Case Report

Diffuse large B-cell lymphoma presenting as acute lumbosacral plexopathy with persistent lower back pain and fatigability

Ritwik Ghosh[1*], Moisés León-Ruiz[2*], Abdus S. Mondal[3], Souvik Dubey[4], Julián Benito-León[5,6,7,8]

[1]Department of General Medicine, Burdwan Medical College and Hospital, Burdwan, West Bengal, India, [2]Department of Neurology, Section of Clinical Neurophysiology, University Hospital "La Paz," Madrid, Spain, [3]Department of Neuromedicine, Bankura Sammilani Medical College and Hospital, Bankura, West Bengal, India, [4]Department of Neuromedicine, Bangur Institute of Neurosciences, Kolkata, West Bengal, India, [5]Department of Neurology, University Hospital "12 de Octubre", Madrid, Spain, [6]Instituto de Investigación Sanitaria Hospital 12 de Octubre (imas12), Madrid, Spain, [7]Centro de Investigación Biomédica en Red Sobre Enfermedades Neurodegenerativas (CIBERNED), Madrid, Spain, [8]Department of Medicine, Complutense University, Madrid, Spain

**RG and ML-R contributed equally and are considered joint first authors.*

Abstract

Various types of lymphoma can involve the lumbosacral plexus, mainly diffuse large B-cell lymphoma, in which cancer-related persistent fatigue and fatigability (a new concept that assesses fatigue to specific activities) can occur. We report a rare case of acute right L2-S1 lumbosacral plexopathy secondary to diffuse large B-cell lymphoma, presenting with persistent lower back pain and pronounced fatigability. A 49-year-old male with controlled primary hypothyroidism experienced progressive lower back pain extending to the right lower limb, accompanied by dysesthesias and significant fatigue exacerbated by physical activities. Clinical examination revealed asymmetrical lower limb weakness, an absent right ankle reflex, and a positive straight leg raise test indicative of lumbosacral plexopathy. Comprehensive serological and imaging evaluations, including MRI and 18F-FDG PET-CT, identified lumbosacral spine lesions and widespread lymphomatous involvement. Immunohistochemical analysis confirmed the presence of CD20+, CD10+, bcl2+, bcl6+, and MUM1+ cells, establishing a diagnosis of diffuse large B-cell lymphoma. This case underscores the importance of considering lymphomatous lumbosacral plexopathy in the differential diagnosis of fatigability and lower back pain to prevent misdiagnosis and ensure timely, appropriate treatment. Further studies are suggested to explore the implications of lymphoma on neuropathy and chronic fatigability among survivors.

Keywords: 18F-FDG PET-CT, cancer-related fatigue, diffuse large B-cell lymphoma, fatigability, immunohistochemistry, lumbosacral plexopathy, MRI, neuropathy, persistent lower back pain

Address for correspondence: Dr. Julián Benito-León, Department of Neurology, University Hospital "12 de Octubre", Madrid, Spain.
E-mail: jbenitol67@gmail.com

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Introduction

Different types of lymphoma can affect the lumbosacral plexus, mainly diffuse large B-cell lymphoma, Burkitt, Hodgkin, MALT type, and rarely T-cell lymphoma.[1] Pain is the most prominent symptom, radiating into the lumbar fossa, hip, buttocks, and

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legs.[1] Cancer-related persistent fatigue frequently occurs in diffuse large B-cell lymphoma patients (up to 36%), significantly impacting their health-related quality of life;[2,3] however, its subjective nature makes it challenging to identify. The relatively new concept of fatigability evaluates fatigue in relation to specific activities or situations. As such, it may serve as a valuable and discerning complement to conventional evaluations of health and functional status in cancer patients and survivors.[4]

We report a case of acute right L2-S1 lumbosacral plexopathy owing to diffuse large B-cell lymphoma, presenting with low-back pain and fatigability. This case report is beneficial for clinicians and patients because it emphasizes the importance of considering persistent lower back pain and fatigability as presenting manifestations of lymphomatous lumbosacral plexopathy.

