

Balancing the Odds from Fragile to Stable: Restoring Balance and Fall Reduction in Hodgkin's Lymphoma Survivor: A Case Report

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Abstract

Background and Introduction: Young adult patients diagnosed with cancer hold a unique challenge to recover. With the rare complications of cancer treatment, it is difficult and challenging for a therapist to identify and set the goals according to the desired priority. Hodgkin lymphoma is a rare malignancy more prevalent in males. The goal of treatment for patients with Hodgkin lymphoma is to cure the disease with control of short and long-term complications. Lymphoma survivors exhibit various complications which are to be dealt with caution.

Case Description: A 22 year old with Hodgkin's Lymphoma referred to Physiotherapy OPD for her complains of impaired balance and increased risk of falls. Complete history and examination was taken. Pre intervention outcomes were taken.

Intervention: A goal centric 6 weeks intervention with the recommended guidelines focusing on all the health components were given. Balance and fall risk were focused individually and exercises focusing these components were practised on daily basis.

Outcomes: Fall Risk was assessed by Fall efficacy scale. Static balance assessed by single leg stance. Dynamic balance assessed by Fullerton Advanced Balance (FAB) Scale.

Conclusion: After 4 weeks of intervention the Fall risk was reduced to 49 from 71 as stated on scale. Balance was also improved with the score of 22 second from 9 seconds on SLS and 10 to 27 on FAB scale.

Keywords: Hodgkin's lymphoma, Cancer care, Rehabilitation

Background:

Hodgkin lymphoma (HL), previously known as Hodgkin disease, is a rare monoclonal lymphoid neoplasm with high cure rates(1).The risk of developing HL is elevated in individuals with Epstein-Barr virus (EBV) and human immunodeficiency virus (HIV) infections, autoimmune disorders, and conditions involving immunosuppression(2).There is also evidence suggesting a familial predisposition to HL. In India, the estimated number of newly diagnosed lymphoma cases in 2020 was 11,230 for Hodgkin lymphoma and 41,607 for non-Hodgkin lymphoma (NHL)(3).

Research has demonstrated that chemotherapy alone can result in high rates of complete and sustained remission in early-stage HL patients. Due to increased awareness of the long-term toxicities associated with treatment, and the high survival rates in early-stage HL with modern therapeutic regimens, recent

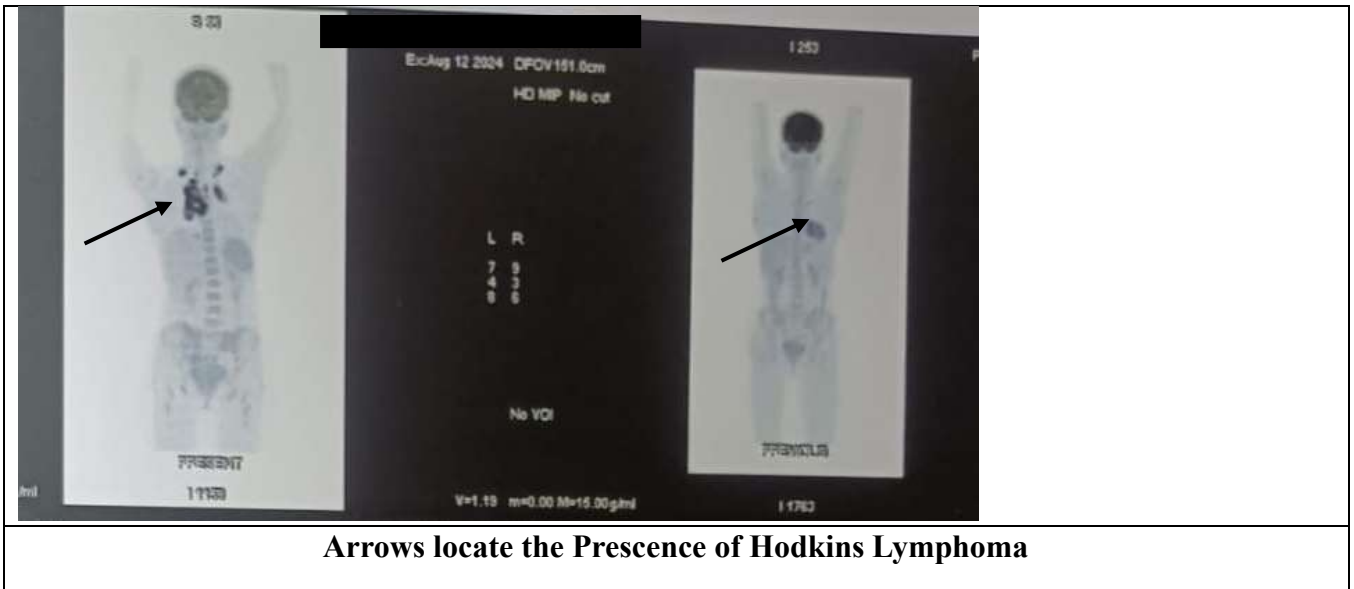
studies have focused on reducing or eliminating radiotherapy and minimizing the number of chemotherapy cycles.(4) The occurrence of late complications is closely linked to the specific treatment protocol used. Radiotherapy-related late effects have been extensively studied, and while some complications—such as hypothyroidism, xerostomia (dry mouth), and dental caries—may reduce quality of life without being life-threatening, there is also an elevated risk of serious, potentially fatal outcomes following radiation therapy(5).

