

2022

## A middle aged gentleman presenting with subacute Neurosyphilis: Report and Literature Review

Sherif Elkattawy

*Rutgers New Jersey Medical School Department of Internal Medicine*

Hardik Fichadiya

*Rutgers New Jersey Medical School Department of Internal Medicine, hardikfichadiya@gmail.com*

Tanya Shankar

*Rutgers New Jersey Medical School Department of Internal Medicine*

Xutong Guo

*St. George's University Department of Internal Medicine*

Omar Elkattawy

*Rutgers New Jersey Medical School Department of Internal Medicine*

*See next page for additional authors*

Follow this and additional works at: <https://scholarlycommons.gbmc.org/jchimp>

---

### Recommended Citation

Elkattawy, Sherif; Fichadiya, Hardik; Shankar, Tanya; Guo, Xutong; Elkattawy, Omar; Fichadiya, Harshil; Patel, Aditya; and Sherer, Clark (2022) "A middle aged gentleman presenting with subacute Neurosyphilis: Report and Literature Review," *Journal of Community Hospital Internal Medicine Perspectives*: Vol. 12: Iss. 2, Article 3.

DOI: 10.55729/2000-9666.1040

Available at: <https://scholarlycommons.gbmc.org/jchimp/vol12/iss2/3>

This Case Report is brought to you for free and open access by the Journal at GBMC Healthcare Scholarly Commons. It has been accepted for inclusion in Journal of Community Hospital Internal Medicine Perspectives by an authorized editor of GBMC Healthcare Scholarly Commons. For more information, please contact [GBMCcommons@gbmc.org](mailto:GBMCcommons@gbmc.org).

---

## **A middle aged gentleman presenting with subacute Neurosyphilis: Report and Literature Review**

### **Authors**

Sherif Elkattawy, Hardik Fichadiya, Tanya Shankar, Xutong Guo, Omar Elkattawy, Harshil Fichadiya, Aditya Patel, and Clark Sherer

# A Middle Aged Gentleman Presenting with Subacute Neurosyphilis: Report and Literature Review

Sherif Elkattawy<sup>a,b</sup>, Hardik Fichadiya<sup>a,b,\*</sup>, Tanya Shankar<sup>a,b</sup>, Xutong Guo<sup>e</sup>, Omar Elkattawy<sup>a</sup>, Harshil Fichadiya<sup>c</sup>, Aditya Patel<sup>d</sup>, Clark Sherer<sup>b</sup>

<sup>a</sup> Rutgers New Jersey Medical School, Department of Internal Medicine, 185 South Orange Ave, Newark, NJ 07103, USA

<sup>b</sup> Trinitas Regional Medical Center, Department of Internal Medicine, 225 Williamson Street Elizabeth, NJ 07202, USA

<sup>c</sup> Monmouth Medical Center, Department of Internal Medicine, 300 Second Ave, Long Branch, NJ 07740, USA

<sup>d</sup> Saint Michael's Medical Center, Department of Internal Medicine, 111 Central Ave, Newark, NJ 07102, USA

<sup>e</sup> St. George's University, Department of Internal Medicine, University Centre Grenada, West Indies, Grenada

## Abstract

Syphilis is a sexually transmitted disease spread by spirochete *Treponema Pallidum*, it has a varied range of symptoms and is divided into stages primary, secondary and tertiary. Central nervous system (CNS) invasion occurs early in the disease in almost all the patients, and does not follow any particular stage. However, clinical manifestation depends on whether inflammatory response occurs. (1)(2) Early neurosyphilis typically affects cerebrospinal fluid (CSF) and meninges presenting like meningitis, while late affects the brain and spinal cord parenchyma, presenting as tabes dorsalis and paresis. Here we present a case of a patient with symptomatic neurosyphilis presenting with CSF findings of bacterial meningitis.

**Keywords:** Atypical presentation of neurosyphilis, MRSA meningitis, Rapid plasma reagin test, CSF Venereal disease research laboratory test, CSF Fluorescent treponemal antigen–antibody test, IV aqueous Penicillin

## 1. Introduction

Syphilis is a sexually transmitted disease spread by spirochete *Treponema Pallidum*. It has a varied range of symptoms and is divided into stages primary, secondary and tertiary. Central nervous system (CNS) invasion occurs early in the disease in almost all the patients, and does not follow any particular stage. However, clinical manifestation depend on whether inflammatory response occurs or not.<sup>1,2</sup> Early neurosyphilis typically affects cerebrospinal fluid (CSF) and meninges presenting like meningitis, while late affects the brain and spinal cord parenchyma, presenting as tabes dorsalis and paresis. Here we present a Case of a patient with symptomatic neurosyphilis presenting with CSF findings of bacterial meningitis.

