

Tuberculoma of the Brain

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Tuberculoma is a peculiar manifestation of tuberculosis which occurs in any solid organ of the body as well as in the lung. It is usually formed by conglomeration of several miliary tubercles, which form around the outer sheaths of the small cerebral blood vessels. The centre of the conglomeration becomes caseous. Caseous material gets inspissated and sometimes liquified. A thick capsule may form around these lesions. The relative frequency of tuberculomas in the brain varies from country to country and its recent decrease in the Western countries must be correlated with the improved health standards, and striking decrease of tuberculosis in general, compared with conditions that prevailed 50 years ago. In India nearly half a million are estimated to die of tuberculosis annually with tubercular morbidity rate of 2½ millions. In 2,473 autopsies, recorded at the Pathology Department, Andhra Medical College (1928-55), 194 were from those who died of tuberculosis. This gives an autopsy incidence of 7.8%.

Varying percentage incidence of tuberculomata of the brain among the space occupying lesions has been given by the authors from various countries and is recorded in Table I. It seems to form a fairly high percentage in India as indicated by recorded literature in our country. On going through the autopsy records of Andhra Medical College from 1928 to 1955 we have observed three cases of tuberculomata out of 22 intracranial space occupying lesions, giving a percentage incidence of 13%.

TABLE I

Country and Author	Intracranial tumours	Tuberculomas	Percentage
1. U.S.A. ; Gushing ² .	2,023	33	1.4
2. England: Wilson ⁹ .	2,190	94	3.6
3. Chile : Asonjo ¹ .	610	97	15.9
4. Spain : Obrader ⁷ .	—	—	7.0
5. Portugal : Imaginario ⁵ .	500	30	6.0
6. India : Gault <i>et al</i> (Vellore) ⁴	100	21	18.0
D. J. Reddy, (Andhra, & Madras)	52	6	11.4
Authors (Andhra Medical College)			
1928-1955.	22	3	13.0

Tuberculoma of the brain may be single or multiple. D. J. Reddy⁸ recorded only one case of multiple lesions among five cases. Asenjo¹ *et al* from Chile in 1951 recorded 33 cases of multiple tuberculomata in 97 verified cases. Multiple tuberculomata associated with plaque like lesions of the meninges are rare, and the following case of multiple tuberculomas of brain associated with plaque like lesions of meninges as observed by us is recorded for its rarity.

Case Report Inclusive of Necropsy Findings

A Hindu male J. A., aged 30 years was admitted in the Medical wards of King George Hospital, Visakhapatnam on 18-1-55 for continuous headache of four months' duration, and a feeling of numbness all over the body. There was no history of fever or cough.

General Examination

Moderately well nourished. Anaemic. Gait somewhat unsteady.

Central Nervous System

The patient's mind was not clear. He could not answer cogently to medical interrogation. Cranial' nerves were normal. Sensory and motor-systems—normal. Signs of meningeal irritation—absent. X-ray skull revealed nothing abnormal.

Other Systems

Cardiovascular and respiratory systems : Nil abnormal.

During the stay of 28 days in the hospital patient had elevation of temperature for 11 days. Temperature was sub-normal on few occasions.

Investigations

Blood pressure	...	130/70 mm. of mercury.	
Blood sugar	...	80 mg. per cent.	
Blood urea	...	30 mg. "	
White Blood Cell	...	Total : 8,800 per cu. mm.	
Count:	Differential count:	Neutrophils	... 83
		Lymphocytes	... 15
		Eosinophils	... 1
		Monocytes	... 1
		Negative for Malarial parasites.	
Faces	—Nil abnormal.		
Urine	—NB abnormal.		
C.S.F.—27-1-55	not under pressure.		
	Gamma globulin-negative		
	Globulin +		
	Proteia 60mg.%		
	Sugar 90 mg.%		
	Chlorides 670mg.%		
	W.R. Negative		
3-2-55	not under pressure.		
	Globulin+		
	Protein 60 mg.%		
	Sugar 90 mg.%		
	Chlorides 620 mg.%		
	Cells-4		
	W.R. Positive.		

Fundus examination did not reveal any abnormality.

Progress under Treatment

No specific treatment was given. The patient has been stupotose since a week after admission. He was taking feeds.

