

Normal Cerebrospinal Fluid, Severe Encephalitis: A Case Report of Herpes Simplex Virus (HSV) and Cytomegalovirus (CMV) Co-Infection as the First Manifestation of Human Immunodeficiency Virus (HIV)

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DOI: <https://doi.org/10.36347/sjmcr.2025.v13i10.113>

| Received: 29.08.2025 | Accepted: 23.10.2025 | Published: 31.10.2025

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Abstract

Case Report

We report the case of a 30-year-old patient with Crohn's disease undergoing long-term corticosteroid therapy and immunosuppressants, hospitalized for status epilepticus. The examination revealed viral encephalitis due to co-infection with cytomegalovirus (CMV) and herpes simplex virus (HSV), diagnosed by polymerase chain reaction (PCR) on cerebrospinal fluid (CSF) despite normal cytology and biochemistry. The patient was also seropositive for human immunodeficiency virus (HIV) with a high viral load, as well as bacterial co-infections (pneumonia caused by *Streptococcus pneumoniae* and *Moraxella catarrhalis*, bacteremia caused by non-typhoidal *Salmonella*). Under appropriate antiviral and antibiotic treatment, progress was slow, with no significant clinical improvement observed. This case illustrates the importance of PCR in the diagnosis of opportunistic infections of the central nervous system (CNS) and highlights the severity of multiple co-infections revealing severe HIV-related immunodeficiency.

Keywords: CMV, Encephalitis, HSV, HIV, Immunodeficiency.

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1. INTRODUCTION

Neurological disorders are common and serious complications in patients living with HIV and can sometimes reveal the infection [1]. In resource-limited countries, the most common causes are tuberculosis, toxoplasmosis, and cryptococcosis [2]. Viral infections with HSV and CMV are rarer and pose a diagnostic and therapeutic challenge. Co-infection of the central nervous system with CMV and HSV is exceptional and described almost exclusively in patients with advanced HIV infection or those receiving immunosuppressive therapy [3,4].

We report here a case of encephalitis involving CMV and HSV revealing a previously undiagnosed HIV infection, complicated by bacterial co-infections, in a patient being treated for Crohn's disease.

2. CASE PRESENTATION

A 30-year-old man, being monitored for Crohn's disease and receiving long-term corticosteroid and immunosuppressive therapy, was admitted to intensive care for status epilepticus. For two weeks, the patient had been experiencing headaches associated with unquantified fever, diarrhea, moderate productive cough, and progressive deterioration in his general condition. There was no known history of opportunistic infection or HIV screening.

On admission, clinical examination revealed a patient with a fever of 39.5°C, confusion (Glasgow 12/15) without meningeal rigidity and no focal neurological deficit. Pulmonary auscultation revealed bilateral crackles. The abdomen was soft, with no tenderness or palpable organomegaly.

The main laboratory and microbiological findings are summarized in Table 1.

Table 1: Laboratory results and microbiological findings

Parameter	Result	Reference range	Comment
Lymphocytes	280 / μ L	1,000–4,800 / μ L	Lymphopenia
CRP (C-reactive protein)	318 mg/L	<10 mg/L	Elevated
Procalcitonin	1.12 ng/mL	<0.5 ng/mL	Elevated
Blood culture	<i>Salmonella</i> sp. (non-typhoidal)	Negative	Positive
BAL (bronchoalveolar lavage)	<i>Streptococcus pneumoniae</i> , <i>Moraxella catarrhalis</i>	Negative	Positive
HIV viral load	3,680,000 copies/mL	—	High
CD4 lymphocyte count	143 / μ L	500–1,500 / μ L	Low

Lumbar puncture revealed clear CSF with normal cell count, normal glycorachia and proteinorachia, and sterile culture. Multiplex PCR on

CSF revealed the presence of HSV-1 and CMV (Table 2).

Table 2: Cerebrospinal fluid analysis

Test	Result
RBC (cells/ μ L)	0
WBC (cells/ μ L)	1
Protein (g/l)	0.37
Glucose (g/l)	0.62
Bacterial culture	No growth
PCR	HSV-1 and CMV : Detected

WBC: White Blood Cells; RBC: Red Blood Cells; PCR: Polymerase Chain Reaction; HSV-1: Herpes Simplex Virus type 1; CMV: Cytomegalovirus

Magnetic resonance imaging (MRI) revealed nodular and patchy signal abnormalities in the supratentorial and infratentorial regions, with T2/FLAIR

hypersignal, without significant enhancement or mass effect. These abnormalities were consistent with viral encephalitis (Figure1).

