



Intrigue in the Meninges: A case of back pain with diffuse leptomeningeal enhancement

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Learning Objectives

- Develop an approach to rapidly progressing neurological deficits.
- Recognize the heterogeneity of clinical presentations for Lyme meningitis.

Evidence of Conflict of Financial Interest

None

	Co-author	Conflict disclosures
1	Dave Buchan	None
2	Krista Wooller	None

Clinical case

- 84F with a history of hypothyroidism and hypertension presented with severe back and abdominal pain.
- Given longstanding fecal incontinence, underwent an MRI spine which showed *diffuse leptomeningeal enhancement and thickening of the cauda equina nerve roots*.
- Lumbar puncture demonstrated elevated CSF protein and lymphocytes, elevated CD4:CD8 T cell ratio on flow cytometry.
- Blood and urine cultures, blastomyces, histoplasma, syphilis, HIV, CSF bacterial + fungal cultures and VZV/HSV PCRs all negative.



MRI spine (T1 sequence): Leptomeningeal enhancement from T9–L5 down to the sacrum with mild thickening of the cauda equina nerve roots

Clinical case continued

Day 10 of admission: rapidly progressive ascending upper extremity weakness, followed by left facial nerve palsy with a forehead-sparing facial droop and lid lag.

- Repeat MRI spine and brain: *progressive leptomeningeal disease now involving the left internal auditory canal and bilateral trigeminal nerves*
- EMG: diffuse absence of F-wave responses and reduced recruitment without active denervation in C7 and C8 myotomes in keeping with polyradiculopathy
- Spinal cord biopsy at the site of leptomeningeal enhancement: *lymphocytic infiltration favouring inflammation*
- Started empirically on IV methylprednisolone 1g IV daily for possible CNS lymphoma with marginal improvement

Day 22 of admission: Lyme serologies positive in both tiers

- Started on ceftriaxone 2g IV daily for total of 21 days
- Neurological deficits gradually resolved, eventually transferred to rehab following course of antibiotics

Nervous system Lyme disease



PRESENTATION

- Occurs **weeks to a few months** after a tick bite, may be the first manifestation of Lyme disease
- **Meningitis:** headache, fever, photophobia
- **Facial nerve palsy:** most common cranial nerve involved, develops over hours to days, can be bilateral
- **Radiculoneuritis:** dermatomal radicular pain with corresponding sensorimotor deficits, reflex changes



DIFFERENTIAL

- **Meningitis:** bacterial (including Syphilis), viral, fungal, TB, lymphoma, leptomeningeal carcinomatosis
- **Facial nerve palsy:** Herpes zoster, Guillain-Barré syndrome, sarcoidosis, HIV, Sjögren's, MS, stroke
- **Radiculoneuritis:** spinal stenosis, primary CNS malignancy, leptomeningeal metastases, diabetic amyotrophy, HIV, ANCA vasculitis



WORKUP

- Blood and urine cultures, blastomyces, histoplasma, syphilis, HIV, Lyme serology
- CSF bacterial and fungal cultures, VZV/HSV PCRs, West Nile virus, enteroviruses, etc; cytology and flow cytometry for malignancy
- Neuro-imaging if CNS involvement, EMG and nerve conduction studies if suspicious for radiculoneuritis



TREATMENT

- **Doxycycline** 100mg BID for 14–21 days
- **Ceftriaxone** 2g IV daily for 14–28 days if severe (e.g. encephalitis)