Scientific Research Publishing

Advances in Infectious Diseases, 2025, 15(1), 151-158
https://www.scirp.org/journal/aid
ISSN Online: 2164-2656
ISSN Print: 2164-2648

Hidden HSV Encephalitis behind the Mask of Chronic Suppurative Otitis Media and Brain Abscess

Simona Zlatanova[1,2], Oliana Boykinova[1,2], Viktoriya Trendafilova[1,2]

[1]Clinic of Infectious Diseases, Parasitology, University Hospital "St George", Plovdiv, Bulgaria
[2]Department of Infectious Diseases, Parasitology and Tropical Medicine, Medical Faculty, Medical University Plovdiv, Plovdiv, Bulgaria
Email: simona.zlatanova.sl@gmail.com

How to cite this paper: Zlatanova, S., Boykinova, O. and Trendafilova, V. (2025) Hidden HSV Encephalitis behind the Mask of Chronic Suppurative Otitis Media and Brain Abscess. *Advances in Infectious Diseases*, **15**, 151-158.
https://doi.org/10.4236/aid.2025.151012

Received: February 11, 2025
Accepted: March 9, 2025
Published: March 12, 2025

Abstract

Introduction: HSV encephalitis remains a severe illness with a significant risk of morbidity and death. Although HSVE exhibits characteristic imaging findings it can also mimic other life-threatening conditions. Mastoiditis is a bacterial infection of mastoid air cells. The complications of chronic mastoiditis mainly include facial paralysis, vertigo, hearing loss or brain abscess and meningitis. **Presentation:** To present an unusual case of a 23-year-old patient with clinical features and CT findings of chronic mastoiditis, complicated by a brain abscess and virological confirmation of HSV type 1 encephalitis, who was hospitalized at the Clinic of Infectious Diseases, UMBAL "St. George," Plovdiv. The disease began with earache, headache, persistent fever above 39˚C, and purulent otorrhea. Two days later, she presented with lethargy, dysphasia, right hemiparesis, facial paralysis, and nuchal rigidity. Although the most common and life-threatening complication of chronic mastoiditis is otogenic meningitis, a lumbar puncture confirmed an active HSV-1 infection through CSF PCR examination. **Conclusion**: HSV encephalitis can be masked by various diseases and should, therefore, be considered in the differential diagnosis of all neurological manifestations. This is particularly crucial in acute neurological events accompanied by fever, even in patients with conclusive brain imaging findings. Early recognition facilitates timely initiation of antiviral therapy, improving the likelihood of a favorable outcome.

Keywords

Herpes Virus Encephalitis, Brain Abscess, Chronic Otomastoiditis, Otogenic Meningitis

1. Introduction

Mastoiditis is a bacterial infection of mastoid air cells, a common complication of otitis media. Particularly in the pre-antibiotic era and in the absence of vaccination, between 10% and 20% of cases of acute otitis media (AOM) were complicated by acute mastoiditis and severe intracranial complications with mortality rate of up to 75% of cases. However, if left untreated, mastoiditis can lead to life-threatening consequences. Pneumococcal meningitis and brain abscess are the most common manifestations of otogenic intracranial complications, followed by brain or epidural abscess, sinus thrombosis, and subdural empyema. Despite advancements in antibiotic therapy, vaccination and surgical interventions, the mortality rate from sequelae of mastoiditis remains at 10% [1]-[4].

The clinical manifestations of viral encephalitis are suggested in the encephalopathic, febrile patient with seizures and focal or global cerebral dysfunction. However, these clinical findings are not pathognomonic [5]. The incidence of VE is 3.5 to 7.5 per 100,000 people, with the highest incidence observed in the young and elderly [6]. Up to 50% of encephalitis cases result from viral infections, with HSVs being the most commonly diagnosed viral encephalitis, accounting for between 50% and 75% of these cases, while enteroviruses are associated with lower odds [7] [8].

