

Listeria Spinal Cord Abscess – Clinical and MRI Findings

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ABSTRACT: *Background:* Intramedullary spinal cord abscess due to *Listeria Monocytogenes* is an uncommon condition usually affecting immunocompromised patients. *Method:* Case study. *Results:* A 69-year-old man presented with 3 weeks history of subacute paralysis of both lower limbs and the left upper limb. Myelogram and CT scan showed a widened upper cervical cord. CSF revealed lymphocytosis, moderately elevated protein and depressed glucose. A gadolinium-enhanced MRI showed diffuse cervical cord edema with two ring-enhancing lesions at C2-C3. Blood and CSF cultures grew *Listeria Monocytogenes*. He received IV ampicillin and gentamycin; the latter was discontinued after 1 month due to nephrotoxicity. Serial MRI over the next 3 months showed significant reduction in the size of these abscesses. The patient made a modest improvement in the power of his lower limbs, however he remained bed-ridden. Aside from being a mild, diet-controlled diabetic, there was no evidence of immunosuppression. *Conclusion:* *Listeria* spinal cord abscess is a treatable disorder and should be considered in the differential diagnosis in patients with a subacute onset of spinal cord dysfunction.

RÉSUMÉ: *Abcès à Listeria de la moelle épinière: observations cliniques et RMN. Introduction:* L'abcès intramédullaire dû au *Listeria monocytogenes* est une condition rare qui atteint généralement les patients immunocompromis. *Méthode:* Étude de cas. *Résultats:* Un homme âgé de 69 ans s'est présenté avec une histoire de paralysie subaiguë des deux membres inférieurs et du membre supérieur gauche apparue trois semaines auparavant. Le myélogramme et le CT scan ont montré une moelle cervicale haute élargie. Le LCR a montré une lymphocytose, une élévation modérée des protéines et un abaissement du glucose. Une RMN rehaussée au gadolinium a montré un oedème diffus de la moelle cervicale avec deux lésions rehaussantes en anneaux au niveau de C2-C3. Des cultures du sang et du LCR ont révélé la présence de *Listeria monocytogenes*. Le patient a reçu de l'ampicilline et de la gentamycine IV, cette dernière médication ayant été cessée après un mois à cause de la néphrotoxicité. La RMN sériée sur une période de 3 mois a montré une diminution significative de la taille de ces abcès. La récupération a été minime et le patient est demeuré alité. Ce patient avait un diabète léger contrôlé par la diète. Il n'avait pas d'évidence d'immunosuppression. *Conclusions:* L'abcès spinal à *Listeria* est une maladie traitable et devrait être considéré dans le diagnostic différentiel des patients qui ont une dysfonction de la moelle épinière à début subaigu.

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Listeria Monocytogenes is a gram-positive rod ubiquitous in soil, water and sewage. It was first reported by Nyfeldt in 1929 as a cause of infection in humans.¹ Since then 186 cases of adult listeriosis have been reported in the English literature by 1980.² Patients with malignancy,³ connective tissue disease,⁴ those receiving immunosuppressive drugs,⁵ patients with AIDS,⁶ pregnant women, neonates and the elderly² are particularly prone to develop listeriosis. Although meningitis is the usual form of presentation, rhombencephalitis,^{7-9,19} brain abscess,^{6,10} and spinal cord abscess^{11-13,17,18} are increasingly being recognized since the advent of magnetic resonance imaging (MRI). The following is a case report of *Listeria* spinal cord abscess studied serially with MRI and successfully treated with intravenous ampicillin without surgical intervention.

CASE REPORT

A 69-year-old right-handed Caucasian man developed subacute onset of paresthesia of his feet and unsteady gait in July 1994. He was otherwise healthy except for mild diet-controlled diabetes mellitus, hypertension, gout and moderate daily alcohol consumption of 2 to 3 oz.

Initial examination showed normal mental status and cranial nerves. Motor power was normal in the upper and lower limbs. Deep tendon reflexes were 2+ and symmetrical in the upper limbs but ankle reflexes

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were absent. Detailed sensory examinations of the upper limbs were normal; however he had reduction of pain sensation at his toes. The Romberg test was positive and his tandem gait was poor. Laboratory investigations showed WBC $12.1 \times 10^9/L$ with neutrophilia; ESR = 3; random blood sugar was slightly elevated at 9.5 mmol/L. HbA1C was also increased at 0.078 (normal 0.043-0.061). His VDRL was negative, protein electrophoresis was normal, chest X-ray and 5-TU TB skin test were negative. EMG and nerve conduction studies showed a mild sensory-motor peripheral neuropathy of his lower extremities.

Two weeks later, he developed progressive left upper limb and bilateral leg weakness. Examination showed moderate tri paresis (MRC power 3/5). His biceps and brachioradialis reflexes were absent bilaterally and the left plantar response was extensor. There was severe loss of vibration and joint-position sense of his feet. CT scan of his brain was normal. A myelogram-CT scan showed an enlarged upper cervical cord with spondylolytic bar at C4-5.

