

Children's Mercy Kansas City

SHARE @ Children's Mercy

Posters

11-2023

A case report of a 48-year-old female with cauda equina syndrome in the setting of disseminated MRSA infection

Aimee Lambeth

Sarah Eickmeyer

Stephanie Fortune

Let us know how access to this publication benefits you

Follow this and additional works at: <https://scholarlyexchange.childrensmercy.org/posters>



Part of the [Rehabilitation and Therapy Commons](#)



Objective:

To present an interesting case of cauda equina syndrome due to disseminated MRSA, where inpatient EMG was useful in diagnosis and treatment planning.

Background:

Cauda equina syndrome is a polyradiculopathy of the spinal nerves as they exit the inferior portion of the spinal cord. It generally presents with a classic triad of symptoms including lower extremity weakness, saddle anesthesia with perineal numbness, and bowel and bladder dysfunction. While these symptoms vary in severity, symmetry and exact pattern, this is generally a lower motor neuron syndrome with hyporeflexia and weakness. It is most commonly caused by a disc herniation or disc disease, but may also be caused by trauma, malignancy or infection. EMG is a useful tool in diagnosing this syndrome.

Physical Exam:

Table 3: Neurologic exam on admission to inpatient rehabilitation.

General, cognition	Awake, alert, oriented, Montreal Cognitive Assessment score 22/30 (mild cognitive impairment)
Cranial nerves	Mild right tongue deviation
Cerebellar and coordination	Finger to nose with mild dysmetria bilaterally
Sensation	Pt reports tingling throughout her right leg, worse in anterior right thigh
Tone	No clonus or increased tone noted in bilateral upper and lower extremities
Reflexes	(-) Hoffman bilaterally. DTRs 2/4 in upper extremities and 1/4 in lower extremities (right patellar, unable to assess 2/2 wound vac). Downgoing Babinski bilaterally.
Muscle Strength	Noted mild (4 to 4+/5) proximal weakness in both arms and legs, full strength (5/5) in bilateral wrist extension, finger flexion, and finger abduction. Noted left ankle dorsiflexion 2/5, eversion 3/5, and left great toe extension 1/5, with left ankle inversion and plantarflexion 4/5. On the right, ankle dorsiflexion, plantarflexion, eversion and inversion were all 5/5, but right great toe extension was only 3/5.

A case report of a 48-year-old female with cauda equina syndrome in the setting of disseminated methicillin-resistant Staphylococcus aureus infection.

Aimee Lambeth, DO, Sarah Eickmeyer, MD, and Stephanie Fortune, DO
Department of Rehabilitation Medicine, The University of Kansas Medical Center

Case description:

In late summer, a 48-year-old female was found down and obtunded, with extensive burns noted due to prolonged exposure to hot concrete, 10% TBSA. She was found to be critically ill, with disseminated MRSA infection. Her initial ICU stay included intubation for airway protection, CRRT with transition to HD, lactic acidosis, rhabdomyolysis, and septic shock. Her hospital course included initial blood culture with positive MRSA smear in 2/2 bottles, positive CSF and psoas muscle abscess cultures for MRSA, and evidence of multifocal neurological involvement.

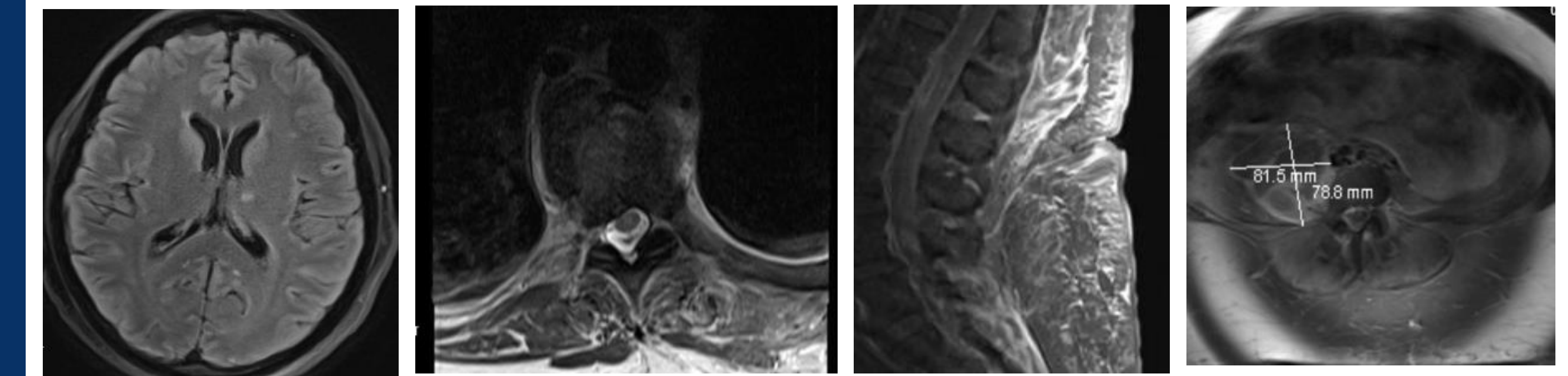
She had evidence of (1) small multifocal embolic strokes, (2) ventriculitis, (3) mid-thoracic cord compression, edema and myelomalacia (worse on left at T5-6 level), (4) meningitis and arachnoiditis along the thoracic and lumbar spine with paravertebral myositis, (5) enhancement of the cauda equina nerve roots, and (6) abscess and myositis in the right psoas muscle. She completed 6 weeks of IV antibiotics during her stay.