In the current era, neurodiagnostic evaluation and lumbar puncture (LP) can provide support for the diagnosis by the demonstration of temporal or frontal lobe edema/hemorrhage. MRI is also the preferred modality for evaluating HSV encephalitis. Despite its sensitivity, low-density lesions associated with HSV encephalitis are observed in approximately 80% of cases on both CT and MRI. These lesions typically appear 3 to 10 days after the onset of the infection. False-negative neuroimaging early in the disease course is important to consider in the evaluation of such patients, as well as in the assessment of mimicking conditions and complications. However, CT examination of the mastoid air cells in the temporal bone is a standard investigation in patients with suspected mastoiditis. Additionally, CT or magnetic resonance imaging (MRI) can help rule out increased intracranial pressure and the risk of uncal herniation prior to performing an LP [9].

In March 2012, the International Encephalitis Consortium included CSF pleocytosis as only 1 of 6 minor criteria for the diagnosis of encephalitis. According to Habis *et al.*, the initial LP may show an absence of pleocytosis in up to 24% HSVE cases [10] [11]. However, diagnosis depends crucially on lumbar puncture and PCR examination of cerebrospinal fluid (CSF). CSF should be analyzed for cell counts, glucose levels and protein. The diagnostic gold standard is the detection of herpes simplex virus (HSV) DNA in the cerebrospinal fluid by polymerase chain reaction (PCR).

The use of acyclovir significantly improves the outcome of HSVE. Despite the availability of antiviral drugs, mortality rate remains 20% to 30% even with early administration of therapy, and up to 70% of patients die without treatment [11]

[12]. Acyclovir initiation should not be delayed. Initial standard course with IV acyclovir should be started, even in the absence of pleocytosis in patients with suspected encephalitis. Treatment of HSV encephalitis with Acyclovir is administered at 10 mg/kg every 8 h for 14 to 21 days in immunocompetent adults.

2. Case Study

We present a clinical case of 23-year-old female patient, with a two-year history of multiple episodes of mastoiditis of unknown etiology, for which outpatient antibiotic treatment was performed without further follow-up.

The patient presented with a three-day history of headache and fever exceeding 39˚C, followed by the onset of purulent otorrhoea two days prior to admission. On the day of admission, her condition worsened with the development of lethargy, dysphasia, right-sided hemiparesis, facial paralysis, and neck stiffness. Upon examination, the patient was found to be in critical condition, soporous, with a Glasgow Coma Scale Score of 10 p. (E4V1M5), and presenting with clinical signs of pulmonary edema, including extreme dyspnea and restlessness, producing blood-tinged cough and frothing at the mouth. The blood pressure and heart rate were stable. Neurological examination upon admission revealed signs of meningeal irritation, including positive nuchal rigidity, with negative Kernig and Babinski signs. The patient exhibited the right-sided lower motor neuron facial paralysis, suggestive of complete right facial nerve involvement. Additionally, there was total aphasia, indicative of severe language impairment, and moderate right hemiparesis, consistent with involvement of the corticospinal tract. The findings, along with evidence of basal ganglia dysfunction, suggested significant subcortical and cortical involvement.

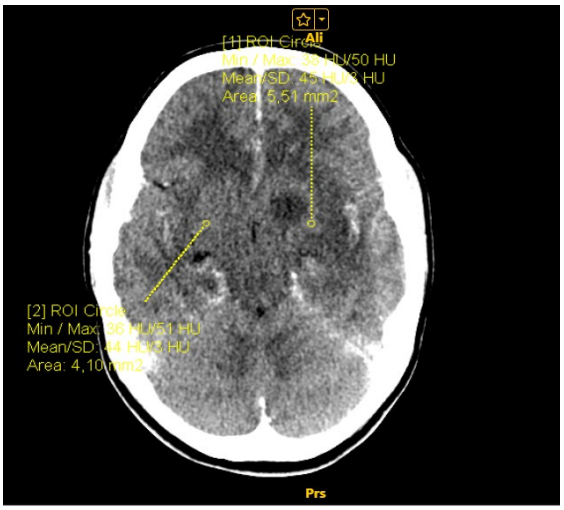

Figure 1. Motion artifacts: Axial computed tomography of the skull; Hypodense ill-defined oval lesion on the left basal nucleus, in the nucleus lentiformis, with a diameter of 19 mm. Perifocal edema of the white matter of the brain. After contrast application, the finding does not capture the CSF. Ventricular system—medially located, with normal capacity for age. Free subarachnoid spaces. Calvarial and base bones—without visible traumatic changes. Bilateral sclerotic mastoid cells, with the latter on the left being involved by exudate.