6-2-55: His condition was weak. B. P. fell, to 80/60. 400 c.c. of blood was transfused and¹ B.P. rose to 116/90. P.A.M., 2 c.c. per day for 10 days without any change in the condition of the patient.

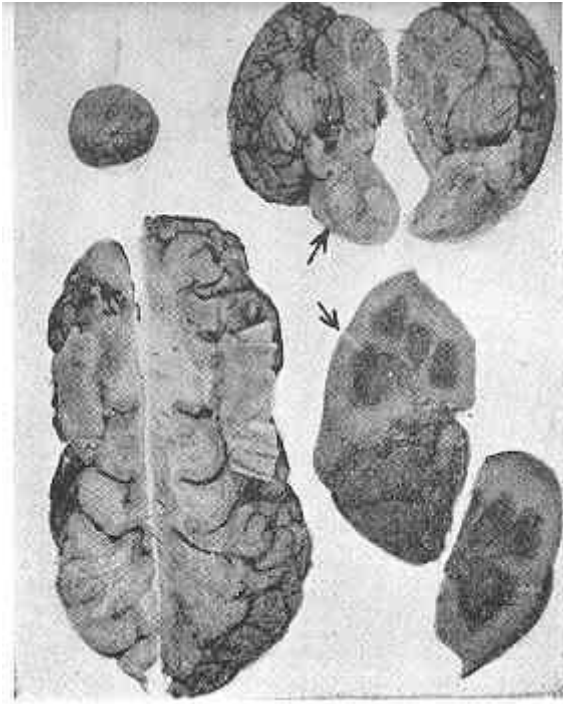
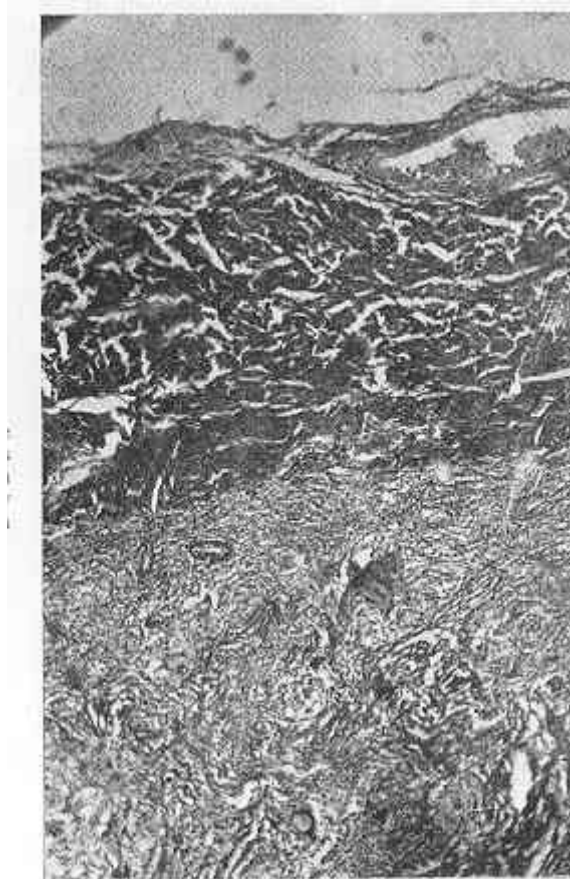


Fig 1
Photograph illustrates the brain with meningeal plaque, pons with the tuberculoma and the kidney with military tuberculosis. The separate circular mass seen at the top is the tuberculoma from the frontal region.

Fig. 2
Photomicrograph illustrates the marked thickening of the meninges and dense fibrous tissue beneath arranged in whorls amidst a few giant-cells and caseating areas (Von Gieson. X 40)