Case Report

A 49-year-old man from rural West Bengal, India, with primary controlled hypothyroidism, was admitted with persistent lower back pain spreading to the right lower limb for the last month. The pain was associated with dysesthesias over the right posterior thigh, right foot's dorsum, and perineal area. He denied bladder control issues, drenching night sweats, involuntary weight loss, anorexia, fever, recent trauma, exposure to tubercular patients, or radiation. He had easy fatigability with repeated exercise (e.g., raising arms).

On examination of his cognitive functions, cranial nerve functions, cerebellar and autonomic functions were intact. Motor examination was remarkable for asymmetric lower limb weakness (right more than left; especially mild weakness in hip flexion, knee extension, adduction, ankle dorsiflexion, and great toe extension) without any discernible muscle atrophy. Right ankle deep tendon reflex was absent, and knee one was reduced. The straight leg raise test elicited a positive result on the right side at an angle of 50 degrees. His gait was antalgic, and he could not walk on heels. The clinical examination revealed right-sided, non-tender, non-matted, rubbery inguinal lymphadenopathy.

A complete blood cell count revealed mild normocytic normochromic anemia and raised erythrocyte sedimentation rate. Liver, kidney, and thyroid function assessments and evaluations of serum electrolytes, urinalysis, and glycemic markers returned normal results. Serological tests for syphilis, hepatitis (B and C), Lyme disease, Epstein-Barr virus, HIV 1 and 2, ANA-HEp-2, ANA profile, p, c-ANCA, acetylcholine receptor antibodies, and anti-muscle-specific kinase antibodies were negative. Electroneurography and electromyogram revealed right L2-S1 lumbosacral plexopathy diagnosis with denervation [Figure 1]. The repetitive nerve stimulation test was normal.

Magnetic resonance imaging (MRI) with contrast of the lumbosacral spine revealed an L5 vertebral lesion with right-sided paravertebral soft tissue and pedicle involvement. 18F-fluorodeoxyglucose positron emission tomography-computed tomography (18F-FDG PET-CT) of the whole body revealed metabolically active supra and infra-diaphragmatic lymphadenopathy along with extranodal disease involving gastroduodenal junction, spleen, peritoneum, retroperitoneum, and right paravertebral regions with the destruction of L4, L5 vertebral bodies and focal hypermetabolic marrow lesions involving right iliac bone, right iliacus and psoas muscles, and shaft of right proximal femur suggestive of lymphomatous involvement [Figure 2]. Transpedicular C arm guided wide bore needle biopsy revealed multiple pieces of tissue showing sheets of intermediate to large sized mononuclear cells having opened up nuclear chromatin, irregular nuclear margin, and amphophilic cytoplasm and some cells showing distinct nucleoli and a fair number of mitotic figures. Immunohistochemistry revealed that cells expressed CD20, CD10, bcl2, bcl6, and MUM1, and are negative for CD5, CD30. About 15% of these cells expressed c-myc. CD3 and CD5 mark background T lymphoid cells. The Mib1 (Ki67) labeling index was about 95%–98%. Histopathology alongside immunohistochemistry suggested a diagnosis of diffuse large B-cell lymphoma. The patient was directed to the oncology department for continued management.

Discussion

Lumbosacral plexopathy is characterized by symptoms and signs that the involvement of a single root or peripheral nerve cannot explain.[5,6] Pain, the dominating and initial symptom in approximately 70% of patients, is often dull and achy.[7] It may be imprecisely localized but can mimic radiculopathy extending to the buttocks and the posterior aspects of the thigh with symptomatic sensory loss, causalgia, and deafferentation.[7] Numbness in the perianal region and incontinence can occur.[7] The involvement of sympathetic fibers causes the "hot and dry foot" syndrome.[1,7] Weakness or paresthesias is the presenting symptom in 15% of patients.[7] Bilateral (usually asymmetric) plexus involvement occurs in approximately two-thirds of patients.[7] About half of them with neoplastic lumbosacral plexopathy have local pain in the back region.[8]