A CT scan of the head and neck with contrast enhancement (Figure 1) was performed, revealing signs of pansinusitis and chronic bilateral otomastoiditis with exacerbation on the left side. CT of the neck showed multiple enlarged lymph nodes in all cervical regions. Additionally, an irregular 19-mm low-density area without enhancement was observed in the left basal ganglia, surrounded by vasogenic edema, which was consistent with a brain abscess. Chest X-ray revealed pulmonary edema (Figure 2).

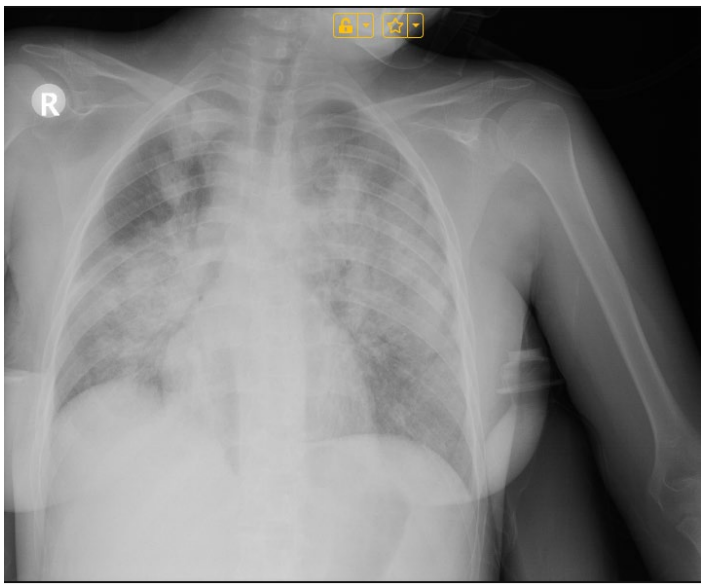

Figure 2. Bilateral symmetric ground-glass opacities. High-grade congestive changes, according to the type of pulmonary edema.

Initial laboratory findings showed the following pathological values: neutrophilic leukocytosis (WBC of 18.38; neutrophils 82.3%) and elevated inflammatory markers (CRP of 98 to 249 mg/l (reference range 0 - 5 mg/l)). Liver enzymes, blood urea nitrogen and creatinine levels were within normal limits. On the third day, coagulation tests revealed low levels (Table 1).

Cerebrospinal fluid (CSF) analysis showed WBC count of 377 (59% lymphocytes, Sg - 8%; Mo - 33%) and protein of 0.69 g/L. The follow-up LP performed three days later showed an increased protein level of 1.23 g/l and pleocytosis of 352 (94% lymphocytes) (Table 1).

Multiplex PCR (Biofire, FilmArray, bioMerieux) was performed to exclude bacterial agents (S. pneumoniae, S. agalactiae, N. meningitis, L. monocytogenes, H. influenzae, E. coli K1), based on the presumed diagnosis of otogenic meningitis, as well as other possible agents, viruses and fungi (cytomegalovirus, herpes simplex virus-1, herpes simplex virus 2, human herpes virus 6, human parechovirus, varicella-zoster virus; Cryptococcus neoformans/gatti).

Multiplex PCR confirmed the diagnosis of HSV type 1.

The patient had not been on any immunosuppressive medication, and the serological test for HIV was negative.

Table 1. Laboratory investigations.

Date	27.10	01.11
HGB g/l	125	115
RBC 10^{12}/l	4.95	4.71
WBC 10^9/l	18.38	20.32
PLT 10^9/l	160	108
Gluc mmol/l	5.91	-
CRP mg/l	98	249
AST U/l	25	108
ALT U/l	9	15
Na mmol/l	148	160
Cl mmol/l	113	110
Creatinine μmol/L	67	103
Urea mmol/l	5.4	16.5
PT%	79%	53.6
INR	1.06	1.27
Fibrinogen g/l	3.5	4.23
D-dimer mg/l	1.39	4.57
Lks-CSF 10^6/l	377	352
U-CSF Prot g/l	0.69	1.23
Gluc-CSF mmol/l	4.5	7.8
Na-CSF mmol/l	156	169
K-CSF mmol/l	2.9	3.3
Cl-CSF mmol/l	127	142
IgG-CSF mg/l	3.09	4.6

