CLINICAL CASE - TEST YOURSELF Test Yourself

Unveiling the Hidden: A case of two different concurrent infections in an undiagnosed HIV patient

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PART A

A 48-year-old male with a known history of autoimmune hepatitis presented to the emergency department with a 3-day history of altered mental status, fever, dyspnea and tachypnea. On examination, he exhibited confusion, hypoxemia, and tachycardia. The patient had not previously been diagnosed with HIV and was unaware of his status. His medical history was significant for autoimmune hepatitis, which had been managed with immunosuppressive therapy. Laboratory tests revealed leukopenia, elevated liver enzymes, and increased inflammatory markers. Given his clinical presentation, a CT scan of the brain and chest was ordered and due to the findings of the brain CT he subsequently underwent an MRI of the brain and cervical spine.

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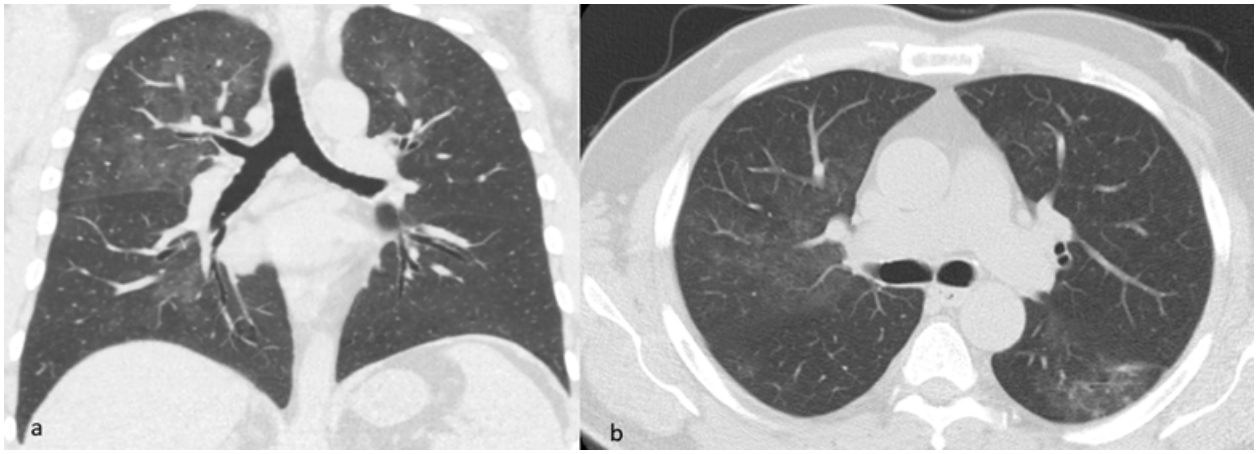