She was admitted to inpatient rehabilitation after 12 weeks in acute care. She reported no significant prior medical history before her current hospitalization. She was noted to have BMI 41. She had been diagnosed with a rash concerning for drug reaction with eosinophilia and systemic symptoms (DRESS) during her acute care admission, and continued on a prednisone taper for this, which she completed while in inpatient rehab. Admission exam was notable for left leg weakness, significantly greater than right. She confirmed that her weakness was new during this hospitalization. In addition to left leg weakness, she noted paresthesias around the site of a right wound vacuum-assisted closure device (where she had developed a secondary Enterobacter cloacae infection during her acute care stay), and possibly some vague/generalized numbness all throughout right leg, but no sensory changes in her left leg. She had intermittent urinary incontinence, with a component of retention, requiring occasional straight catheterization while in rehab.

About a week after her rehab admission, electrodiagnostic testing was performed on the left lower extremity to help clarify the cause of her left leg weakness. Nerve conduction studies assessing left sural sensory nerve, left superficial peroneal sensory nerve, left motor peroneal nerve to the extensor digitorum brevis, and left tibial motor nerve to the abductor hallucis all fell within normal limits; see table to right. Needle EMG was notable for evidence of acute, active/ongoing denervation in the left tibialis anterior, left peroneus longus and left medial gastrocnemius muscles. We concluded this was most consistent with a lesion affecting the L4-S1 nerve roots, consistent with an acute, severe polyradiculopathy, or cauda equina syndrome.

Table 2: Imaging findings, and selected radiology

Brain MRI (6 days after initial admission, see FLAIR below on left)	Small foci of restricted diffusion in left ventral thalamus, subependymal margins of left frontal horns, occipital horns of lateral ventricles bilaterally, concerning for multifocal (likely septic emboli-related) acute infarcts and ventriculitis.
Thoracic spine MRI (6 days, then repeated 10 days, after initial admission – 2nd image from left, from 6 days after admission)	Right T3 facet edema or effusion, left paracentral disc protrusion and degenerative changes at T5-6 with left spinal canal stenosis, cord compression and cord edema at this level, T7 vertebral body hyperintensity thought to reflect degenerative edema vs early osteomyelitis, diffuse edema in left greater than right paraspinal muscles consistent with myositis, as well as mild degenerative spinal changes from T7-T12.
Lumbar spine MRI (6 days after initial admission, see image that is 3rd from left)	Grade I anterolisthesis at L4-5, diffuse meningeal thickening and enhancement throughout the lumbar spinal canal, enhancement of the cauda equina nerve roots, conus in normal position at L1-2, described right psoas abscess and paraspinal muscle edema as noted above, anterolisthesis, symmetric disc bulge, ligamentum flavum thickening and facet arthrosis at L4-L5 resulting in mild to moderate central spinal stenosis, moderate bilateral lateral recess stenosis, and mild bilateral neural foraminal stenosis.
MRI pelvis (about 2.5 weeks after admission, see far right image)	Described abscess noted on prior L spine MRI: multiloculated iliopsoas abscess extending into retroperitoneum, pelvis, and right pelvic sidewall, as well as edema of right adductor, piriformis, gluteus, and partially visualized anterior thigh musculature as above likely representing contiguous spread of infection/pyomyositis.



EMG Findings:

Nerve / Sites	Muscle	Latency (ms)	Ref. (ms)	Amplitude (mV)	Ref. (mV)	Area (mV)	Duration (ms)	Segments	Distance (cm)	Lat Diff (ms)	Velocity (m/s)	Ref. (m/s)	Temp. (°C)
L. Peroneal - EDB	EDB	5.5	6.5	1.8	1.3	6.6	0.1	Ankle - EDB	8				30.2
B. Fib	EDB	12.5	1.4	5.1	6.3	B. Fib head - Ankle	26.5		7.0		34	338	30.2
A. Fib - Head	EDB	14.2	1.5	5.6	6.4	A. Fib Head - B. Fib head	10	1.6	61	342			30.3
L. Tibial - AH	AH	4.3	6.1	5.1	14.4	16.7	5.7	Ankle - AH	8				29.9
Pop. fossa	AH	12.1	4.2	15.1	6.3	Pop fossa - Ankle	34	7.8	44	239			30.2