## 2. Case presentation

A 50-year-old male with no significant past medical history presented to the emergency department with a left frontal headache radiating to the occiput. It was gradual in onset, progressively worsening, pressure-like, and associated with photophobia and neck stiffness, which began 15 days ago and was partially responsive to Ibuprofen. He denied fever, chills, dizziness, vision changes, nausea, vomiting, sensory deficits, or hearing loss. Physical exam elicited a soft neck with painful flexion, equal and round pupils reactive to light and accommodation, negative Kernig and Brudzinski sign, and no spinal tenderness. Initial blood showed leukocytosis of 11.9 K (normal 4.8–10.8), with neutrophilia of 82% (typical 42–75%).

CT head showed some punctate calcifications in the parietal and temporal lobes but no acute

Received 13 July 2021; revised 13 November 2021; accepted 23 November 2021.  
Available online 12 April 2022.

\* Corresponding author at: 1070 Morris Ave, Apt 1123 Union, NJ 07083, USA.

E-mail addresses: [sherifelkattawy@gmail.com](mailto:sherifelkattawy@gmail.com) (S. Elkattawy), [hardikfichadiya@gmail.com](mailto:hardikfichadiya@gmail.com) (H. Fichadiya), [tanyashankar@yahoo.com](mailto:tanyashankar@yahoo.com) (T. Shankar), [xguo@sgu.edu](mailto:xguo@sgu.edu) (X. Guo), [ome11@scarletmail.rutgers.edu](mailto:ome11@scarletmail.rutgers.edu) (O. Elkattawy), [harshilfich@gmail.com](mailto:harshilfich@gmail.com) (H. Fichadiya), [adi3apr4@gmail.com](mailto:adi3apr4@gmail.com) (A. Patel), [csherer@gmail.com](mailto:csherer@gmail.com) (C. Sherer).

<https://doi.org/10.55729/2000-9666.1040>

2000-9666/© 2022 Greater Baltimore Medical Center. This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).

pathology. Cerebrospinal fluid (CSF) analysis was concerning for bacterial meningitis (as in Table 1). Urine cryptococcal and pneumococcal tests were negative.

Blood and CSF cultures were sent, and empiric treatment with intravenous antibiotics (2 gm ceftriaxone, 2 gm ampicillin, and 1 gm vancomycin) and dexamethasone was initiated.

Herpes simplex virus Polymerase Chain Reaction and Tuberculosis QuantiFERON tests were also negative.

As a part of meningitis workup, a serum rapid plasma reagin (RPR) test was performed, and positive titers of 1:64 were noted. The patient did not recall having any penile ulcers or mucocutaneous lesions. He has been in a monogamous relationship with his wife over the past 20 years and stated consistent condom use with his prior sexual partners.

CSF also tested positive for Venereal Disease Research Laboratory antibodies (titers of 1:1) and Fluorescent Treponemal Antigen–Antibody test.

Later, the patient started feeling symptomatically better. On day 3 of admission, CSF cultures grew Methicillin-Resistant *Staphylococcus Aureus* (MRSA). Given the sub-acute presentation of the patient's symptoms, MRSA meningitis seemed unlikely, raising a possibility of a para-vertebral source of MRSA infection creating these CSF findings. MRI of cervical, thoracic and lumbar spine with gadolinium contrast was remarkable for osteomyelitis and discitis at the C5–C6 vertebral endplates. The patient's nares were colonized with the bacteria, but he denied any intravenous drug abuse or skin infections. Also, blood cultures were negative for any organism growth. In the search for a focus of MRSA, an echocardiogram was performed, but no vegetations were noted.

Repeat CSF analysis on day four was still significant for neutrophilia but noted a downtrend in

glucose, protein, and total leucocyte count (Table 1). CSF cultures now did not grow any organisms.

The plan now was to treat the patient for neurosyphilis and MRSA discitis. We initiated treatment with 4 million IU of IV aqueous penicillin every 4 h for ten days for the neurosyphilis (Ideally, it's a 14-day course, but as our patient was treated with ceftriaxone in the initial few days, it was reasonable to reduce the duration of IV penicillin treatment). For the osteomyelitis and discitis, we continued therapy with IV Vancomycin in the initial four weeks, maintaining a trough of 20, and then transitioned to oral Linezolid and Rifampin for the next four weeks.