Long-term management of HL must consider these complications, as patients often experience side effects from cancer treatments over time. Additionally, cancer patients face a significantly increased risk of falls due to a combination of disease-related, treatment-related, and individual patient factors. Polypharmacy is common, especially among those with co-existing conditions, which heightens the risk of adverse drug reactions. Certain medications, known as “fall-risk increasing drugs,” are particularly associated with this risk. For example, one study found that benzodiazepine use was linked to a two-fold increase in fall risk among cancer patients.(6)

Often, cancer patients overlook early symptoms until they become chronic and interfere with activities of daily living (ADLs). Therefore, it is crucial that early treatment-related complications are promptly recognized and managed alongside cancer therapy to improve overall patient outcomes.

Case Description:

A 22-year-old female diagnosed with Hodkin’s Lymphoma was referred to physiotherapy OPD. She was diagnosed with Hodkin’s Lymphoma 6 months back and was undergoing chemotherapy and radiation sessions. On taking history patient’s grandfather died of chronic cancer 9 years back. Patient had been treated with bone marrow transplant for the same condition 3 years back. She was relieved and was apparently alright with no complications until 8 months back. She started having symptoms like high fever, cough, fatigue, reduction in appetite for which she consulted general physician. After the investigations were done, she was referred to oncologist. She was diagnosed with stage 2 Hodkin’s Lymphoma and was prescribed with chemotherapy. Patient was also asked to undergo bone marrow transplantation. 4 months after beginning the medications patient started having trouble maintaining her balance, she complained of frequent falls and injury due to the same. She visited her Family doctor with the same complains and was referred to physiotherapy. Detailed Medical, Occupational and Environmental history and description of symptoms were taken. Patient was Physiotherapy student studying in 4th yr. She lived with her parents and younger brother in a 2bhk flat having 18-20 stairs to her home. On studying her investigations, we found patient was also positive for ANA suggesting RA symptoms. Systemic examination was performed, lower limb strength, girth, range of motions was assessed. Patient had no pain in legs except after prolong stair climbing. She was explained the causes and educated about importance of adherence to the Physiotherapy treatment for improvement in symptoms.



Description of the symptoms:

Balance deficits	Falls and injury
<u>Onset:</u> Gradually developed	<u>Onset:</u> Gradually developed
<u>Frequency:</u> 3 to 4 times in a Day	<u>Frequency:</u> 3 to 4 times in a week
<u>Associated with:</u> Trembling	<u>Associated with:</u> Injury
<u>Aggravating factors:</u> Fast walking, Narrow walking, walking with thoughts	<u>Aggravating factors:</u> Fast walking, Narrow walking, walking with thoughts
<u>Reliving Factors:</u> slow walking, pause between steps.	<u>Reliving Factors:</u> slow walking, pause between steps

Treatment:

Planning a treatment: After assessment a structured exercise protocol was formed, it was patient centered and focused on the desired outcomes. The protocol followed all the exercise guidelines and recommendations given for the cancer patients(7). All the necessary precautions and safety was ensured prior to testing and training. Every exercise was timed and monitored closely , and progression was recorded closely. The exercise protocol was designed taken into consideration all the guidelines of exercise training for patients with cancer. PAGA (the US Department of Health and Human Services 2008 Physical Activity Guidelines for Americans (PAGA) applies the same prescription to older adults, with the addition that those whose physical conditions preclude.(8) The ACSM guidelines note that modifications of varying degrees to PAGA are sometimes needed for many cancer survivors to safely participate in resistance training. (Kathleen Y. Wolin).

