Case Report

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Physiotherapy Section

Physiotherapeutic Assessment and Management of a Rare Case of Eosinophilic Granulomatosis with Polyangiitis: A Case Report

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ABSTRACT

Eosinophilic Granulomatosis with Polyangiitis (EGPA) is a type of necrotising vasculitis mainly involving small and medium-sized vessels. In this condition, eosinophils accumulate within affected tissues and lead to organ damage through ischaemia and tissue infiltration. The present case report presents the case of a 72-year-old female patient with eosinophilic granulomatosis with polyangiitis with reduced muscle strength, balance, functional independence and this report aims to evaluate the result of a tailor-made physiotherapy treatment protocol. The patient's muscle strength was assessed using Medical Research Council (MRC) grading system and Concern of falling was assessed using Falls Efficacy Scale (FES). The patient had issues with balance which was assessed using Berg Balance Scale and functional independence was evaluated using Barthel Index. The patient underwent a six-week tailor-made rehabilitation programme consisting of 45-minute sessions, six days per week for six weeks. The treatment protocol included graded exercises for upper and lower-limb strengthening, core stabilisation, balance training and functional training like stair climbing with progressions. There were definite improvements in the patient's outcomes post-treatment. The Falls Efficacy Scale score reduced from 61/64 to 26/64, indicating marked reduction in concern of falling. The Berg Balance Scale score improved from 10/56 to 42/56, demonstrating a significant improvement in balance control. Functional independence of the patient also improved which was shown by Barthel Index score from 60/100 to 95/100. The tailor-made physiotherapy treatment protocol for six weeks including strengthening exercises, balance training and functional training had shown effectiveness in a patient with EGPA.

Keywords: Balance, Churg-Strauss syndrome, Physiotherapy, Reduced muscle strength, Rehabilitation, Vasculitic neuropathies

CASE REPORT

A 72-year-old female with a known case of EGPA was referred from the Medicine Department and brought to the Physiotherapy Outpatient Department with complaints of progressive muscle weakness in both upper and lower limbs, along with numbness in the palms and soles. The patient initially visited a local hospital where she received symptomatic treatment for respiratory distress. As her condition didn't improve, she was brought to a tertiary care hospital with gradually progressing breathlessness and a persistent cough in 2019 (approximately six years prior). As her symptoms didn't subside, she returned to the hospital one year later. Further clinical evaluation and diagnostic investigation led to a diagnosis of nasal polyps during that time. She underwent surgical excision of the nasal polyps, but her respiratory symptoms did not resolve despite the intervention. She remained on long-term steroidal medication (Wysolone) at a dosage of 1-0-0 for over the next five years, with only partial improvement in symptoms. There was no relevant Family history noted. Approximately four months before the current visit, the patient discontinued her prescribed medications. This was followed by the gradual onset of weakness and numbness involving all four limbs. During the initial phase of symptoms progression, she experienced a fall. Comprehensive clinical, laboratory, and imaging investigations were conducted in the Medicine Department, leading to a diagnosis of EGPA. After the diagnosis, the patient was brought to the Physiotherapy Department.

On clinical examination conducted in the Physiotherapy Department, it was revealed that the patient had reduced muscle strength of both upper and lower limbs on the right-side. The patient also had balance issues and concern of falling and difficulty in walking and was presented with waddling gait. The patient also had difficulties in doing basic Activities of Daily Living (ADLs).

Motor examination: Range of motion was full and pain-free. Muscle strength (MRC grading) [1] showed reduced strength on the right compared with the left in both upper and lower limbs [Table/Fig-1].

Region	Right	Left
Shoulder joint		
Flexor muscles	3	4
Extensor muscles	3	4
Abductor muscles	3	4
Adductor muscles	3	4
Medial rotator muscles	3	4
Lateral rotators muscles	3	4
Elbow joint		
Flexor muscles	3	4
Extensor muscles	3	4
Wrist joint		
Flexor muscles	3	4
Extensor muscles	3	4
Hip joint		
Flexor muscles	3	4
Extensor muscles	3	4
Abductor muscles	3	4
Adductor muscles	3	4

Knee joint		
Flexor muscles	3	4
Extensor muscles	3	4
Ankle joint		
Plantar flexor muscles	3	4
Dorsiflexor muscles	3	4

[Table/Fig-1]: Pre-treatment assessment of muscle strength of upper and lower extremities.