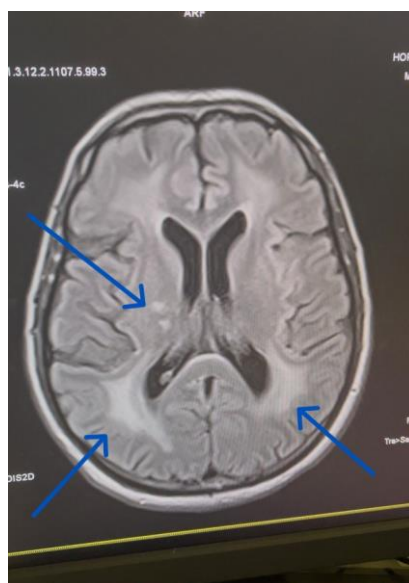


Figure 1: Axial T2 FLAIR MRI scan of the brain showing nodular and patchy periventricular hypersignals (indicated by blue arrows), consistent with viral encephalitis

The patient received an antiviral (ganciclovir) combined with a third-generation cephalosporin, tailored to microbiological results. Rehydration and intensive monitoring were provided. Appropriate antiepileptic treatment was promptly initiated to control the status of epilepticus and prevent further seizures, with rigorous neurological monitoring. The prognosis remains poor. The patient remains hospitalized in intensive care, with no significant clinical improvement to date.

The initiation of antiretroviral treatment was postponed until the acute condition had stabilized.

3. DISCUSSION

The cytological and biochemical normality of cerebrospinal fluid (CSF) in our patient clearly illustrates the limitations of conventional diagnostic techniques. As shown in previous studies on viral meningoencephalitis [5,6], CSF may appear normal or show no significant abnormalities even in the presence of severe central nervous system viral infections, justifying the essential use of PCR to establish an accurate diagnosis.

Simultaneous CMV and HSV co-infection of the CNS, although rare, has been reported in the literature [3,4,7,8]. These cases confirm the seriousness of such conditions, which occur mainly in the context of profound immunosuppression.

The isolation of non-typhoidal *Salmonella* in blood culture is recognized as a marker of immunosuppression in HIV-infected patients [9-12]. The association with *Streptococcus pneumoniae* and *Moraxella catarrhalis* demonstrates the multisystemic vulnerability of immunocompromised patients and is consistent with observations reported in other series of HIV patients [13].

The nodular and patchy abnormalities with T2/FLAIR hypersignal observed on MRI are consistent with multifocal infectious lesions. Similar imaging abnormalities have been described in HIV patients with herpes encephalitis or other opportunistic infections [3,14,15]. Although these findings are non-specific, they require confirmation by PCR to establish the diagnosis.

In this case, prolonged use of corticosteroids and immunosuppressants for Crohn's disease was an aggravating factor, as these treatments have been shown to promote severe opportunistic infections, particularly in HIV-infected patients [16-18].

Finally, the incidental discovery of HIV infection during the treatment of opportunistic infections is a crucial aspect that highlights the importance of systematically screening for underlying immune deficiency in cases of unusual or multiple infections [2]. Delayed diagnosis exposes patients to a very high risk of severe complications, reinforcing the need for early and systematic screening.

In summary, a comparison of our observations with the literature confirms the need for comprehensive microbiological testing, including multiplex PCR on CSF, blood cultures, and respiratory samples, as well as simultaneous and appropriate management of the various infectious etiologies.

4. CONCLUSIONS

CMV and HSV encephalitis can occur even with normal CSF findings in immunocompromised patients. The association with invasive bacterial infections illustrates the severity of the immune deficiency associated with HIV and immunosuppressive treatments. This case highlights the diagnostic value of PCR, the need for early HIV screening, and the importance of coordinated management of opportunistic co-infections.

Compliance with ethical standards

Disclosure of conflict of interest

Authors declare no conflict of interest.

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