

# Confirmed Tuberculous Brain Miliary in an Immunocompetent Patient: A Case Report

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**Abstract:-** Cerebral tuberculous miliary remains a rare extra-pulmonary clinical entity and potentially fatal form of tuberculosis. We present here a 69-year-old immunocompetent patient with tuberculous miliary with cerebral and pulmonary involvement, complicated by hydrocephalus. The aim was to clear our understanding of the clinical and radiological polymorphism of tuberculosis which can delay diagnosis and consequently delay the start of treatment.

**Keywords:-** Tuberculous Miliary, Brain Miliary, BK, Tuberculosis.

## I. INTRODUCTION

Tuberculosis remains a global threat to public health, despite advances in treatment and prevention. Cerebral tuberculous miliary remains a rare extra-pulmonary clinical entity, characterised by the dissemination of tuberculous infection within the cerebral parenchyma (Guyot et al. 2021). We present here a case of tuberculous miliaria with cerebral and pulmonary involvement, complicated by hydrocephalus in a 69-year-old immunocompetent patient. We aim to clear our understanding of the clinical and radiological polymorphism of tuberculosis and to highlight the importance of a multidisciplinary approach in the management of complex cases.

## II. CASE PRESENTATION

The patient was 69 years old, with no recent history of tuberculosis or any particular pathological history. For the

past 3 months, she had presented asthenia, weight loss, night sweats, and a productive cough producing yellowish sputum, all evolving in a context of fever, followed by the onset of paraparesis and confusion. On initial physical examination, the Glasgow score was 13/15, afebrile at 36.7°C, polypnoeic at 26 cycles/minute, desaturated at 92% in free air, paraparesis and the rest of the examination was unremarkable. The brain scan showed multiple sub and supra-tentorial nodules involving both cerebral hemispheres, accompanied by peri-lesional oedema and moderate tri-ventricular hydrocephalus with transependymal resorption with an active appearance. The chest X-ray showed diffuse bilateral micronodules, suggestive of tuberculous miliary. A lumbar puncture was performed, showing a clear CSF, with 70 white blood cells (100% lymphocytes), hyperproteinorachia at 1.58 g/l, and a glycorachia/glycaemia ratio of 30%. The BK PCR in the CSF came back positive, the LF-LAM test was positive, Genexpert in the sputum was negative, and BK culture in the sputum was negative. HIV serology was negative, normochromic normocytic anaemia, with haemoglobin 9.9 g/dl, hyperleukocytosis 15,000 cells, predominantly neutrophilic, lymphocyte count 1,800 on CBC. The diagnosis of cerebral and pulmonary tuberculosis was accepted. The patient was put on oxygen therapy, anti-bacillary ERIPK-4 treatment, bolus Solumedrol as corticosteroid therapy combined with adjuvant treatment and thrombo-embolic prophylaxis. An external ventricular derivation was performed by the neurosurgeons. The patient died on day 3 of hospitalization in respiratory distress.

