



Exercise Efficacy in Management of Cervical Spondylotic Myelopathy – A case report

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Summary

Cervical Spondylotic Myelopathy is an ageing, degenerative spinal condition and a common cause of myelopathy in adults, with the average age of presentation being 56 years. This case report was on a 63-year man who was apparently healthy until he was presented with grade v on Nurick Classification System for Myelopathy. Lhermitte Sign was present. The clinical presentations were motor deficit in the upper limbs (ULs), lower limbs (LLs) and hands; intermittent bouts of spasms in lower limbs; painfully reduced range of motion (ROM) in the shoulder, cervical and lumbosacral joints; impaired activity of daily living (ADL) including ambulation, and reduced sleeping hours. The treatment plan aimed to relieve pain at the affected joints; improve ROM in joints of ULs and LLs; strengthen weak muscles (ULs and LLs); improve trunk control; improve patella mobility and release of tight muscle/structures(hamstrings). The adopted Exercise protocols, which were done between 11 am-1 pm at thrice weekly appointments for four months, were Mobilization & Strengthening Exercises (all limbs); Back Flexibility Exercises; Quadriceps Strengthening Exercises both LLs and Neuromotor Exercises. The patient became stable on a tripod stand in the fourth month and was discharged on a home programme at the end of the fourth month. The observed improvement in the clinical condition of this Cervical Spondylotic Myelopathy patient lays credence to the efficacy of the use of exercise interventions in this condition.

Keywords: Cervical Spondylitis, Myelopathy, Degenerative Diseases

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Introduction

Cervical Spondylotic Myelopathy (CSM) is a non-traumatic degenerative spinal neurological condition presenting with insidious symptoms of possible episodic worsening disability and clinical morbidity^{1,2,3}. Loss of fine motor control of the hands and numbness in the limbs; spasticity and gait impairments have been identified with this condition^{2,3,4}. Neck pain and referred pain in the shoulder; scapular region; arm and forearm may be present^{1,5}; bowel and bladder dysfunction are possible presentations¹. The mechanism of this condition is essentially repetitive injuries which may be static or dynamic and possibly result from direct trauma and ischemia^{1,5,6,7}. The degenerative changes

affect the intervertebral disks, vertebrae, facet joints, and ligamentous structures encroach on the spinal canal and damage the spinal cord, especially in congenitally small cervical canals^{4,5}. The mean age at presentation is 56 years⁴, the most common form of spinal cord injury in adults, being 54 per cent of non-traumatic spinal cord injuries in North America⁸. The recommended non-operative treatment modalities include bed rest, medications, steroids, injections, exercise, soft collar, rigid collar, cervical traction and thermal therapy⁹. Early effective treatment interventions are essential to ensuring a patient's good quality of life, especially before the development of irreversible spinal cord damage⁴.

Case presentation

The patient was a 64-year-old man diagnosed with Cervical Spondylotic Myelopathy (CSM). He complained of quadriparesis, with lower limbs more affected than upper limbs. The patient was apparently well until seven months before presentation when he developed neck pain and later back pain which progressively worsened with gradual deterioration of motor functions of the limbs, initially at the lower limbs and later upper limbs. There was associated radiating pain to the lower limbs and left upper limb. Intermittent bouts of spasms in lower limbs were reported. He afterwards lost ambulatory functions. Lhermitte Sign was equally reported to be present. The patient could hardly sleep for 2 hours because of the pain and severe spasms in both lower limbs. He had good bladder and bowel control. No decubitus ulcer was reported; no history of hypertension or diabetes mellitus; no previous surgery; the patient was not asthmatic and was a monogamous businessman and father of 6 children who did not smoke nor take alcohol.

The patient was wheeled into the examination room, unable to ambulate. He was not in any apparent respiratory distress. Sitting BP- $160/80$ mmHg; RR- 20cpm; PR- 84bpm. Assessment of upper limbs, ULs showed pain at all (R) joints with reduced AROM and pain at (L) all joints. The pain Score on NPRS was $6/10$. The PROM in ULs were painful and reduced at all joints of (L) UL. (R) Shoulder Flexion was 045° and full AROM at (L). Muscle bulk was preserved bilaterally, while muscle tone was normotonic bilaterally. Cutaneous and deep sensations were intact bilaterally, likewise BTR and TTR. The gross muscle power (GMP) was 1 (R) and 3 (L), with power grip being poor (R) and fair (L). There was pain in all joints of both lower limbs (AROM and PROM), LLs; Pain Score on NPRS $8/10$. Muscle bulk was preserved bilaterally, but the tone was hypertonia (flexor compartment). Cutaneous and deep sensations were intact bilaterally, likewise PTR with no

T/A tightness. Gross muscle power in LL was 2. Hypo mobile patella was observed bilaterally. There was pain at the lumbosacral (L1 – L5) on digital compression pain score on NPRS $8/10$. The Spasm Frequency Score (SFS) was 4 (both LL). Cervical joint pain at C4-C7, NPRS $2/10$.

Investigations

Cervical MRI Examination revealed degeneration of all cervical discs; spinal stenosis from C3-C6; spondylosis with anterior & lateral lipping; C3-C4 and C5-6 disc bulge; C4-5 and C6-7 show para-central herniation but no soft tissue lesion. MRI Lumbar Spine showed degeneration and narrowing of all disc spaces; bone marrow oedema of L4-5; mild scoliosis convex to the left; spondylosis with lateral and anterior lipping; posterior osteophytes of LS; L2-3, 3-4 & L4-5 show disc bulge but no disc herniation and no para-spinal soft tissue lesion.