Work up for other sexually transmitted infections, including HIV, Hepatitis B, Hepatitis C, Chlamydia, and Gonorrhea was negative.

The patient was discharged to a sub-acute rehabilitation center with a peripherally inserted intravenous catheter for the prolonged antibiotic treatment.

### 3. Discussion

Meningitis was our top differential, given that our patient had presented with photophobia, headache, and neck stiffness. Current guidelines recommend CSF analysis and culture on admission.<sup>1</sup>

Performing a head CT scan prior to lumbar puncture has become standard at many institutions to avoid brain herniation.

Studies for the US Emergency department report a delay of up to 5.9 h to get the final CT Scan report.<sup>3</sup> Hence significant delays have been noted in the diagnosis and treatment of this fatal condition.

As per a study from the New England journal of medicine, in the absence of features like altered mental status, focal neurological signs, papilledema, seizure, or immunocompromised state, a lumbar puncture could be performed without a prior head CT Scan with a low risk for herniation. This

Table 1. CSF finding on the day of admission and 4 days later.

	Normal CSF levels	CSF levels on admission	CSF levels 4 days later
Appearance	Clear	Clear	Clear
Opening Pressure	10–25 cm	Not recorded	17 cm
WBC	0–8/mm <sup>3</sup>	1926/mm <sup>3</sup>	324/mm <sup>3</sup>
PMN	<2	64	77
Lymphocytes		6	23
RBC <sup>a</sup>	0/mm <sup>3</sup>	79/mm <sup>3</sup>	10/mm <sup>3</sup>
Glucose	45–60 mg/dl Normal CSF glucose to serum glucose ratio: 0.04	12 mg/dl (CSF glucose: serum glucose ratio 0.09)	58 mg/dl
Protein	15–60 mg/dl	202 mg/dl	155 mg/dl
Culture	No growth	MRSA	No growth

<sup>a</sup> RBC count should not be higher than 1 RBC for every 5 WBCs (which would indicate a bloody tap).

approach has been estimated to decrease the number of CT Scans by 41% in patients suspected to have meningitis.<sup>4</sup>

When acute bacterial meningitis is suspected, and a delay in lumbar puncture is expected, recommendations are to treat patients with empiric antibiotics with 1 h of presentation to reduce the risk of death and poor outcomes.<sup>5</sup>

Findings suggestive of bacterial meningitis on CSF analysis are an elevated opening pressure (200–500 mmH<sub>2</sub>O), an elevated WBC count ranging from 1000 to 5000 cells/cubic mm with a neutrophilic predominance (although 10% of cases may have lymphocytic predominance), decreased glucose concentration to < 40 mg/dl in 50–60% cases (with CSF glucose to serum glucose concentration >0.04), and an elevated protein concentration. In the absence of prior empiric antibiotic administration, CSF cultures are positive in 70–85% of cases.<sup>6</sup> As noted above, our patient had an elevated WBC count, decreased glucose concentration, and elevated protein concentration, consistent with the diagnosis of bacterial meningitis.

MRSA meningitis presents acutely with severe symptoms like altered mental status, seizures, high-grade fevers, and recurrent bacteremia. It progresses rapidly and is associated with a poor prognosis.<sup>7</sup>

Although one of the patient's CSF cultures grew MRSA, it is unlikely to cause his illness as our patient had a sub-acute course and was not septic.

In light of the imaging consistent with osteomyelitis and discitis, MRSA in CSF could be due to sample contamination.

Neurosyphilis presents a spectrum of diseases, including asymptomatic Neurosyphilis, meningeal Neurosyphilis, meningovascular Neurosyphilis, general paresis, and tabes dorsalis. Although it is a reported disease, the exact incidence remains unknown due to the vague classification and varied presentation.<sup>8</sup>

The pathophysiology includes *T. pallidum* infecting the cerebral spinal fluids, meninges, and meningovascular tissue inciting systemic B cell and T cell-mediated immune responses causing inflammation and CSF pleocytosis.<sup>9</sup>

CSF analysis is the gold standard for diagnosis. Although commonly employed, CSF VDRL is not a very sensitive test and cannot exclude the disease. CSF FTA-ABS is characterized by high sensitivity but low specificity, particularly in asymptomatic Neurosyphilis. Hence in cases of CSF pleocytosis with non-reactive CSF VDRL, CSF FTA-ABS can be used to rule out Neurosyphilis definitively.<sup>10</sup>

Our patient's presentation and CSF exams are consistent with early Neurosyphilis, and treatment with 4 million units IV Aqueous Penicillin G every 4 h for 10–14 days was employed.