Sensory examination [2]: A sensory assessment showed absence of superficial, deep, and combined cortical sensations in the bilateral heel regions. Vibration sense was absent in the bilateral upper and lower limbs [Table/Fig-2].

Sensation	Right		Left	
	Upper limb	Lower limb	Upper limb	Lower limb
Fine touch	Intact	Absent in heels	Intact	Absent in heels
Pain	Intact	Absent in heels	Intact	Absent in heels
Crude touch	Intact	Absent in heels	Intact	Absent in heels
Proprioception	Intact	Diminished	Intact	Diminished
Vibration	Absent	Absent	Absent	Absent
Tactile localisation	Intact	Absent in heels	Intact	Absent in heels

[Table/Fig-2]: Sensory evaluation.

Gait evaluation: During the assessment of gait, patient was presented with waddling gait. There was also noted reduction in arm swing; other parameters were also markedly reduced [Table/Fig-3]. The patient had significant difficulty in climbing stairs and was using maximal support and compensatory movements.

Parameters	Observations
Step length	17 cm
Stride length	40 cm
Cadence	38 steps/min

[Table/Fig-3]: Pre-treatment assessment of gait parameters.

Outcome measures: Pre-treatment or baseline outcome measures concerning the patient's balance, functional independence and risk of fall were recorded at the beginning of the therapy. Falls Efficacy Scale [3] was used to assess the risk of fall and a score of 61/64 was recorded which is suggestive of high concern of falling. Functional Independence of the patient was evaluated using the Barthel Index [4], and a score of 60/100 was recorded, which is an indication of patient's moderate dependence. Balance was assessed using the Berg Balance Scale [5]; and the patient scored 10/56, indicating severe balance impairments [Table/Fig-4].

Evaluation tools	Observations
Fall efficacy scale [3]	61/64 (High concern)
Barthel Index [4]	60/100 (Moderate dependence)
Berg Balance Scale [5]	10/56 (High Fall Risk)

[Table/Fig-4]: Pre-evaluation of outcome measures [3-5].

Physiotherapy management: The patient underwent a tailored physiotherapy rehabilitation programme consisting of 45-minute sessions, six days per week for six weeks. The intervention focused on progressive strengthening of upper and lower limb muscles, balance training, and functional mobility exercises. Strengthening exercises targeting upper and lower limbs were performed by resisted exercises using resistance bands and weight cuffs. Grip strengthening was done using a Grip Strengthener by progressively increasing spring count. Balance training included static and dynamic tasks in sitting and standing, with gradual progression to weight-shifting and single leg standing with minimal support. Gait training was initiated with support and was later progressed to independent ambulation. Functional task-oriented activities such as sit to stand transitions and stair-climbing training were incorporated based on patient's tolerance. The repetition and intensity of the exercises were progressively increased according to patient's tolerance to these exercises and fatigue levels [Table/Fig-5].

Week	Exercises	Regimen	
		Set (1 set =10 reps)	Weight (kg)
1	Shoulder flexor strengthening	1	0.5
	Shoulder extensor strengthening	1	0.5
	Shoulder abductor strengthening	1	0.5
	Elbow flexor strengthening	1	0.5
	Elbow extensor strengthening	1	0.5
	Knee extensor strengthening	1	0.5
	Bridging	1	-
	Sit to stand	1	-
	Standing without support	1 (5 sec hold)	
	Ambulation (with walker)	200 meters	
3	Shoulder flexor strengthening	2	
	Shoulder extensor strengthening	2	
	Shoulder abductor strengthening	2	
	Elbow flexor strengthening	2	
	Elbow extensor strengthening	2	
	Knee extensor strengthening	2	
	Hip abductor strengthening	2	
	Grip strengthening	4 (1 spring)	
	Bridging	2	
	Sit to Stand	3	
	Standing without support	1 (20 sec hold)	
	Weight shifting in standing	1 (10 sec hold)	
	Stair climbing	1 (2 stairs)	
	Ambulation	200 meters	
6	Shoulder flexor strengthening	3	1.5
	Shoulder extensor strengthening	3	1.5
	Shoulder abductor strengthening	3	1.5
	Elbow flexor strengthening	3	1.5
	Elbow extensor strengthening	3	1.5
	Knee extensor strengthening	3	1.5
	Hip abductor strengthening	3	1.5
	Hip extensor strengthening	3	1.5
	Grip strengthening	4 (springs)	
	Bridging	2 (5 sec hold)	3
	Standing with narrow BOS with mild perturbation	120 secs	
	Weight shifting in standing	3 (15 sec hold)	
	Single leg standing with mild support	30 sec hold	
	Stair climbing with weight on b/l leg without support	10 stairs (3 rounds)	0.5
	Ambulation with weight on b/l leg without support	500 meters (2 rounds)	0.5