Laboratory Investigations were HBS Ag- Non Reactive; HCV- Non Reactive; RVS- Non Reactive; PCV- 38%; WBC- $4.8 \times 10^3/\text{UL}$; Lymphocytes- 39; Monocytes- 11; Neutrophils- 49; Cr- 0.7mg/dL ($0.8-1.4\text{mg/dL}$); ALT- 11u/L ($3-36\text{u/L}$); FBG- 5.0mmol/L ($3.3-5.8\text{mmol/L}$); ALB- 41g/L ($35-50\text{g/L}$); TP- 78g/L ($60-83\text{g/L}$); U/Acid- 340mmol/L ($180-420\text{mmol/L}$); T_{CHOL} - 5.6mmol/L ($3.3-6.2\text{mmol/L}$); T_{RIG} - 1.0mmol/L ($<2.6\text{mmol/L}$); $T_{\text{Ca}^{2+}}$ - 2.68mmol/L ($2.15-2.57\text{mmol/L}$).

Functional ability

Katz score $1/6$ (could only feed); completely dependent on ADLs; the patient could not stand independently; the patient could not sit from a lying position, and the patient could not roll on the bed. The summary of findings were: pain of the joints of ULs & LLs and Lumbosacral; reduced ROM at the left UL; poor grip strength of the right UL; globally reduced muscle power; hamstring tightness bilaterally; poor trunk control; bilateral patella hypo mobility and grade v Nurick Classification System for Myelopathy.

Treatment

The treatment was planned to relieve pain at the affected joints, improve ROM in joints of ULs and LLs, strengthen weak muscles (ULs and LLs), improve trunk control, improve patella mobility and release tight muscle/structures (hamstrings). The Exercise Intervention Appointment was made between 11 am-1 pm. 1st Month protocols were Mobilization & Strengthening Exercises (all limbs), 3ce weekly at 45mins/session; Back Flexibility Exercises, 20repsx3sets and Quadriceps Strengthening Exercises both LLs, 20reps/3sets/LL. 2nd Month protocols were Ambulatory retraining with bilateral backslabs on Zimmer's frame (10ftx2x2 sets); Recumbent Cycle Ergometer, 15mins x 2 sets; Mobilization & Strengthening Exercises (all limbs), 3ce weekly at 45mins/session; Back Flexibility Exercises, 20repsx3sets and Neuromotor Exercises, 20repsx3sets. 3rd Month protocols were Standing with tripods commenced at 4mins; Ambulatory retraining with bilateral backslabs on Zimmer's frame (10ftx2x2 sets); Recumbent Cycle Ergometer, 15mins x 2sets; Mobilization & Strengthening Exercises (all limbs), 3ce weekly at 45mins/session; Back Flexibility Exercises, 20repsx3sets and Neuromotor Exercises, 20repsx3sets. At the 4th month, the patient became stable on a tripod stand; received Back Flexibility Exercises, 20repsx3sets and was discharged on a home programme.

Outcome and follow-up

At 1st Month, GMP – ULs R 2⁺ L 3⁺, LLs R 2⁺ L 2⁺; Grip strength, R Fair L Good; Pain Score (L1 – L5) on NPRS ⁶/₁₀; Pain Score (ULs) on NPRS ⁴/₁₀; Pain Score (LLs) on NPRS ⁶/₁₀; R Shoulder Flexion AROM, 065⁰; fully restored patella mobility, bilaterally; Spasm Frequency Score (SFS), 3 (both LL); Spasm severity, 3 (severe) and Sleep hours, 4hours.

At 2nd Month, GMP – ULs R 3⁺ L 4, LLs R 3⁻ L 3⁻; Grip strength, R Good L Good; Ambulation with bilateral backslabs on Zimmer's frame (10ftx2x2 sets); TUG (with

Zimmer's frame), 50s; pain Score (L1 – L5) on NPRS ⁴/₁₀; Pain Score (ULs) on NPRS ³/₁₀; pain Score (LLs) on NPRS ⁴/₁₀; R Shoulder Flexion AROM 090⁰; Spasm Frequency Score (SFS), 3 (both LL); Spasm severity, 3 (severe) while Sleep hours, 5hours.

At 3rd Month, GMP – ULs R 4 L 4⁺, LLs R 3⁺ L 3⁺; TUG (with Zimmer's frame), 30s; Ambulation with tripods stand for 4mins; Pain Score (L1 – L5) on NPRS ³/₁₀; Pain Score (ULs) on NPRS ³/₁₀; Pain Score (LLs) on NPRS ³/₁₀; R Shoulder Flexion AROM 0-110⁰; Spasm Frequency Score (SFS), 2 (both LL); Spasm severity, 2 (moderate) and Sleep hours, 6hours.

At 4th Month, GMP – ULs R 4⁺ L 5, LLs R 4 L 4; the patient became stable on tripod stand; TUG (with Zimmer's frame), 12.5s; TUG (with tripod stand), 11s; Pain Score (L1 – L5) on NPRS ²/₁₀; Pain Score (ULs) on NPRS ³/₁₀; Pain Score (LLs) on NPRS ³/₁₀; Spasm Frequency Score (SFS), 1 (both LL); Spasm severity, 1 (mild); Patient now on grade iv on Nurick Classification System for Myelopathy from the initial grade v; Sleep hours, 7hours and patient discharged on a home programme.

Conclusion

This report underscores physiotherapy as part of the multidisciplinary management of cervical spondylotic myelopathy. It also shows exercise as an efficacious treatment option in managing the presenting pain dysfunction, motor deficits, functional dependency, and overall well-being of the patient.

Ethical clearance – Taken from Institutional Research Ethical Committee, JUTH, Nigeria (JUTH/DCS/IREC/127/XXXI/395).

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Conflict of interest – None

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