

The Deceptive Mask: Poorly Differentiated Sarcoma Masquerading as Disseminated Tuberculosis and Invasive Fungal Infection

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Case Report

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Abstract

In tuberculosis-endemic regions, bilateral pulmonary nodules with hemoptysis in a young patient reliably trigger infectious workup. We report a 33-year-old immunocompetent male whose diagnosis was anchored by a trace GeneXpert Ultra result for *Mycobacterium tuberculosis* and a positive bronchoalveolar lavage (BAL) galactomannan. Failure to respond to maximal anti-infective therapy prompted PET-CT, revealing a massive FDG-avid mediastinal mass with intracranial metastases. Navigation-guided brain biopsy established the definitive diagnosis of poorly differentiated sarcoma. The patient was initiated on palliative chemotherapy but succumbed to Tumor Lysis Syndrome, septic shock, and respiratory failure within six weeks of presentation. This case illustrates the dangers of anchoring on trace infectious biomarkers and the diagnostic utility of biopsy at accessible metastatic sites.

Introduction

The overlap between disseminated tuberculosis, invasive fungal infection, and aggressive malignancy poses a formidable diagnostic challenge in TB-endemic settings. Highly sensitive molecular assays, while invaluable, carry the risk of trace-positive results that can anchor clinical reasoning toward infection and delay the recognition of malignancy. We present a case in which a poorly differentiated sarcoma successfully mimicked a multi-infectious process in a young immunocompetent adult, with ultimately fatal consequences.

Case Presentation

A 33-year-old male with eight years of occupational fiberglass exposure presented with a three-week history of dry cough, exertional dyspnea, and hemoptysis following a febrile illness treated as typhoid fever at an outside facility. HRCT at referral demonstrated bilateral centrilobular consolidations with ground-glass opacities. He was afebrile on admission with a heart rate of 92/min, blood pressure 120/70 mmHg, and SpO₂ 98% on room air. Chest examination revealed bilateral coarse crepitations.

Flexible bronchoscopy with BAL on day 2 detected *Mycobacterium tuberculosis* at a "very low" (trace) level on GeneXpert Ultra, and BAL galactomannan was positive at 1.2. Repeat HRCT (day 7) demonstrated extensive bilateral centrilobular nodules with a positive halo sign, interpreted as invasive fungal disease (Fig. 2). Anti-tubercular therapy (ATT; Akurit-4) was commenced alongside Caspofungin – Voriconazole was avoided given the hepatotoxicity risk with concurrent ATT. Vasculitis workup (ANCA, ANA, anti-CCP) was negative apart from a low-titre ANA. A repeat BAL on day 7 did not detect MTB, and serum galactomannan returned negative on day 13; Caspofungin was stopped. With moderate clinical improvement, the patient was discharged on ATT.

Within ten days of discharge he re-presented with acute chest pain, worsening dyspnea, orthopnea, and blood-stained sputum. He was hypoxic (SpO₂ 89% on room air), tachycardic, and tachypneic; bi-level positive airway pressure ventilation was initiated. D-dimer was markedly elevated at 5850 ng/mL, haemoglobin had fallen to 10.4 g/dL, and procalcitonin was very low at 0.07 ng/mL. The combination of

clinical deterioration despite maximal anti-infective therapy and a very low procalcitonin raised serious concern for a non-infective aetiology. PET-CT revealed a massive FDG-avid mediastinal mass (75 × 95 × 82 mm) with FDG-avid intracranial lesions (Fig. 3). MRI brain confirmed multiple ring-enhancing space-occupying lesions (Fig. 4).

CT-guided biopsy of a left upper lobe lung nodule yielded only necrosis and haemorrhage and was non-diagnostic. To avoid the morbidity of open-lung biopsy in a critically ill patient, a navigation-guided biopsy of the brain lesions was performed. Histopathology demonstrated sheets of pleomorphic, poorly differentiated malignant cells with hyperchromatic nuclei, prominent nucleoli, brisk mitotic activity, and areas of necrosis (Fig. 5), confirming poorly differentiated sarcoma. Immunohistochemistry proved undifferentiated sarcoma with markedly elevated proliferative index.