Despite radiological evidence of brain abscess and clinical suspicion of otogenic meningitis, intravenous acyclovir therapy was initiated empirically prior to serological confirmation on the third day of hospitalization. The patient was set under i.v. treatment with Ceftriaxone, Vancomycin, Ampicillin, antiepileptic drugs, vitamins and PPI, along with measures to reduce intracranial pressure and pulmonary edema. Antibiotic therapy included Amikacin, Meropenem, and Fluconazole due to the isolation of Enterobacter cloacae and Candida glabrata. All microbiological tests from throat swab, blood cultures and gram stain of CSF were negative.

Over the next two days, the patient's responsiveness/consciousness levels deteriorated to coma, accompanied by multiple tonic-clonic seizures, with hemodynamically instability and refractory pulmonary edema, which led to the requirement of mechanical ventilation and supportive therapy. The patient remained on mechanical ventilation for 4 days. Unfortunately, despite all efforts, the patient passed away 7 days later.

3. Discussion

Herpes simplex encephalitis (HSE) is a life-threatening consequence of herpes simplex virus (HSV) infection of the central nervous system (CNS). According to literature data, the mortality rate reaches 70% in the absence of therapy and only a small proportion of individuals return to normal function.

HSV encephalitis should be suspected in clinical practice in patients presenting with acute changes in consciousness. Similar clinical manifestations can also occur in neuroinfections caused by various etiological agents. Diagnostic confirmation of HSV encephalitis usually depends on the demonstration of viral DNA in the cerebrospinal fluid and MRI.

A timely and rational diagnostic approach, along with appropriate therapeutic regimens, including intravenous acyclovir and pathogenetic agents, is essential to optimize the patient's chances for a favorable recovery.

Despite the fatal outcome, our case highlights the importance of early diagnosis in atypical and life-threatening HSV-1 encephalitis. The concomitant bacterial inflammations of chronic mastoiditis and suppurative otitis media, which predispose to secondary involvement of the nervous system, would shift the diagnostic thinking in this direction.

Up to the time of this hospitalization, there was no evidence of a disease leading to immunocompromise, including HIV (negative). However, the fact that the patient has a chronic inflammatory process can be considered as a cause of immunodepression, which in turn is a predisposing factor for the clinical manifestation or reactivation of another infection.

This case suggests that HSV-1 should be considered in any neurological manifestation, even in the presence of an undisputed diagnosis. Clinicians should consider HSV encephalitis and recognize the clinical signs and symptoms, even when they are masked by other neuroinfections [13]. RT-PCR is one of the most significant scientific achievements in molecular biology, and it is an excellent technique for the rapid detection of pathogens. Radiological features include hypodensity in the temporal lobes unilaterally or bilaterally, with or without involvement of the frontal lobe. However, in many cases, a normal CT scan cannot exclude the diagnosis but can still be useful in determining the etiology of encephalitis, as well as in identifying mimicking conditions [14]-[17].

4. Conclusions

HSV-1 encephalitis should be suspected in the presence of other neurological manifestations, even if there is an indisputable diagnosis, as in our case of chronic mastoiditis and suppurative otitis. Early diagnosis of HSV-1 encephalitis is of utmost importance for the therapeutic approach and outcome of the disease.

Written Consent

Written consent was obtained from the patient's family for this publication.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Leskinen, K. and Jero, J. (2005) Acute Complications of Otitis Media in Adults. *Clinical Otolaryngology*, **30**, 511-516. https://doi.org/10.1111/j.1749-4486.2005.01085.x

[2] Ayaz, Z., Taj, B., Yaseen, M.S., Ishaq, U., Laique, T., Malik, J., *et al.* (2020) Causality of Chronic Suppurative Otitis Media: An Observational Study. *Cureus*, **12**, e9832. https://doi.org/10.7759/cureus.9832

[3] Hafidh, M.A., Keogh, I., Walsh, R.M.C., Walsh, M. and Rawluk, D. (2006) Otogenic Intracranial Complications. A 7-Year Retrospective Review. *American Journal of Otolaryngology*, **27**, 390-395. https://doi.org/10.1016/j.amjoto.2006.03.004