Fig 1a,b

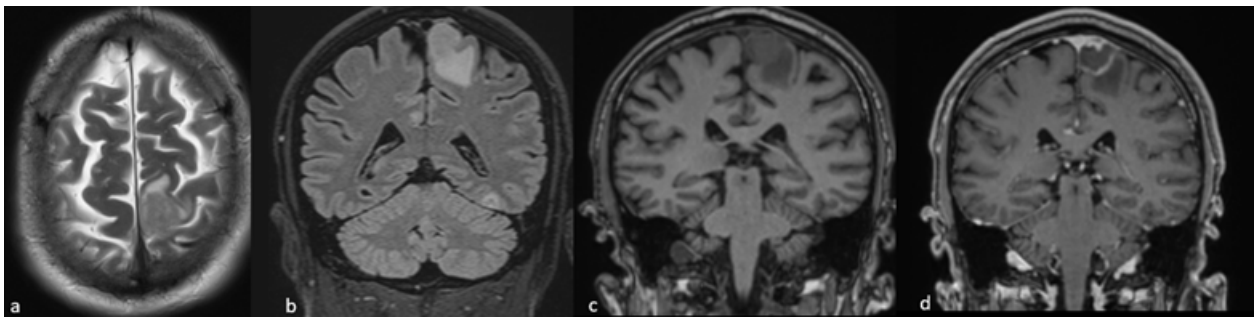

Fig 2 a-d

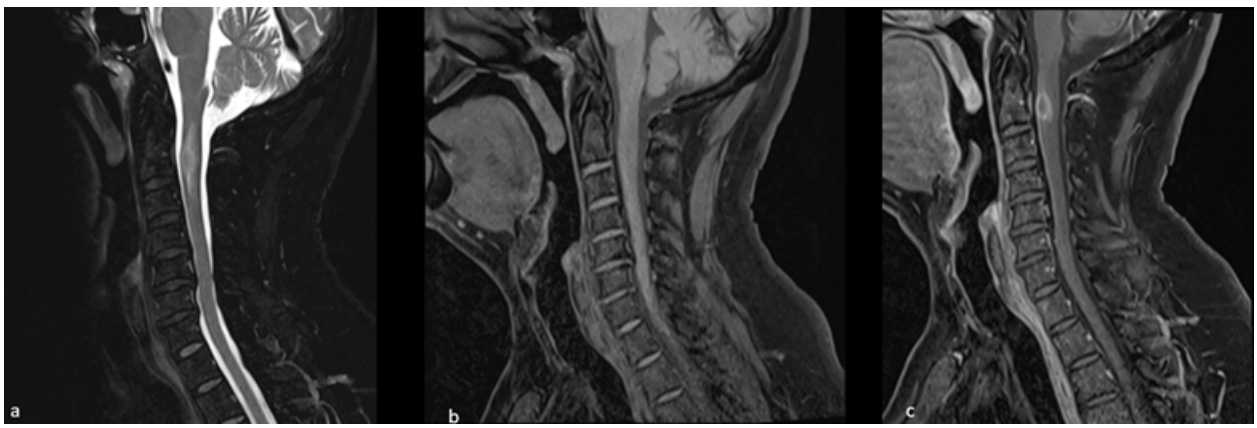

Fig 3 a-c

PART B

Diagnosis: Concommitant central nervous system toxoplasmosis and P.Jirovecii lung infection in an undiagnosed HIV positive patient.

We present a case of concurrent infections of P.Jirovecii and neurotoxoplasmosis in the same patient as the initial manifestations of HIV. Chest CT demonstrated extensive bilateral ground glass opacities without pleural effusions or lymphadenopathy (Fig1 a,b) . Brain MRI revealed a T2-isointense lesion (Fig.2 a,b) in the precentral gyrus along with perilesional oedema, which ring-enhancement and the typical eccentric-target sign on post contrast images (Fig.2 c,d). Furthermore, MRI of the cervical spine showed an expansive intramedullary lesion isointense to spinal cord in T1 and hyperintense in T2-weighted images (Fig 3 a), with ring-enhacement on post contrast images (Fig 3 b,c). Imaging findings along with the severe leukopenia of the patient were suspicious for cerebral toxoplasmosis and subsequently the patient underwent a lumbar puncture in order to evaluate for infectious etiologies while an HIV panel was ordered which resulted positive. Broncheoalveolar lavage also confirmed the P.Jirovecii infection.

P.Jirovecii is an uncommon opportunistic fungus that leads to pneumonia, particularly in individuals with weakened immune systems, especially those lacking cell-mediated immunity. This fungus predominantly resides in the lung's alveoli, where it attaches to the alveolar lining. The main defense against P. jirovecii comes from intraalveolar macrophages; any deficiency or dysfunction in these macrophages can result in infection [1]. CD4+ T lymphocytes, which decrease in HIV-infected individuals, play a crucial role in eliminating P. jirovecii and can also cause inflammatory damage to the lungs. While bacterial pneumonia is the most prevalent lung infection in AIDS patients, P. jiroveci pneumonia (PJP) remains the most common opportunistic infection in the U.S. among those with AIDS, especially in individuals unaware of their HIV status, and is considered an AIDS-defining condition [2].