Palliative chemotherapy with weekly Paclitaxel was initiated following multidisciplinary team discussion. After the first dose, the patient developed florid Tumor Lysis Syndrome with hyperuricemia, hyperkalemia, hyperphosphatemia, and acute kidney injury. Respiratory status deteriorated despite escalating ventilatory support, and the patient succumbed to septic shock and Type 1 respiratory failure approximately six weeks after initial presentation.

Discussion

This case illustrates the convergence of three powerful diagnostic mis leaders: a trace molecular TB result, a positive fungal biomarker, and classical radiological features of invasive fungal disease. The GeneXpert Ultra platform, while offering superior sensitivity, produces trace results in paucibacillary disease and, rarely, non-TB samples. A single trace result — not replicated on repeat testing, with negative BAL cultures and no cavitating lesions — was sufficient to initiate full ATT. The progressive negativity of serum galactomannan on serial testing was an important early clue that the initial positive BAL result may have been spurious, yet radiological pattern recognition continued to dominate clinical reasoning.

Sarcomatous pulmonary metastases can precisely reproduce the centrilobular distribution and ground-glass halo classically associated with angio-invasive *Aspergillus*. The halo sign, while strongly associated with invasive fungal disease in immunocompromised hosts, is well described with haemorrhagic pulmonary metastases and should not be considered pathognomonic outside that context. The markedly elevated D-dimer, falling haemoglobin, and very low procalcitonin on readmission — in the setting of treatment failure — collectively pointed away from infection and toward a pro-malignant or pro-thrombotic state.

When CT-guided biopsy of the lung nodule yielded only necrosis — a finding common to both high-grade tumours and TB — the team pivoted to navigation-guided brain biopsy, avoiding the substantial morbidity of open-lung surgery in a critically deteriorating patient. This represents a key transferable lesson: in patients with accessible metastatic deposits, targeting these sites may be safer and more diagnostically productive than repeated attempts at a necrotic primary lesion. Finally, Tumor Lysis Syndrome following

the first dose of chemotherapy underscored the enormous tumour burden present at diagnosis; anticipatory prophylaxis is essential when initiating treatment in patients with bulky solid-tumour disease.

Conclusion

A trace GeneXpert Ultra result and positive BAL galactomannan, in the absence of corroborative microbiological or histological evidence, should not anchor diagnosis — particularly when repeat testing is negative and the patient fails to respond to anti-infective therapy. The radiological halo sign is not pathognomonic for fungal disease. When primary biopsy is non-diagnostic due to necrosis, accessible metastatic sites offer a safer and often more definitive route to tissue diagnosis. Vigilance for malignancy must be maintained even when infectious biomarkers appear confirmatory.

Abbreviations

ANA: Anti-Nuclear Antibody; ANCA: Anti-Neutrophil Cytoplasmic Antibodies; anti-CCP: Anti-Cyclic Citrullinated Peptide; ATT: Anti-Tubercular Therapy; BAL: Bronchoalveolar Lavage; BiPAP: Bi-level Positive Airway Pressure; CT: Computed Tomography; FDG: Fluorodeoxyglucose; H&E: Haematoxylin and Eosin; HRCT: High-Resolution Computed Tomography; MDT: Multidisciplinary Team; MRI: Magnetic Resonance Imaging; MTB: Mycobacterium tuberculosis; PET-CT: Positron Emission Tomography–Computed Tomography; TB: Tuberculosis; TLS: Tumour Lysis Syndrome.

Declarations

Ethics approval and consent to participate

Ethics committee approval for the publication of this case report was obtained from the Institutional Ethics Committee, Aster Medcity, Kochi (Reference No: AM/EC/588-2026, dated 08 June 2026; EC Registration No: EC/NEW/INST/2023/KL/0315; ECR/737/Inst/KL/2015/RR-21). A copy of the signed ethics committee approval letter is appended to this manuscript. Written informed consent to participate was obtained from the patient's next of kin following the patient's death; the signed consent form is held by the corresponding authors and can be provided for review by the Editor of this journal at any time on request.

Consent for publication

Written informed consent for the publication of this case report, including all personal and clinical details and any accompanying identifying images (radiological, histopathological, and clinical), was obtained from the patient's next of kin. The signed consent form is held by the corresponding authors and can be provided for review by the Editor of this journal at any time on request.