[Table/Fig-5]: Tailored physiotherapy exercise prescription.

Mid-programme and week 6 progression included increased sets, repetitions, and weights for the shoulder, elbow, hip, and knee musculature progressive balance tasks (narrow base of support, perturbations, single-leg standing with support), stair climbing, and increased ambulation distance up to 500 meters. The upper and lower limbs strengthening exercises are shown in [Table/Fig-6].

[Table/Fig-6]: a) Image shows upper limb strengthening exercises during rehabilitations (biceps curls); b) Image shows lower limb strengthening exercises during rehabilitation {side-lying Straight Leg Raise (SLR)}.

Post-treatment assessment: The efficacy of the rehabilitation programme was assessed at the end of the sixth week using manual muscle testing, gait parameter evaluation, and outcome measures. Manual muscle testing showed improvement in most of the upper and lower limb muscle groups, particularly on the previously weaker right side. (MRC grade 3/5 improved to 4/5, selected muscle groups reached 5/5). Improvement in gait parameters demonstrates better walking efficiency and postural control. There was also clear improvement noted across all outcome measures after the rehabilitation programme. The FES score reduced from 61/64 to 26/64, indicating marked reduction in concern of falling, which also drastically improved the patient's confidence during daily activities. The Berg Balance Scale score improved from 10/56 to 42/56, demonstrating a significant improvement in balance control. Functional independence of the patient also improved which was shown by Barthel Index score from 60/100 to 95/100, suggesting a transition from moderate dependence to near independence in ADL. By the end of the rehabilitation programme the patient was confidently walking without much difficulties and there was also a significant improvement in stair climbing which was really poor during the beginning of the regimen [Table/Fig-7-9]. [Table/Fig-10a,b] show the clinical images of the patient pre and post-treatment.

Region	Right	Left
Shoulder joint		
Flexor muscles	4	4
Extensor muscles	4	4
Abductor muscles	4	4
Adductor muscles	4	4
Medial rotator muscles	4	4
Lateral rotator muscles	4	4
Elbow joint		
Flexor muscles	5	5
Extensor muscles	4	4
Wrist joint		
Flexor muscles	4	4
Extensor	4	4
Hip joint		
Flexor muscles	4	4
Extensor muscles	4	4
Abductor muscles	4	4
Adductor muscles	4	4
Knee joint		
Flexor muscles	4	4
Extensor muscles	5	5
Ankle joint		
Plantar flexor muscles	4	4
Dorsiflexor muscles	4	4

[Table/Fig-7]: Post-treatment muscle strength evaluation.

Gait evaluation	
Step length	38 cm
Stride length	80 cm
Cadence	85 steps/min

[Table/Fig-8]: Post-treatment gait evaluation.

Outcome measures	
Falls Efficacy Scale	26/64 (Moderate concern)
Barthel Index	95/100 (Slight dependency)
Berg Balance Scale	42/56 (Low fall risk)

[Table/Fig-9]: Post-treatment outcome measures evaluation.

[Table/Fig-10]: a) Pre-treatment image showing the patient having difficulty while climbing stairs and requiring additional support; b) Post-treatment image demonstrates improved lower-limb control, increased strength, and ease in climbing stairs.