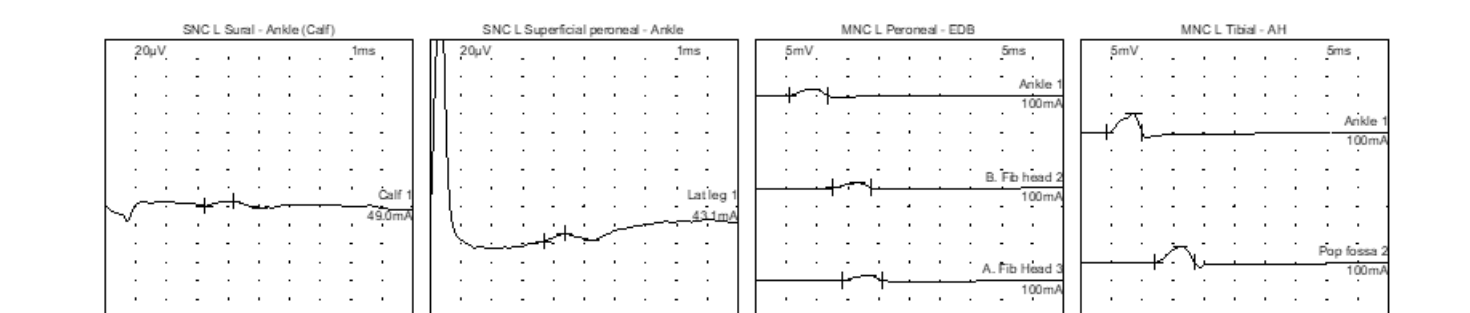
Nerve / Sites	Rec. Site	Onset Lat (ms)	Peak Lat (ms)	Ref. (ms)	NP Amp (µV)	Ref. (µV)	Segments	Distance (cm)	Velocity (m/s)	Temp. (°C)
L. Sural - Ankle (Call)	Call	3.3	4.2	5.4	5.3	14.0	Call - Ankle	14	43	30.2
L. Superficial peroneal - Ankle	Ankle	3.7	4.4	5.4	7.8	25.0	Lat leg - Ankle	14	38	30.3

Muscle	Spontaneous	LA	Fib	PSW	Fasc	Amp	Duration	PPV	Recruitment	Interference	Adt	Comments
L. Tibialis anterior	None	None	None	None	None	None	None	None	None	None	None	None
L. Peroneus longus	None	None	None	None	None	None	None	None	None	None	None	None
L. Gastrocnemius (Medial head)	None	None	None	None	None	None	None	None	None	None	None	None

Conclusion:

ABNORMAL

1. There is electrodiagnostic of an acute, severe left L4-S1 polyradiculopathy.
2. There is no evidence of a left lumbosacral plexopathy.
3. There is no evidence of a left sciatic, fibular or tibial mononeuropathy.
4. There is no evidence of a peripheral polyneuropathy.



Conclusion:

Disseminated MRSA infection is a rare but important cause of cauda equina syndrome. EMG is a helpful tool for physiatrists and clinicians to use in the inpatient setting when diagnostic clarity is needed, and will help guide treatment and rehabilitation.

References

1. Gardner A, Gardner E, Morley T. Cauda equina syndrome: a review of the current clinical and medico-legal position. *European Spine Journal*. 2011;20(5):690-697. doi:10.1007/s00586-010-1668-3
2. Krishnan V, Amritanand R, Sundararaj G. Methicillin-Resistant Staphylococcus aureus as a Cause of Lumbar Facet Joint Septic Arthritis: A report of Two Cases. *The Journal of Bone & Joint Surgery*. 2010; 92 (2): 465-468. doi: 10.2106/JBJS.H.01888.
3. Walton A, Mecklosky J, Carr C, et al. Cauda Equina Syndrome Secondary to Diffuse Infiltration of the Cauda Equina by Acute Myeloid Leukemia: Case Report and Literature Review. *World Neurosurgery*. 2020;134:439-442. doi:10.1016/j.wneu.2019.11.068
4. Cohen DB. Infectious origins of cauda equina syndrome. *Neurosurgical focus*. 2004;16(6):e2. doi:10.3171/foc.2004.16.6.2
5. Perez-Moreno, et al. Unusual presence of the immune evasion gene cluster in livestock-associated MRSA of lineage CC398 causing peridural and psoas abscesses in a poultry farmer. *Emerg Infect Microbiol Clin*. 2017 Dec;35(10):651-654. doi: 10.1016/j.eimc.2016.07.008. Epub 2016 Sep 1.
6. Agarwal, et al. Presentation of cauda equina syndrome due to an intradural extramedullary abscess: a case report. *Spine J*. 2014 Feb 1;14(2):e1-6. doi: 10.1016/j.spinee.2013.09.029. Epub 2013 Oct 17.
7. Kumar, et al. Outcomes of cauda equina syndrome due to lumbar disc herniation after surgical management and the factors affecting it: a systematic review and meta-analysis of 22 studies with 852 cases. *Eur Spine J*. 2022 Feb;31(2):353-363. doi: 10.1007/s00586-021-07001-0. Epub 2021 Sep 28.