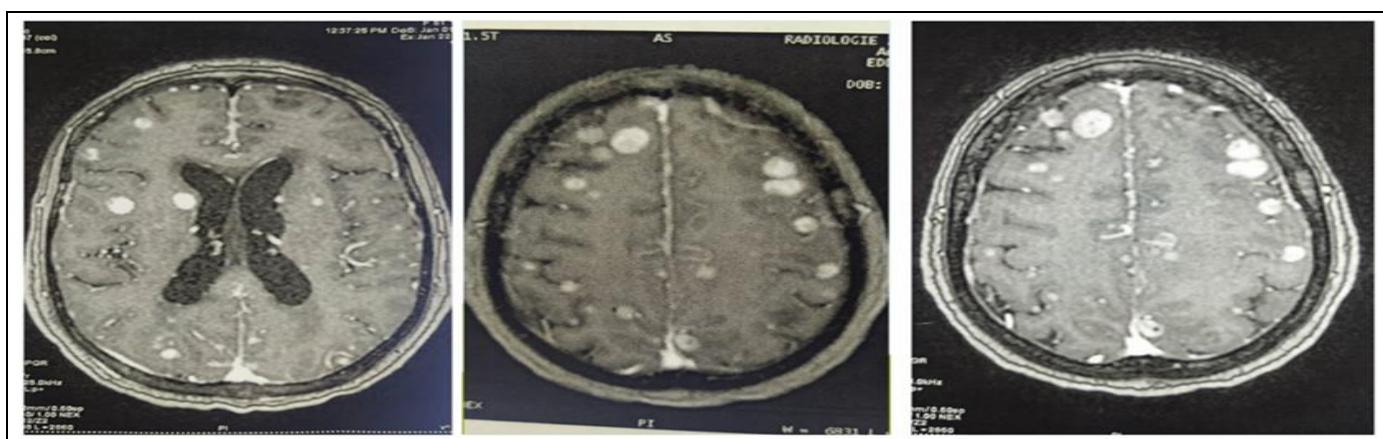


Fig 1: CT Images Showing Multiple Nodules and Micronodules above and Below the Tentorial Surface and Moderate Tri-Vantricular Hydrocephalus with an Active Appearance

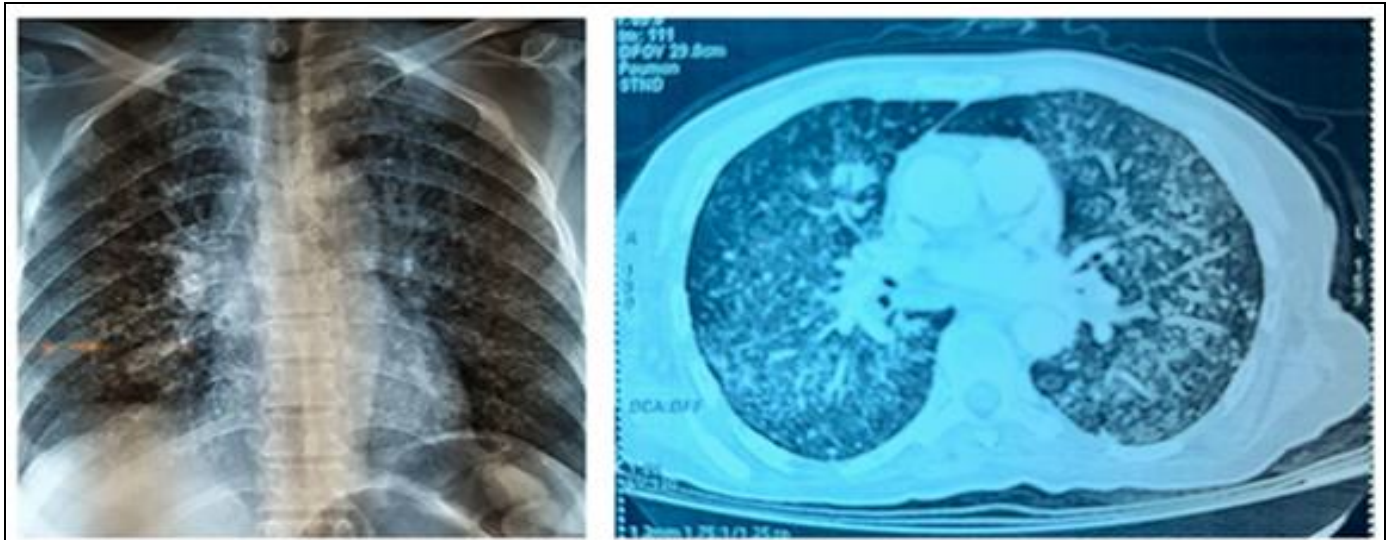


Fig 2: Radiological Images Showing Multiple Bilateral Micronodules of Ubiquitous Distribution with no Interval of Healthy Lung, Giving an Appearance of Tuberculous Miliary