Availability of data and materials

All data generated or analysed during this study are included in this published article. Additional de-identified clinical, radiological, and histopathological data supporting the findings of this report are available from the corresponding authors on reasonable request, subject to institutional data-sharing policies.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

AS was involved in the direct clinical care of the patient, collected and collated the clinical, radiological, and histopathological data, performed the literature review, and drafted the initial manuscript. ESCX, as treating consultant, supervised the clinical management of the patient, contributed to the interpretation of findings, and critically revised the manuscript for important intellectual content. PV, as treating consultant, contributed to the clinical management, the interpretation of the diagnostic findings, and the critical revision of the manuscript. All authors read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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Clinical trial registration

Not applicable.

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Figures

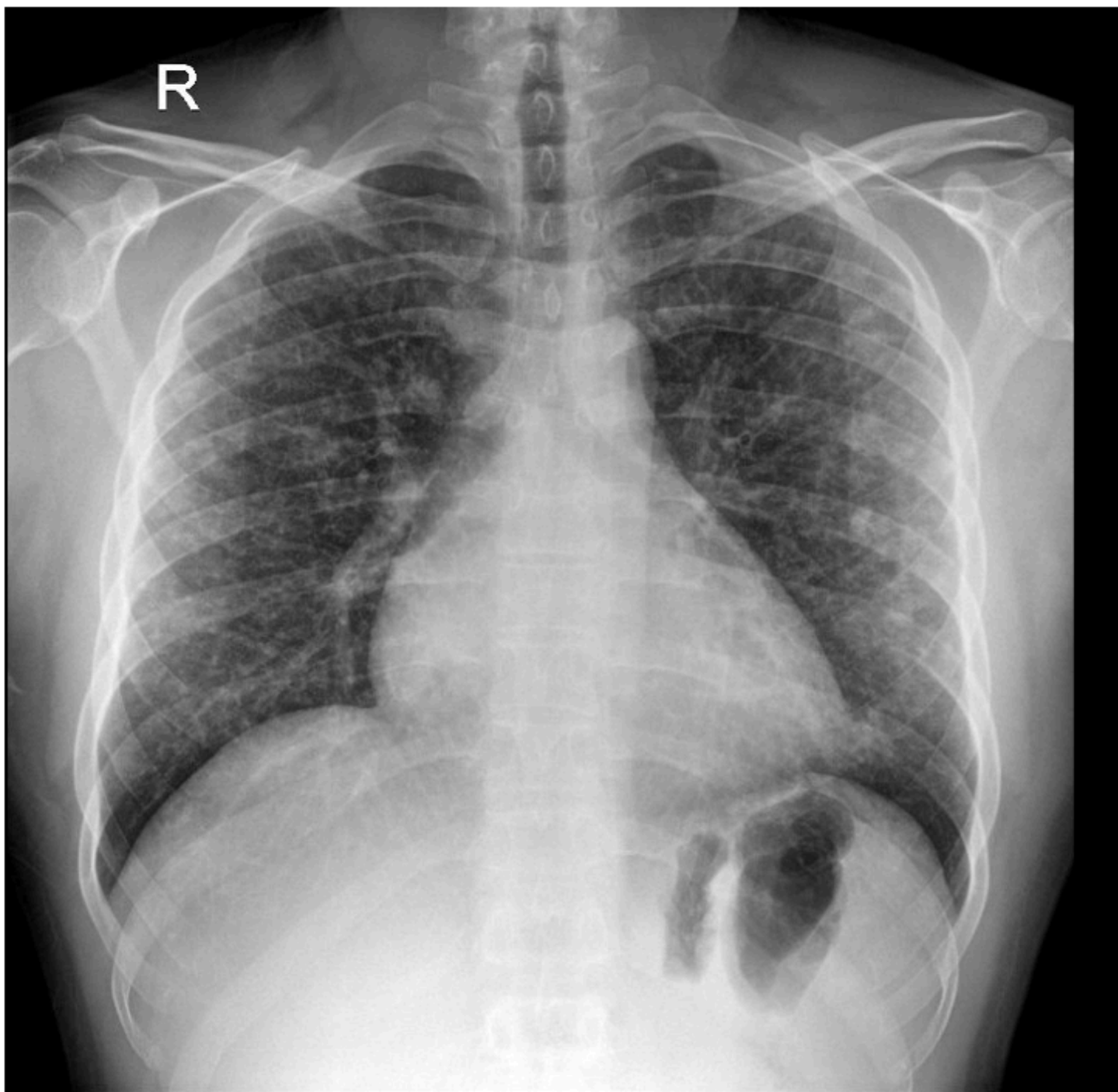


Figure 1

Chest radiograph on initial presentation (02 March 2022): bilateral multifocal infiltrates and centrilobular nodules.