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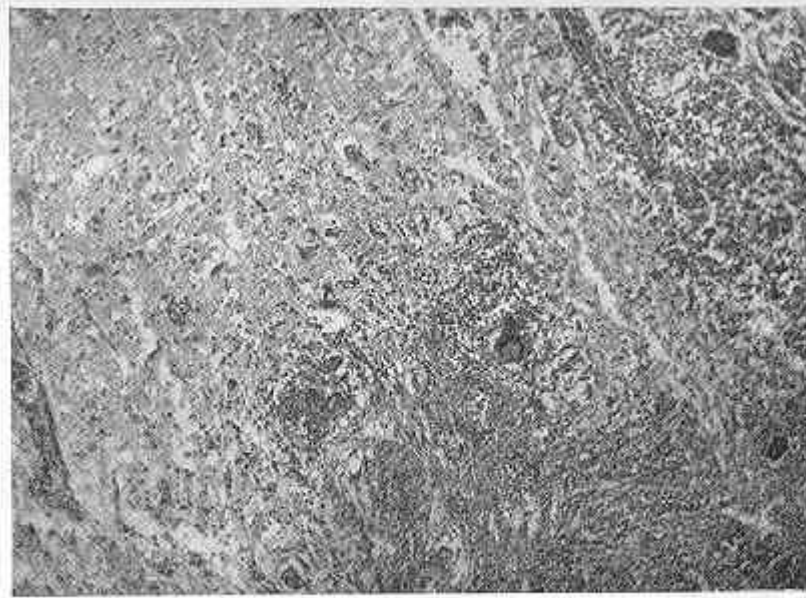


Fig. 3

Photomicrograph illustrates the infiltration of tuberculous granulation tissue into the brain substance (Vangieson X 60).

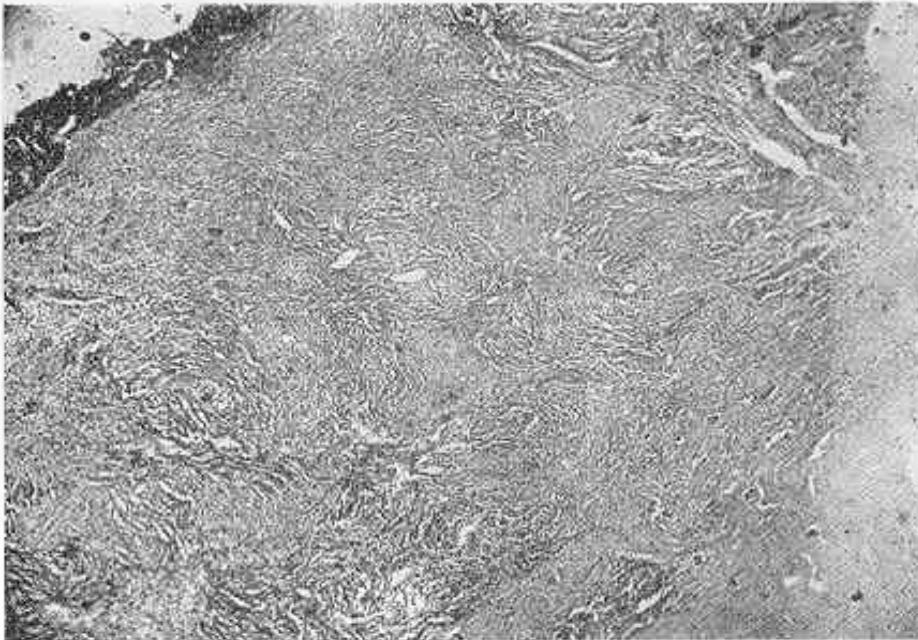


Fig. 4

Photomicrograph showing the dense fibrous wall with central caseating area from the pontine tuberculoma. Giant cells could be seen predominating (Vangieson X 60).

- 8-2-55: Blood sugar 86 mg.% ; Blood urea 80 mg.%. Condition remained the same.
- 14-2-55 : The radial pulse was imperceptible. Respiration 40 per minute and shallow. B.P. could not be recorded. Pupils did not react to light. Noisy bilateral rales were heard in the chest. He died on the same day.

Clinical Diagnosis

“Stupor undiagnosed”.

Nicropsy Findings

(P.M. No. 2471).

Autopsy was conducted on 17-2-55, 72 hours after death. External examination revealed the body of an emaciated individual of 30 years. Anaemic. No other external manifestations were present.

The serous cavities of the body were normal, and did not contain any evidences of free fluid or changes due to inflammation.