### III. DISCUSSION

Cerebral tubercular miliary is a rare form of neuromeningeal tuberculosis, accounting for 1 to 2% of tuberculosis cases and 8% of extra-pulmonary cases. It results from lymphohaematogenous dissemination of BK during a primary infection or reactivation of a latent disease. (Vasconcelos et al. 2020). The spectrum of CNS involvement includes meningitis, which is most often basilar, and tuberculomas, which can block the normal circulation of CSF in the brain, leading to partial or total obstruction of the flow, resulting in hydrocephalus due to excessive accumulation of CSF in the brain's ventricles (Guyot et al. 2021). Diagnosis is difficult and often delayed due to clinical and radiological polymorphism. Those at increased risk of miliary and extra pulmonary tuberculosis are patients suffering from immunodeficiency, particularly HIV infection (Sekkat et al. 2021). In our case, the patient was immunocompetent with negative HIV serology; she presented with multiple diffuse cortico-subcortical tuberculomas involving all cerebral lobes with one tuberculoma responsible for compression of the aqueduct of Sylvius causing moderate tri-ventricular hydrocephalus with transependymal resorption. CSF characteristics in CNS tuberculosis are variable and may even be normal. The CSF typical of tuberculous meningitis includes a predominantly lymphocytic pleocytosis (Shi et Sun 2022). The bacteriology of our patient's CSF was typical, and the chemistry showed hyperproteinorachia and hypoglycorrhachia with a G/G ratio of 30%, results which indicate the presence of inflammation of the meninges. As extra pulmonary lesions are not bacillary, the efficacy of microbiological confirmation of CNS tuberculosis is not satisfactory compared with that of pulmonary lesions. For a single CSF sample, the sensitivity of an AFB smear is around 20-40%, that of a culture around 40-80% and that of a PCR down to 30%, which means that a negative test does not rule out the diagnosis of neuromeningeal tuberculosis (Urs et al. 2022), (Dev et al. 2019). The BK RT-PCR test in our patient's CSF was positive, as was the urine LF-LAM test, although the latter is more significant in HIV infected

individuals. Neuroimaging was supportive of the diagnosis, as the findings were typical. The classic MRI features of cerebral tuberculomas are nodular lesions, best seen on gadolinium enhanced images. MRI is generally the imaging test of choice, given its superiority over CT in the diagnosis of CNS tuberculosis. (Chen et al. 2023), (Delgado-Argote, Leiva, et Rojas 2021). Diagnosis of the patient's pulmonary tuberculosis was essential to confirm the bacillary etiology of the CNS infection. The expert gene, direct examination and culture of BK in sputum were negative.

From a therapeutic point of view, antibacillary molecules are the same for all forms of tuberculosis, but differ in terms of treatment duration, BK resistance and adverse effects. (Thwaites 2013). Adjunctive glucocorticoid therapy of longer duration should be warranted in cases of neuromeningeal tuberculosis. Another essential aspect is the speed of treatment, as the prognosis depends largely on the neurological state at the time of presentation and the time taken to initiate treatment. Empirical treatment should therefore be started as soon as the diagnosis is suspected. (Török 2015). Our patient was put on first-line antibacillary therapy on admission before bacteriological confirmation, and corticosteroid therapy was also given. She underwent surgery with placement of an EVG, underlining the importance of multidisciplinary management. Our patient was followed by infectious diseases specialists, neurosurgeons and intensive care units. The outcome was fatal; the patient died on day 3 of hospitalization.

### IV. CONCLUSION

Cerebral tuberculosis is a rare and potentially fatal form of tuberculosis. The clinical and radiological polymorphism of tuberculosis can delay diagnosis and consequently delay the start of treatment. Rapid diagnosis and early multidisciplinary management could improve vital prognosis.

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