Initial MRI (Figure 1) showed diffuse expansion of the cervical cord from C2 to C7 suggestive of significant edema. He received IV dexamethasone (Decadron) for three days with a presumptive diagnosis of post-infectious myelitis. Subsequent gadolinium-enhanced MRI (Figure 2) showed two intramedullary "ring" enhancing lesions. CSF revealed 96 WBC with 90% lymphocytes, glucose was depressed at 3.9 mmol/L (blood sugar was 9.5 mmol/L), protein was increased to 1.31 g/L (normal <0.45 gm/L). The blood and CSF cultures grew *Listeria Monocytogenes*. His dexamethasone was discontinued and he received 12 gm/d of IV ampicillin and gentamycin 160 mg q8h. The latter antibiotic was discontinued after one month due to nephrotoxicity. His HIV test was negative and there was no laboratory evidence of connective tissue disease.

Serial MRIs (Figures 3, 4) were obtained over the next 2 months to determine his response to parenteral antibiotic therapy. His overall condition improved slowly over the next few months; however he remained bedridden and was eventually transferred to a chronic rehabilitation unit. Unfortunately, he died suddenly of a myocardial infarction 6 months later and no autopsy was permitted.

DISCUSSION

Listeria Monocytogenes spinal cord abscess is a rare but potentially treatable cause of subacute spinal cord disorder.



Figure 1: Sagittal T2-weighted MR (TR/TE/excitations, 4000/85/2) shows a diffuse, intramedullary hyperintensity from the lower brainstem to Th1 (arrows) with two oval lesions in upper cervical cord (arrow heads).



Figure 2: Sagittal gadolinium-enhanced T1-weighted MR (TR/TE/excitations, 616/16/3) shows two intramedullary "ring" enhancing lesions (arrows).

There were five previous cases reported in the English literature^{11-13,17,18} and the current report is the sixth documented case (Table). The first autopsy case of *Listeria* spinal cord and brain stem abscess was reported in a healthy 39-year-old man in Britain (1971).¹³ Kendall et al.¹¹ reported the clinical and autopsy



Figure 3: Six weeks after initial MR, sagittal gadolinium-enhanced T1-weighted MR (TR/TE/excitations, 733/15/2) shows reduction in areas of "ring" enhancement (arrows) in the upper cervical cord but a new lesion is seen at Th1.

Table: Summary of *Listeria* Spinal Cord Abscess in English Literature (1970 - 1996).

Author	Age	Sex	Location	Imaging	Cultures	Rx	Outcome
British Public Health (1971)	39	M	Upper Cervical Cord + Brainstem	None	Abscess of Brainstem at Necropsy	None	Died
Kendall (1972)	60	F	Mid Thoracic	None	CSF(+)	IV Amp. & Chlor. ¹	Died
Morrison (1980)	32	M	Cervical Cord	Myelogram	Open Cord Biopsy (+)	IV Amp. & Chlor. ¹	Ambulatory
King (1993)	50	M	Cervical, Brain	Myelo. & MRI	Blood (+)	Open Biopsy	Died post-op.
Pfadenhauer (1995)	73	M	Thoracic	Myelo. & MRI	CSF(+)	IV Amp. & Gent. ²	Paraplegia
Chu (1996)	69	M	Cervical, Thoracic	Myelo. & MRI	Blood, CSF (+)	IV Amp. & Gent. ²	Triplegia, died of MI

¹ Ampicillin and Chloramphenicol² Ampicillin and Gentamycin

findings of a 68-year-old woman with Th4 to Th8 intramedullary abscess with *Listeria monocytogenes* meningitis. Her predisposing factor was a history of alcoholism and hepatic cirrhosis. Morrison et al.¹⁷ described a previously healthy 32-year-old man who responded favorably to intravenous antibiotic therapy for a biopsy-proven cervical intramedullary abscess due to *Listeria*. Since the advent of MRI, two further cases of *Listeria* spinal cord abscess were reported in the literature by King et al. in 1993¹² and Pfadenhauer et al. in 1995.¹⁸ The patient in this current case has mild diabetes mellitus which could be a predisposing factor for developing *Listeria* infections. It is commonly known that diabetics are more susceptible



Figure 4: Ten weeks after initial MR, sagittal gadolinium-enhanced T1-weighted MR (TR/TE/excitations, 633/15/2) shows significant improvement with only minimal patchy enhancement of the cord (small arrows).

to develop bacterial and fungal infections due to impaired humoral and cellular immunity. This patient was HIV negative and was not on any immunosuppressive treatments. Although the gastrointestinal tract is considered to be the site of invasion by *Listeria*,¹⁸ the fact that it was detected in blood cultures suggests its spread is by hematogenous route.

MRI with gadolinium enhancement is the best neuroimaging technique currently available to accurately document the location and size of intramedullary abscess due to *Listeria*. Early and adequate intravenous ampicillin (12 gm/day) and aminoglycosides is recommended in the treatment due to their synergistic effect. Other antibiotics found to be helpful are rifampin¹⁸ and chloramphenicol.^{11,17} Nevertheless, despite significant radiological improvement; neurologic function may not fully recover. It has been observed that vasculitis in leptomeningeal and penetrating arteries may result in spinal cord ischemia or even infarction hence explaining the overall unfavorable outcome in neurolisterosis.¹⁹ It is therefore important to diagnose *Listeria* spinal cord abscess early and institute appropriate therapy when patients develop any spinal complications in the course of acute bacterial meningitis.

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