On opening the skull and exposing the brain a thickened patch of 1” X 2” was seen, underneath the meninges over the left parasagittal area about 2” anterior to the Rolandic fissure. It was adherent to the underlying cortex. Rest of the meninges was congested (Fig. 1). As the frontal lobes of the brain were being lifted up a well-encapsulated cystic, tumour, 1Y in diameter was seen slipping from the middle of the inferior surface of the left frontal lobe. The wall of the tumour mass was-1 mm. thick and ring of cortical tissue could be seen all round (Fig. 1). On puncturing viscous fluid material came out and smears made from this and stained with acid-fast stain were teaming with tubercle bacilli. There was another hard, encapsulated spherical nodule, 1 cm. in diameter and occupying the lower pons. Sections from this area revealed a thick fibrous capsule with inspissated caseous material. The remaining areas in the brain showed no abnormality.

Lungs

Each lung weighed 480 grms. Examination of the left lung showed three small early breaking down cavities of 3 mm. diameter in the left apical region. The surrounding areas of the lung showed consolidation. Right lung revealed no abnormality. Careful search of both lungs failed to reveal a primary lesion. The regional lymph nodes were not enlarged and did not show any caseous material.

Liver

The liver weighed 1,200 grms. and showed a few discrete miliary tubercles strewn over the surface. Cut section did not reveal any abnormality.

Kidney

Each kidney weighed 120 grms. and revealed discrete miliary tubercles in the cortical region extending down to the medulla. (Fig. 1).

Other organs did not reveal any pathological changes.

Microscopic Examination

(P.M. No. 2471).

Multiple sections from all the organs were taken and studied in detail histologically. All the slides were routinely stained with haematoxylin and eosin.

Sections from the brain, liver, and kidney were stained with Von Gieson stain and Masson's trichrome stain to demonstrate collagen tissue and acid-fast stain.

Brain

Sections from the meningeal plaque showed marked thickening of the meninges with advanced tubercular lesions and dense fibrosis. This fibrous tissue was arranged in whorls amidst collections of giant cells and caseation. Well formed fibrous tissue was demonstrated by Von Geison stain (Fig. 2). The caseation was more markedly seen along the sheaths of the blood vessels. In some areas the tuberculous granulation tissue with giant cells could be seen invading the cortex of the brain (Fig. 3). Sections studied from the pontine tuberculoma showed a dense fibrous wall with areas of caseation and predominant giant cell reaction (Fig. 4).

Lungs

Both the lungs were studied histologically in detail and no primary focus could be demonstrated. In the left lung where there were gross lesions of tuberculosis, areas of caseation, epithelioid and giant cell collection with little collagen reaction were seen. The alveoli surrounding these tuberculous lesions were infiltrated with exudate containing polymorphs and mononuclears.

Liver

The liver showed miliary tubercles in varying stages of their formation (Fig. 5).

Kidneys

The kidneys showed a number of miliary tubercles in the cortical region consisting of central caseating areas with epithelioid and giant cell collections at the periphery

Spleen

Section studied histologically from the spleen showed a number of miliary tubercles in the varying stages of their formation.

Retroperitoneal Lymph Node

Most of the lymph nodes were replaced by pale areas containing epithelioid and giant cells and in areas there is walling off by fibrous tissue.

All the sections which showed tuberculous lesions were stained with acid-fast stain, and tubercle bacilli were demonstrated.

Other Organs

Nil contributory.

Morbid Anatomical Diagnosis

Multiple tuberculomata of the brain with generalised miliary tuberculosis and a meningeal plaque-like lesion.

COMMENT

Most of the tuberculosis are silent and asymptomatic particularly when they are situated in the frontal lobe. Garland and Armitage³ are of the opinion that



Fig. 5
Photomicrograph illustrates the central miliary tubercle in the liver.
Normal liver cells could be seen on either side (Vangieson X 40).