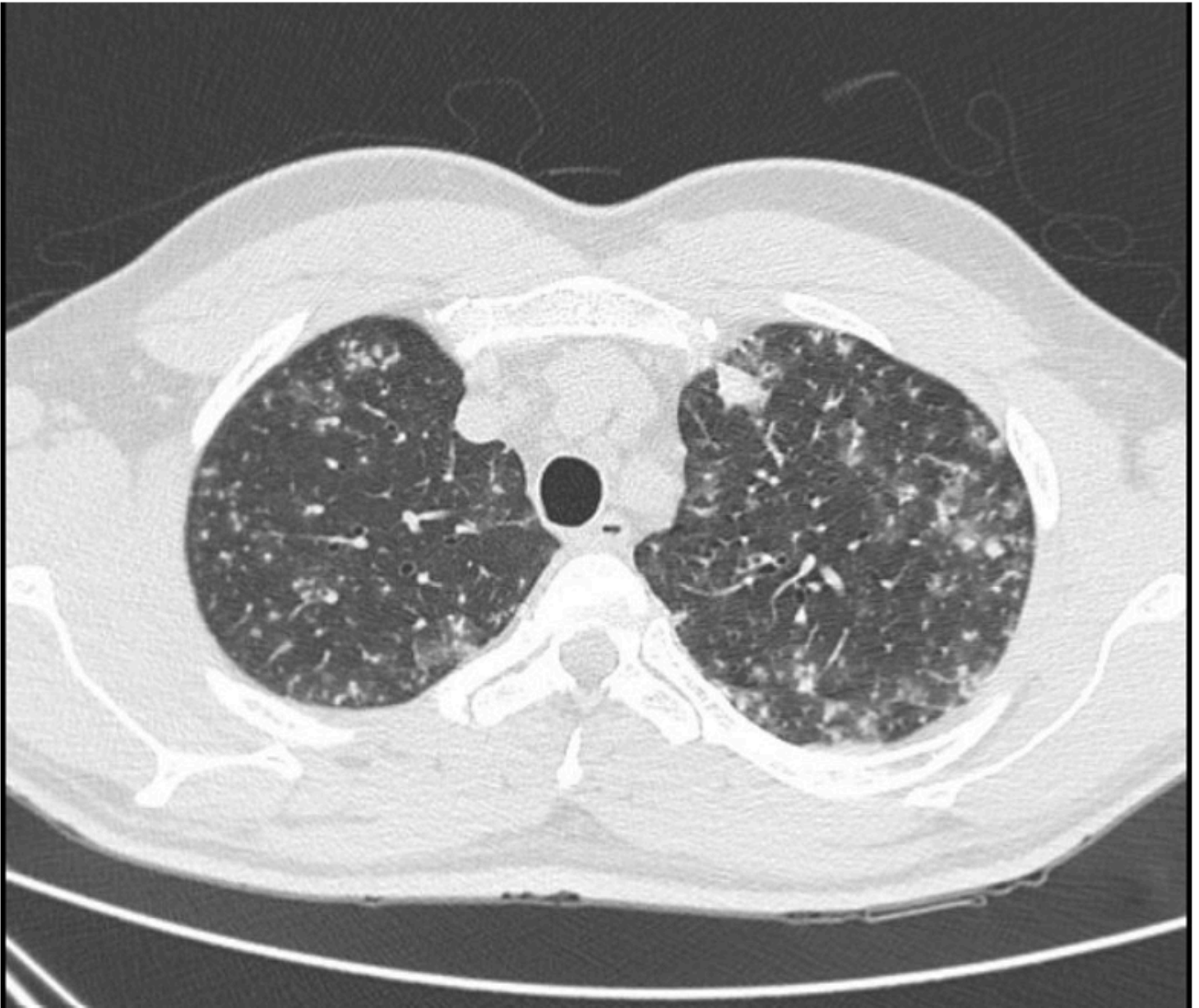


Figure 2

HRCT Chest (09 March 2022): Bilateral centrilobular nodules with surrounding ground-glass halo sign, initially interpreted as invasive fungal disease.