For suspected pneumonia, chest X-rays are typically the first imaging test conducted. However, P.Jirovecii's radiographic signs are often nonspecific, and about one-third of patients may show normal results [3]. HRCT is more sensitive and can be used in patients with high clinical suspicion for. Characteristic imaging findings include bilateral extensive ground glass opacities with a predilection for the upper lobes [2,3]. As the disease progresses septal lines along with interlobular septal thickening on superimposed ground glass lesions (crazy-paving) or consolidation may be demonstrated [2]. Furthermore, pulmonary cysts of varying shape and size may also be recognized which can lead to spontaneous pneumothorax, while pleural effusions and lymphadenopathy do not typically occur [3]. In patients undergoing prophylactic treatment more atypical findings may be demonstrated such as granulomas with or without cavitation, tree in bud opacities, lymphadenopathy and pleural effusions [4].

Neurotoxoplasmosis, caused by the parasite Toxoplasma Gondii, has become a leading cause of central nervous system infections in HIV positive patients [5]. It typically manifests as multiple lesions predominantly in the basal ganglia, thalami and the corticomedullary junction [6]. However, spinal cord involvement or simultaneous cerebral and spinal involvement is uncommon [7]. Typical findings on MRI include multiple lesions iso- or hypointense on T1-weighted images and variable signal intensity on T2-weighted images with surrounding oedema and ring enhancement on post contrast images [4]. The eccentric target sign which describes an eccentric enhancing nodule inside the ring-enhancing lesion is pathognomonic and it is also demonstrated in our case. MR diffusion and mainly MR perfusion are useful in differentiating toxoplasmosis from primary CNS lymphoma especially in immunocompromised patients. SWI is also helpful as CNS lymphoma does not contain intralesions susceptibility signal foci which are identified in the vast majority of patients with neurotoxoplasmosis [5].

Spinal cord lesions present with similar imaging findings and include typically multiple intramedullary lesions ranging from 5mm to 20mm with perilesional oedema [7]. The spinal cord may appear thickened and