Electrodiagnostic techniques can help localization and distinguish between carcinomatous and radiation-induced plexopathy. Denervation of plexus-innervated muscles, absence of sensory nerve action potentials of the sural and fibular superficial nerve, and absence of paraspinal denervation indicate plexus lesions.[1,4] Definitive diagnosis of neoplastic involvement is made by careful imaging studies such as CT, MRI, and, increasingly, ultrasound. MRI is more sensitive than CT in showing a mass compressing the plexus or thickening or enlargement of the plexus. 18F-FDG PET-CT may also increase the sensitivity in detecting a tumor in the lumbosacral plexopathy.[7]

A wide variety of malignant carcinomas and lymphoreticular tumors can invade the lumbosacral plexus either by direct invasion from the primary site (colorectum,

::: SUMMARY REPORT :::

Motor Nerve Studies

Nerve: TIBIAL + PERONEAL-Lt

Site	Lat1 (mS)	Dur (mS)	Amp	Dist (mm)	NCV (m/S)
LT ANKLE(PTN)	4.90	7.60	8.3 mV		
LT Pop. fossa	12.92	12.50	7.9 mV	360	44.89
LT ANKLE(CPN)	3.54	17.92	4.5 mV		
LT Febular. Hea	10.83	28.02	3.3 mV	310	42.52
RT ANKLE(PTN)	4.90	13.65	2.5 mV		
RT Pop. fossa	12.19	23.02	1.8 mV	360	49.38
RT ANKLE(CPN)	3.23	14.06	1.1 mV		
RT Febular. Hea	10.83	28.02	1.0 mV	310	40.79

Nerve: Femoral

Site	Lat1 (mS)	Dur (mS)	Amp	Dist (mm)	NCV (m/S)
LT Inguinal	4.90	7.60	8.3 mV		
RT Inguinal	3.92	7.50	3.9 mV		

Sensory Nerve Studies

Nerve: Lat Femoral Cut-Lt

Site	Lat1 (mS)	Dur (mS)	Amp	Dist (mm)	NCV (m/S)
LT	2.67	3.08	10.4 µV		
RT	2.54	2.88	3.7 µV		

Nerve: SURAL RT

Site	Lat1 (mS)	Dur (mS)	Amp	Dist (mm)	NCV (m/S)
LT	2.54	1.71	16.2 µV		
RT	2.67	2.29	NR		

Nerve: Superficial Peroneal

Site	Lat1 (mS)	Dur (mS)	Amp	Dist (mm)	NCV (m/S)
LT lateral mal	2.90	3.60	18.3 µV		
RT lateral mal	2.92	3.50	NR		

Nerve: Saphenous

Site	Lat1 (mS)	Dur (mS)	Amp	Dist (mm)	NCV (m/S)
LT med mal	2.79	4.20	16.3 µV		
RT medial mal	2.72	4.32	NR		