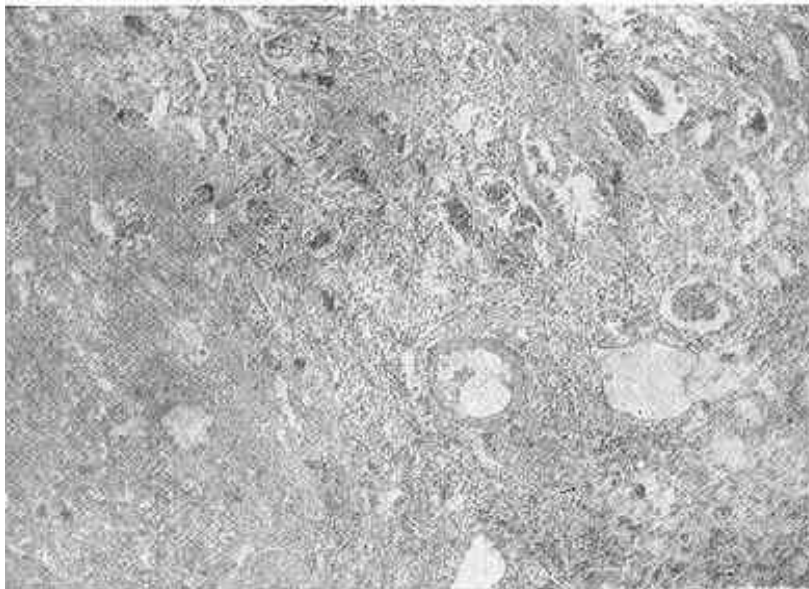


Fig. 6
Photomicrograph illustrates the miliary tuberculous infection of the kidney. A few normal tubules and glomeruli could be seen at one side;
(H. & E. X 60).

75 per cent of all the cases of tuberculoma are silent till meningitis supervenes. Lewison⁶ *et al* found 20 cases of tuberculoma of brain in the autopsy material of Cook County Hospital, and 11 of them had not even been suspected during life. Only two out of 20 lesions had given rise to symptoms of intra cranial lesions. In the case recorded above the symptoms of intra cranial lesion were wanting, as one tuberculoma was situated in the frontal lobe and another in the pons was probably too small to cause symptoms. The persistent headache in the case is in all likelihood due to the meningeal plaque.

Tuberculomas are commonly seen in the cerebellum, cerebrum and pons in that order of frequency. It is almost always secondary to an extra neural lesion and in many cases may be from the primary lesion in the lung. In the present case healed pulmonary lesion was not demonstrable.

The lesions in the brain as stained by fibrous tissue stain are much older than any other lesion found at autopsy and it is probable that the other lesions are a result of haematogenous spread from the cerebral tuberculomatous areas*.

Extra neural lesions are demonstrable at autopsy in almost all the cases of tuberculoma of the brain. Asenzo⁷ *et al* showed a definite tuberculous lesion in 86 of their cases in which the lungs were involved in 62 cases. But the clinical demonstration of a healed lesion in the lungs as well as other extra pulmonary lesions is not always easy. Even if a pulmonary lesion can be demonstrated in x-ray, it must be kept in mind that it is so common in our country as not to be of conclusive diagnostic value. In many of these cases the chemical changes in the cerebro spinal fluid may not be of value as they are normal unless evidences of meningitis supervenes. The case recorded very well exemplifies the above finding. With the advances in neurosurgery and the advent of newer anti-biotic therapy for tuberculosis, the outlook is more encouraging if only tuberculoma is borne in mind in these cases.

Summary

1. Literature on tuberculoma of the brain is briefly reviewed.
2. A case report of multiple tuberculomata of the brain with a meningeal plaque like lesion, inclusive of necropsy findings with detailed histological observations is recorded.
3. Emphasis is laid on the rarity of such a combination of lesions.
4. The difficulties in diagnosis of such a condition are briefly discussed.

Acknowledgments

We are extremely grateful to Dr. S. Pinakapani, M. D., for the case notes. With pleasure we record the services rendered by photo artist, Edwin.

*A member of the Editorial Board comments :

“The mere fact that the cerebral lesions are older and the lesions in other organ are more recent should not mean that the latter lesions are the result of haematogenous spread from the former. It is only one of several possibilities. On the other hand, both cerebral lesion as well as the other lesions may have been derived from early haematogenous foci, the progress having been different in the different organs : the apparently recent miliary foci may be the result of recent flare-up of old dormant insignificant lesions due to recent change in tissue “resistance. Also there is the possibility of these being due to recent haematogenous spread from the active pulmonary lesions which were present.”

—Editor

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