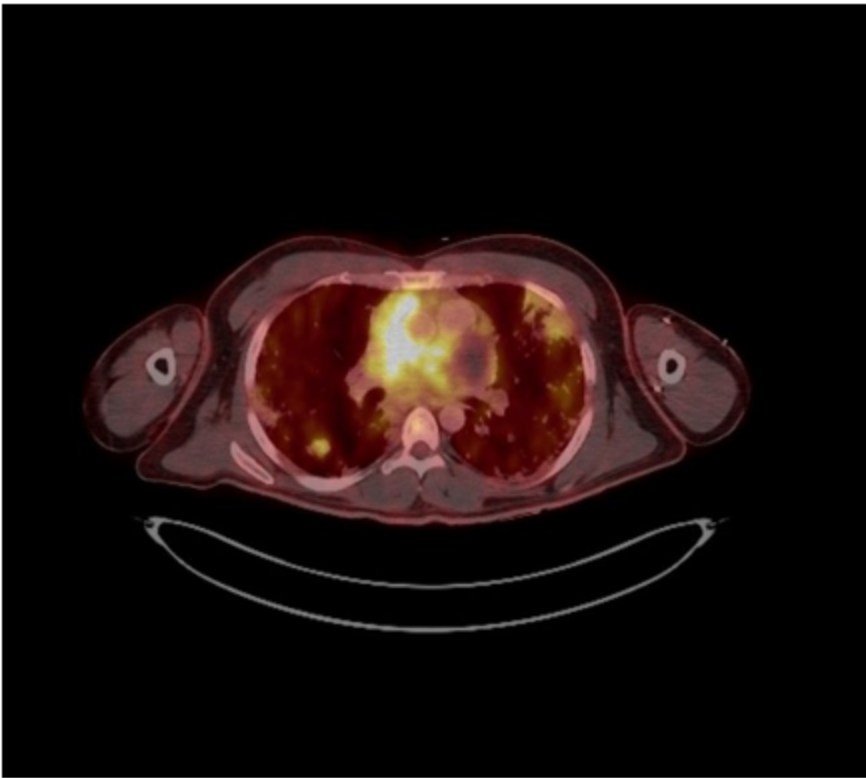


Figure 3

PET-CT fused image (28 March 2022): Massive FDG-avid mediastinal mass with intense central uptake.

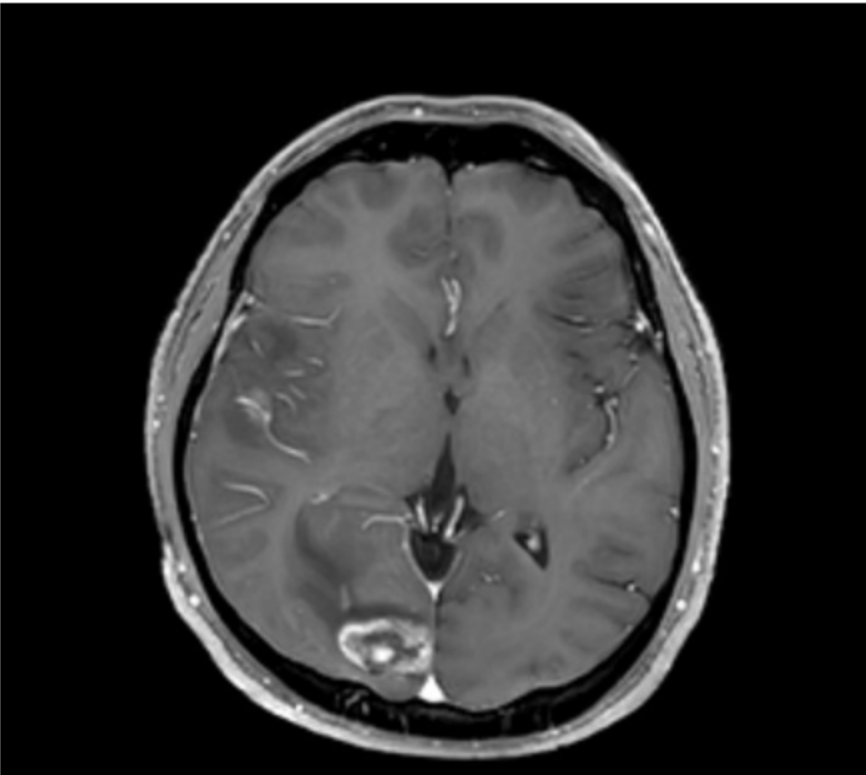


Figure 4

MRI Brain T1 post-contrast (06 April 2022): Ring-enhancing space-occupying lesion with perilesional edema, mimicking disseminated TB.

