongue. The opposite planter response may be extensor with diminished superficial abdominal reflexes on the side opposite to the lesion.

Epileptic disturbances may occur and may assume an uncinat form.

(b) **Cerebellar abscess.**

There are often great difficulties in localisation. Headache is often suboccipital.

Signs of cerebellar deficiency vary in severity and may be slight, e.g. nystagmus, incoordination and hypotonia.

Pressure on the brain stem may occur leading to compression of cranial nerves, especially the 6th and 7th, and slight signs of pyramidal defect on the opposite side.

CEREBROSPINAL FLUID CHANGES

The cerebrospinal fluid is very seldom completely normal in cases of cerebral abscess and examination of the fluid is often of great diagnostic value.

The pressure of the fluid is raised. When the abscess is localised there is an increase in the amount of total protein and cells (usually not more than 100 per c.mm.). At first the cells are mainly lymphocytes. As the number of cells increases the proportion of polymorphs increases. Finally as the abscess approaches

close either to the ventricle or to the convex surface of the brain, there may be a brisk pleocytosis which causes the fluid to become turbid, but it is still sterile with a normal or slightly reduced content of chlorides and sugar. The finding of a turbid cerebrospinal fluid in which no organisms are seen and which remains sterile on culture is always extremely suggestive of a cerebral abscess. Supervention of generalised meningitis leads to a change in the C.S.F. Cells increase markedly and polymorphs predominate. Chlorides and glucose diminish and organisms may be present.

DIAGNOSIS

In cerebral abscesses secondary to chronic otitis media (i.e. where the causal infective focus is obvious) it is necessary to distinguish abscess from the other pyogenic intracranial complications, e.g. meningitis.

PROGNOSIS

The natural termination of a cerebral abscess which is not drained is in the vast majority of cases the death of the patient. Death takes place from the results of raised intracranial pressure, from acute meningitis from spread of the infection to the general subarachnoid space, or from rupture into the ventricle.

TREATMENT

The treatment of a cerebral abscess is surgical. The condition is one of the greatest urgency, as death may occur at any moment. An acute abscess is ill-defined and if possible a major operation should be delayed for about six weeks to allow the abscess to become walled off. The longer active surgical treatment can be delayed, within reason, the better the eventual outlook. The successful treatment of this condition depends upon allowing sufficient time to elapse for the abscess to become firmly encapsulated, for attempts at drainage in the early stages are often disastrous. During the interval antibiotics are exhibited and aspiration of the abscess to relieve the tension and diminish the danger of rupture into the ventricle may be necessary. Increasing coma or the presence of organisms in the C.S.F. is an indication for operation in the acute stage.

The primary cause of the abscess has also to be considered.

SUMMARY

Three cases of cerebral abscess secondary to chronic otitis media are described to draw atten-

tion to the fact that this condition is still prevalent. The need for its prevention is stressed although it can be adequately treated should it unfortunately occur.

ACKNOWLEDGEMENTS

I wish to record my thanks to Mr. L.J. Seow, F.R.C.S., E.N.T. Surgeon, General Hospital, Singapore, for his advice; to Dr. Ho Kok Kheong of the Department of Pathology, University of Malaya, for performing the necropsy in Case 1.

I am grateful to Pro. E.S. Monteiro for permission to publish this report.

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