Follow-up

On a recent telephonic follow-up call, the patient seemed very active and informed that she is doing all the ADLs and exercises independently. However, long-term follow-up outcome measures were not taken objectively as the patient didn't come back to physiotherapy OPD.

DISCUSSION

EGPA is an uncommon multisystem necrotising vasculitis characterised by eosinophilia, asthma, and vascular inflammation [6]. It was first described by Churg and Strauss in 1951 and is now classified as an Antineutrophil Cytoplasmic Antibody (ANCA)-associated vasculitis. The annual prevalence and incidence are 10.7 -17.8 and 0.9-2.4 per million, respectively. The major debilitating feature of this condition is mononeuritis multiplex or symmetrical axonal polyneuropathy, occurring in 60-75% of patients [6,7]. The progressive bilateral limb weakness and sensory deficits noted in the present case correspond with the neurological patterns described in earlier literature: eosinophil-mediated vasculitis and ischaemia leading to sensory loss and axonal injury [7,8]. The patient presented with reduced proprioception, loss of vibration sense, and weakness across major joints of both upper and lower limbs. Large-fibre involvement affects myelinated sensory and motor nerves responsible for proprioception, strength, and reflexes. Damage caused to sensory fibres causes loss of joint position and vibration sense, which leads to sensory ataxia, ataxic gait, and increased reliance on vision for balance. Involvement of motor fibres causes muscle weakness and impaired coordination, and reduced gait parameters. Loss of deep tendon reflexes further limits postural stability, increased fall risk and limiting daily activities [7].

Although pharmacological therapy remains the primary treatment modality, recent evidences emphasise the significance of

physiotherapy in reducing the long-term disability associated with vasculitic neuropathy and also improving the functional independence [9]. A previous case report by Pistone G and Camilli S showed that balance-oriented rehabilitation can lead to significant improvements in postural control and fall prevention. The case study used Progressive challenges like reduced base of support, single leg standing, and visual biofeedback to improve sensory integration, compensate for proprioceptive deficits, and reduce fall risk. Outcome measures like Berg Balance Scale, Mini BESTest and Tinetti Mobility Scale have shown improvement and supported the effectiveness of these treatments [8]. Another case report which was done on an EGPA patient also followed a tailored treatment protocol which was given for six weeks consisting of balance and gait training also demonstrated improvement in balance and functionality [10].

Following a six-week intensive tailor-made rehabilitation programme, the patient had significant improvements across motor, balance, and functional domains. The protocol included graded exercises for upper- and lower-limb strengthening, core stabilisation, balance, and functional training like stair climbing. Over the course of treatment, the muscle strength improved helping the patient to carry out daily tasks The Berg Balance Scale score also showed improvement in post-treatment assessment indicating better static and dynamic balance. FES score has also improved showing reduction in concern of falling. Barthel Index score shows significant improvement which demonstrates great reduction in dependence. The patient has also shown improvement in gait parameters. The patient also started stair climbing during the regimen and greatly improved at it by the end of the treatment regimen. These findings correlate with previously done studies on EGPA, showing the importance of physiotherapeutic treatment in improving strength, balance, and functional independence in patients with vasculitic neuropathies.

The observed improvements highlight the potential benefits of structured strengthening, balance training, and functional training in managing neuromuscular deficits secondary to EGPA. Given the limited number of studies available in the existing database, further well-designed studies including Randomised Controlled Trails (RCTs) are required to systematically evaluate the effectiveness of specific protocols and establish evidence based rehabilitation guidelines.

CONCLUSION(S)

In conclusion, the present case report highlights the importance of an individualised physiotherapy in the functional rehabilitation of a patient with EGPA. A structured, tailor-made rehabilitation programme emphasising progressive strengthening, balance training, and functional task-oriented activities resulted in significant improvements in muscle strength, balance, gait parameters, fear of falling, and functional independence. Given the rarity of EGPA and the limited physiotherapy focused literature, this report adds to the growing evidence supporting targeted rehabilitation as a supplement to medical management in reducing disability and enhancing quality of life in patients with vasculitic neuropathies.

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