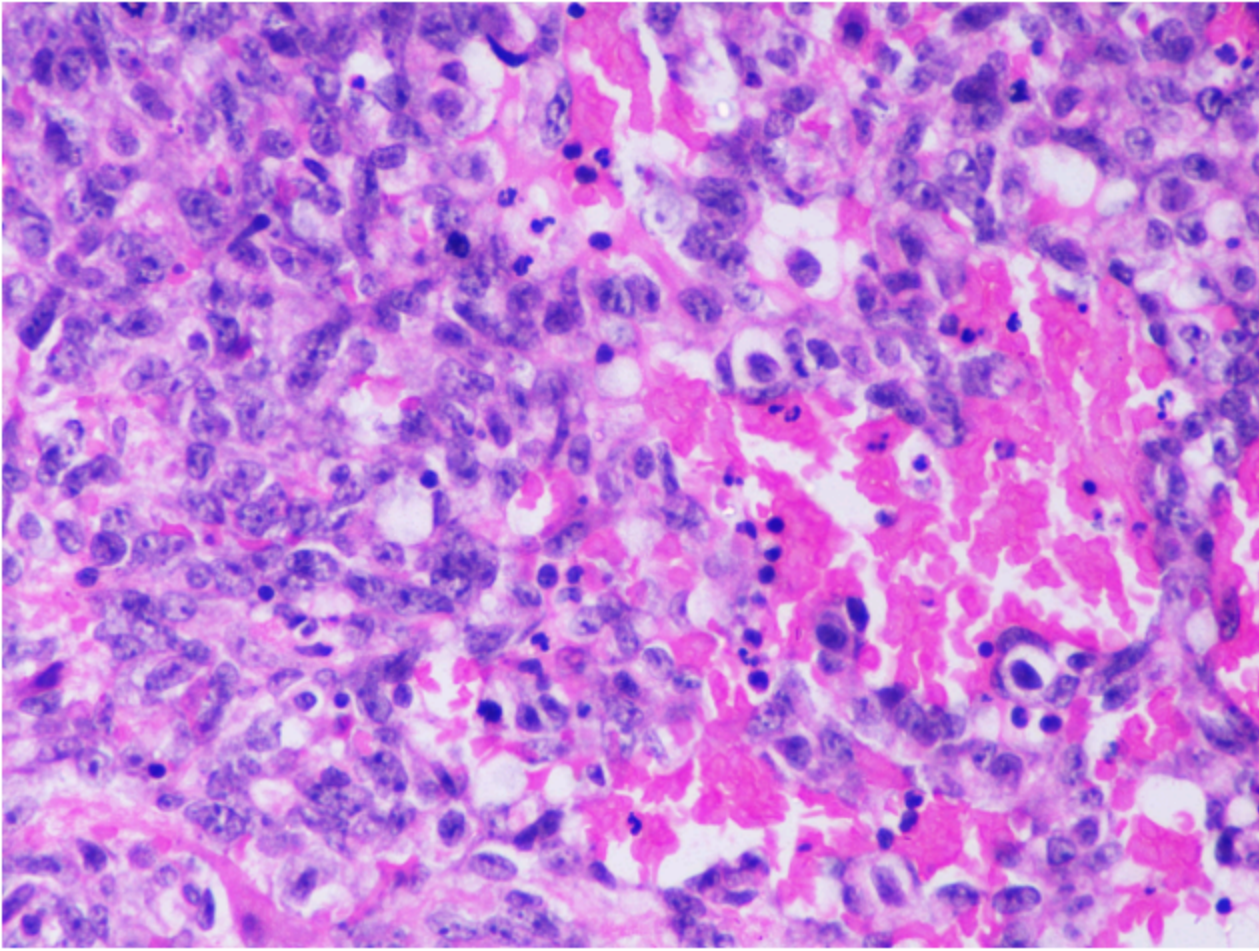


Figure 5

Brain biopsy, H&E (high power): Sheets of pleomorphic tumour cells with hyperchromatic nuclei, prominent nucleoli, and brisk mitotic figures.