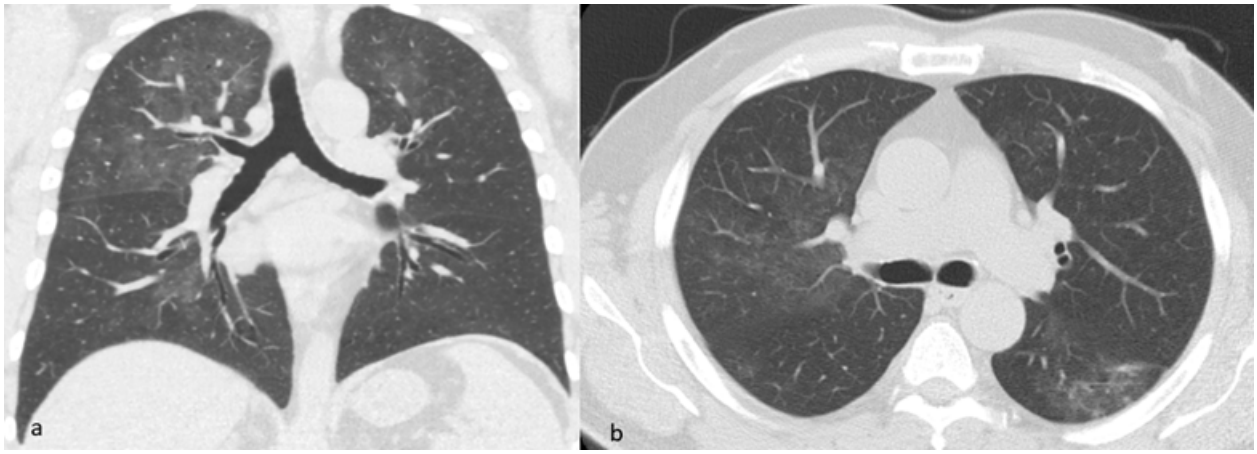

Fig 1a,b

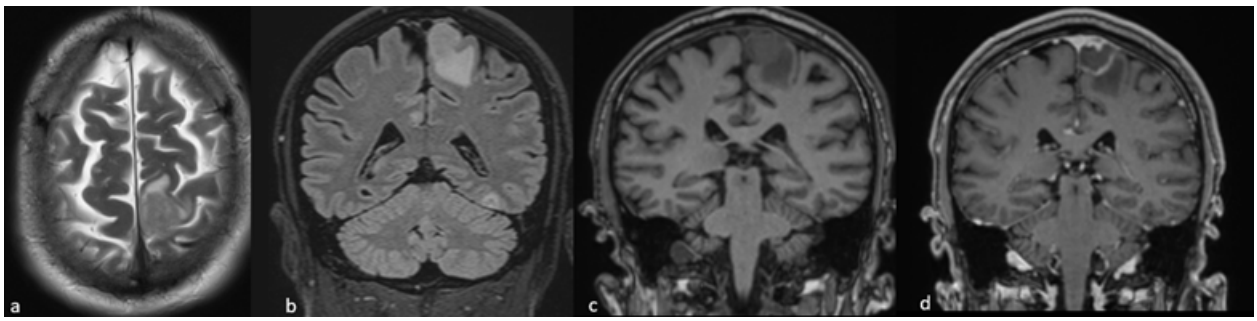

Fig 2 a-d

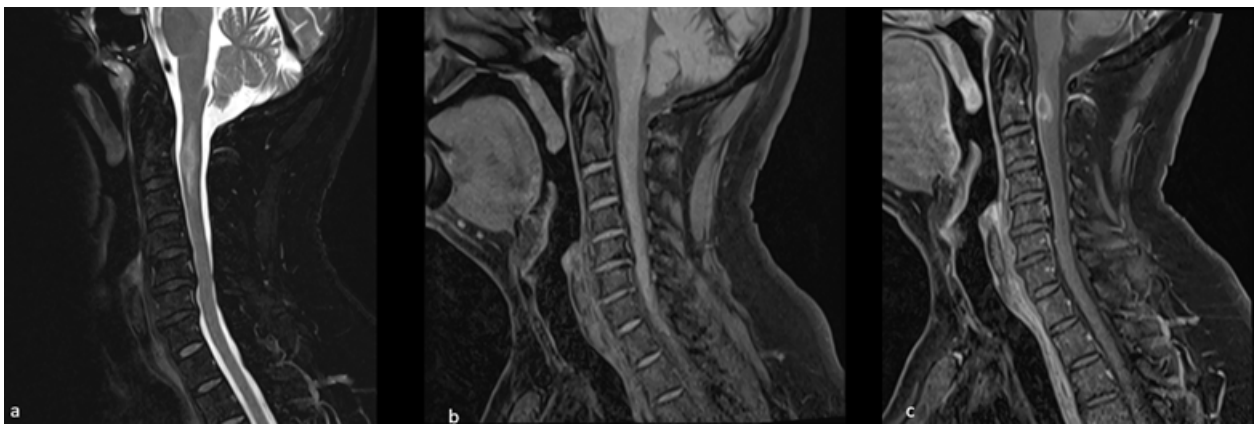

Fig 3 a-c

swollen while post-contrast images will demonstrate ring-shaped or nodular-shaped enhancement. Spinal cord toxoplasmosis must be differentiated from bacterial or tuberculous abscesses and spinal metastases. The imaging findings along with lumbar puncture results can be helpful in concluding to the right diagnosis.

Conclusion

This case highlights the crucial role of radiological imaging in diagnosing opportunistic infections in patients with undiagnosed HIV. Awareness of such presentations is vital for healthcare providers to ensure timely management and improve patient outcomes. **R**

KEY WORDS toxoplasmosis, opportunistic infection, pneumocystis pneumonia, HIV

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