#### 4. Conclusion

Prognosis of neurosyphilis depends on stage at presentation, where patients who are asymptomatic or have meningitis usually revert to normal health. Treatment should be initiated immediately; penicillin is the mainstay. CSF VDRL is highly specific and should always be ordered in CSF analysis to catch the disease early and start appropriate treatment.<sup>4</sup>

#### Conflict of interest

No potential conflict of interest was reported by the authors.

#### References

- Alamarat Z, Hasbun R. Management of acute bacterial meningitis in children. *Infect Drug Resist.* 2020 Nov 11;13: 4077–4089. <https://doi.org/10.2147/IDR.S240162>. PMID: 33204125; PMCID: PMC7667001.
- Van de Beek D, de Gans J, Spanjaard L, Weisfelt M, Reitsma JB, Vermeulen M. Clinical features and prognostic factors in adults with bacterial meningitis. *N Engl J Med.* 2004;351(18):1849–1859. <https://doi.org/10.1056/NEJMoa040845>. Erratum in: *N Engl J Med.* 2005 Mar 3;352(9):950. PMID: 15509818.
- Perotte R, Lewin GO, Tambe U, et al. Improving emergency department flow: reducing turnaround time for emergent CT scans [internet]. In: *AMIA annual symposium proceedings. AMIA symposium.* American Medical Informatics Association; 2018 [cited 2021Jul12]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6371246>.
- Hasbun R. *Computed tomography of the head before lumbar puncture in adults with suspected meningitis: NEJM [internet].* Author Affiliations From the Departments of Internal Medicine (R.H., Steigbigel NH, Others) AJand, T. T. Shimabukuro and Others, M. G. Thompson and Others. *New England Journal of Medicine*; 2001 [cited 2021Jul12]. Available from: <https://www.nejm.org/doi/full/10.1056/NEJMoa010399>.
- van de Beek D, Cabellos C, Dzupova O, et al. *ESCMID guideline: diagnosis and treatment of acute bacterial meningitis [Internet]. Clinical microbiology and infection : the official publication of the European Society of Clinical Microbiology and Infectious Diseases.* U.S. National Library of Medicine; 2016 [cited 2021Jul12]. Available from: <https://pubmed.ncbi.nlm.nih.gov/27062097>.
- van de Beek D, Cabellos C, Dzupova O, et al. *ESCMID guideline: diagnosis and treatment of acute bacterial meningitis [Internet]. Clinical microbiology and infection : the official publication of the European Society of Clinical Microbiology and Infectious Diseases.* U.S. National Library of Medicine; 2016 [cited 2021Jul12]. Available from: <https://pubmed.ncbi.nlm.nih.gov/27062097>.
- Gordon JJ, Harter DH, Phair JP. Meningitis due to *staphylococcus aureus* [Internet]. Elsevier *Am J Med.* June 1985;78(6 Part 1):965–970. <https://www.sciencedirect.com/science/article/abs/pii/0002934385902190>.
- Marra CM, Maxwell CL, Sahi SK, Tantalo LC, Dunaway SB, Lukehart SA. *Previous syphilis alters the course of subsequent episodes of syphilis [internet].* *Clinical infectious diseases : an*

- official publication of the Infectious Diseases Society of America. Oxford University Press; 2020 [cited 2021Jul12]. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7442847/>.
9. Gudowska-Sawczuk, Monika, Barbara Mroczko. Chemokine ligand 13 (CXCL13) in neuroborreliosis and neurosyphilis as selected spirochetal neurological diseases: a review of its diagnostic significance. *Int J Mol Sci.* 22 Apr. 2020;21(8):2927. <https://doi.org/10.3390/ijms21082927>.
  10. Hicks Charles B, Clement Meredith. Syphilis: screening and diagnostic testing [internet]. UpToDate. [cited 2021Jul12]. Available from: [https://www.uptodate.com/contents/syphilis-screening-and-diagnostic-testing?search=neurosyphilis&topicRef=7599&source=see\\_link#H3942014125](https://www.uptodate.com/contents/syphilis-screening-and-diagnostic-testing?search=neurosyphilis&topicRef=7599&source=see_link#H3942014125).