F Wave Studies

Nerve: Peroneal-Lt

M Lat	Fmin Lat	Fmax Lat	Fmean Lat
3.3 mS	48.1 mS	49.2 mS	48.7 mS

Nerve: Peroneal-Rt

M Lat	Fmin Lat	Fmax Lat	Fmean Lat
2.7 mS	NR	NR	NR

Nerve: Tibial-Lt

M Lat	Fmin Lat	Fmax Lat	Fmean Lat
5.0 mS	46.9 mS	47.7 mS	47.3 mS

Nerve: Tibial-Rt

M Lat	Fmin Lat	Fmax Lat	Fmean Lat
5.2 mS	NR	NR	NR

H Reflex Studies

Nerve: Soleus-Lt

M Lat	H Lat	H-M Lat	H-Amp
4.2 mS	28.1 mS	24.0 mS	03.60 mV

Nerve: Soleus-Rt

Figure 1: Electrodiagnostic results. Nerve conduction (motor nerve studies): Nerve Conduction Studies (Motor Nerve): Right Side: The compound muscle action potentials (CMAPs) amplitude of the tibial, peroneal, and femoral nerves are reduced with normal latency and conduction velocity. Left Side: The CMAPs amplitude is within normal limits. Nerve Conduction Studies (Sensory Nerve): Right Side: The sensory nerve action potentials (SNAPs) for the sural, superficial peroneal, saphenous, and lateral femoral cutaneous nerves are non-recordable. Left Side: The SNAPs are within normal limits. F Wave Studies: Right Side: Tibial and peroneal F-latencies are absent. Left Side: Tibial and peroneal F-latencies are within normal limits. H-Reflex Studies: Right Side: H-reflex is absent. Left Side: H-reflex is present with normal amplitude. Electromyography: Right Side: High amplitude, polyphasic motor unit action potentials with increased duration and reduced recruitment, along with fibrillation potentials, are observed in the rectus femoris, vastus medialis, vastus lateralis, biceps femoris (short head and long head), tibialis anterior, extensor digitorum brevis, and gastrocnemius (medial and lateral) muscles after full volitional effort. Bilateral Lumbar Paraspinal Muscles: Motor unit action potentials are normal

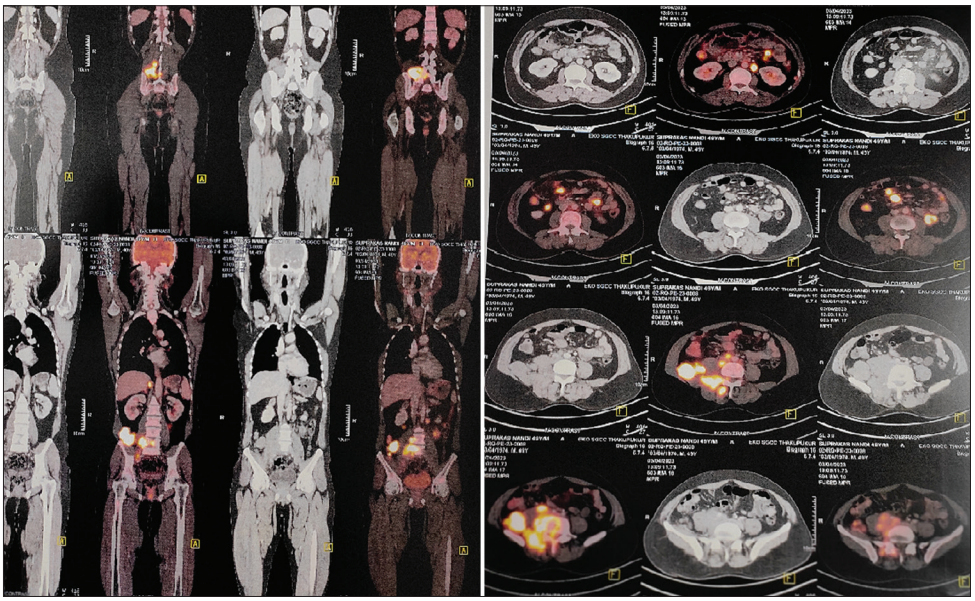

Figure 2: 18F-fluorodeoxyglucose positron emission tomography-computed tomography (18F-FDG-PET-CT) of the whole body. It shows metabolically active supra and infra-diaphragmatic lymphadenopathy along with extranodal disease involving gastroduodenal junction, spleen, peritoneum, retroperitoneum, and right paravertebral regions with the destruction of L4, L5 vertebral bodies and focal hypermetabolic marrow lesions involving right iliac bone, right iliacus and psoas muscles, and shaft of right proximal femur suggestive of lymphomatous involvement

uterus, prostate, and ovary) or by metastatic spread (breast, sarcoma, lymphoma, bronchus, testis, myeloma, and thyroid, melanoma).[6] Locally, invasive colorectal carcinoma is the most frequent cause of neoplastic plexus lesions.[6] Of note, in cases of intraneural lymphomatosis causing lumbosacral plexopathy, the peripheral nerve and lumbosacral plexus can act as a haven for the lymphoma cells because the chemotherapeutic agents may not be able to cross the blood-nerve barrier.[5]

This would be the first reported case of lymphomatous lumbosacral plexopathy presenting with lower back pain and fatigability. Lymphomatous lumbosacral plexopathy should be included in the differential diagnosis of fatigability and lower back pain. Early recognition will help achieve prompt diagnosis, avoid misdiagnosing as neuromuscular junction disorder or radiculopathy, respectively, and provide tailored, supportive care. Further studies addressing the effects of lymphoma on neuropathy and fatigue are warranted.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given consent for his images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

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