[4] Wanna, G.B., Dharamsi, L.M., Moss, J.R., Bennett, M.L., Thompson, R.C. and Haynes, D.S. (2010) Contemporary Management of Intracranial Complications of Otitis Media. *Otology & Neurotology*, **31**, 111-117. https://doi.org/10.1097/mao.0b013e3181c2a0a8

[5] Elmamoun, S., Mavinamane, S. and Meenakisundaram, S. (2013) Stroke Mimics—A Case of Viral Encephalitis. *European Journal of Internal Medicine*, **24**, e51. https://doi.org/10.1016/j.ejim.2013.08.124

[6] Said, S. Kang, M. (2023) Viral Encephalitis. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK470162/

[7] Piret, J. and Boivin, G. (2020) Immunomodulatory Strategies in Herpes Simplex Virus Encephalitis. *Clinical Microbiology Reviews*, **33**, e00105-19. https://doi.org/10.1128/cmr.00105-19

[8] George, B.P., Schneider, E.B. and Venkatesan, A. (2014) Encephalitis Hospitalization Rates and In-Patient Mortality in the United States, 2000-2010. *PLOS ONE*, **9**, e104169. https://doi.org/10.1371/journal.pone.0104169

[9] Granerod, J., Davies, N.W.S., Mukonoweshuro, W., Mehta, A., Das, K., Lim, M., *et al.* (2016) Neuroimaging in Encephalitis: Analysis of Imaging Findings and Interobserver Agreement. *Clinical Radiology*, **71**, 1050-1058. https://doi.org/10.1016/j.crad.2016.03.015

[10] Venkatesan, A., Tunkel, A.R., Bloch, K.C., Lauring, A.S., Sejvar, J., Bitnun, A., *et al.* (2013) Case Definitions, Diagnostic Algorithms, and Priorities in Encephalitis: Consensus Statement of the International Encephalitis Consortium. *Clinical Infectious Diseases*, **57**, 1114-1128. https://doi.org/10.1093/cid/cit458

[11] Habis, R., Kolchinski, A., Heck, A.N., Bean, P., Probasco, J.C., Hasbun, R., *et al.* (2024) Absence of Cerebrospinal Fluid Pleocytosis in Encephalitis. *Clinical Infectious Diseases*, ciae391. https://doi.org/10.1093/cid/ciae391

[12] Hjalmarsson, A., Blomqvist, P. and Skoldenberg, B. (2007) Herpes Simplex Encephalitis in Sweden, 1990-2001: Incidence, Morbidity, and Mortality. *Clinical Infectious Diseases*, **45**, 875-880. https://doi.org/10.1086/521262

[13] Bewersdorf, J.P., Koedel, U., Patzig, M., Dimitriadis, K., Paerschke, G., Pfister, H., *et al.* (2018) Challenges in HSV Encephalitis: Normocellular CSF, Unremarkable CCT, and Atypical MRI Findings. *Infection*, **47**, 267-273. https://doi.org/10.1007/s15010-018-1257-7

[14] Tyler, K.L. (2004) Update on Herpes Simplex Encephalitis. *Reviews in Neurological Diseases*, **1**, 169-178.

[15] ElShimy, G., Mariyam Joy, C., Berlin, F. and Lashin, W. (2017) Intracranial Hemorrhage Complicating Herpes Simplex Encephalitis on Antiviral Therapy: A Case Report and Review of the Literature. *Case Reports in Infectious Diseases*, **2017**, Article ID: 6038146. https://doi.org/10.1155/2017/6038146

[16] Sun, X.W., Zhang, J.J., Ding, Y.P., Dou, F.F., Zhang, H.B., Gong, K.B. and Xu, A.T. (2011) Efficacy of High-Resolution CT in Differential Diagnosis of Chronic Suppurative Otitis Media and Cholesteatoma Otitis Media by Soft-Tissue Shadows. *Chinese Journal of Otorhinolaryngology Head and Neck Surgery*, **46**, 388-392.

[17] Sili, U., Kaya, A. and Mert, A. (2014) Herpes Simplex Virus Encephalitis: Clinical Manifestations, Diagnosis and Outcome in 106 Adult Patients. *Journal of Clinical Virology*, **60**, 112-118. https://doi.org/10.1016/j.jcv.2014.03.010