Table 2.1: General exercise recommendations according to guidelines of PAGA and ACSM.

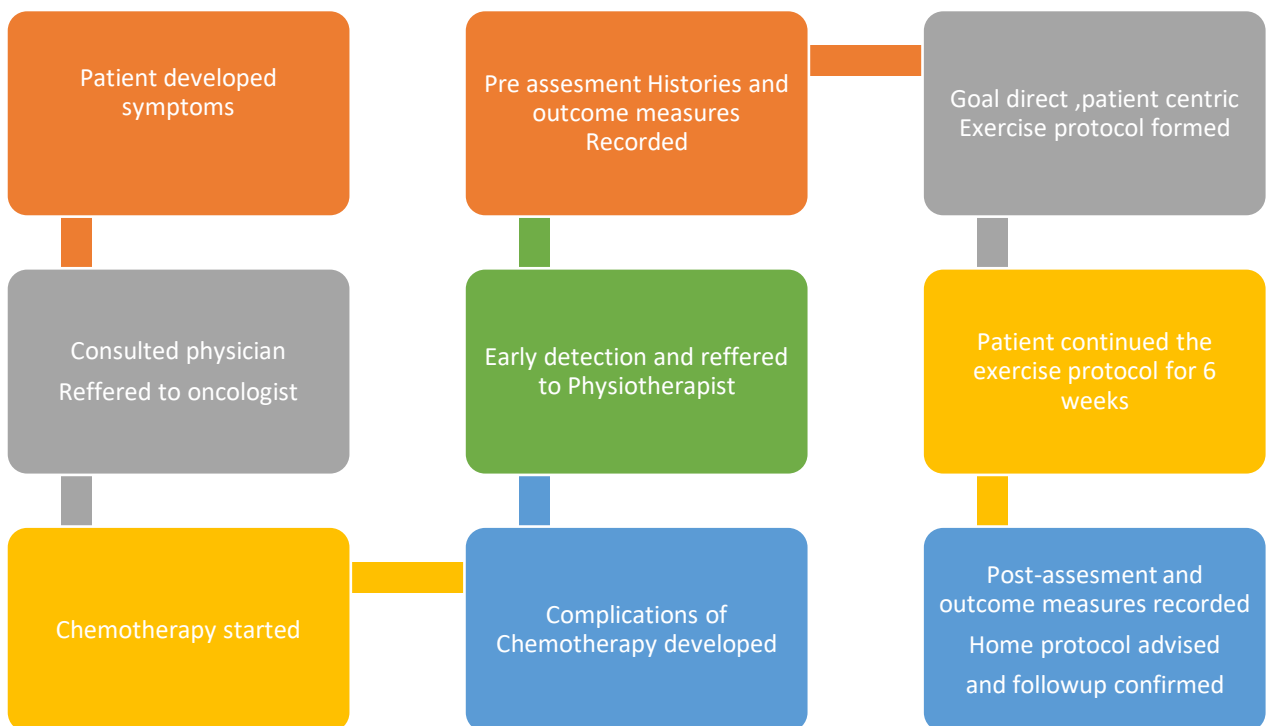
Resistance training	Moderate- or high-intensity activities for all major muscle groups at least twice per week.
To improve flexibility,	Stretching major muscle groups and tendons on days they participate in other types of activity

Aerobic training	150 min/ week of moderate-intensity activity
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Table 1.2: Structured goal centric exercise protocol followed for the patient

Education	Week 1	Week 2	Week 3	Week 4	Week 5
Balance exercises -Static exercises	Sitting perturbation.	One leg standing -eye open and eyes closed.	Swiss ball sitting with perturbation.	Reach objects , Draw figure of 8	Sitting on Uneven surface , Swing Chair with 360 Degree turns
Dynamic balance exercises	Single line Walking Forward walking (in front of mirror, with parallel bars).	Tandem walk Increased speed	Backward walking, Lateral walking Walking on uneven surface	ascending and descending stair climbing	Increased cadence in backward and lateral walking, Eye closed walking Obstacle walking Balancing on Wobble board

Timeline of Case:






Precautions and termination criteria:

Adapted National Comprehensive Cancer Network Triage Approach Based on Risk of Exercise-Induced

Adverse Events(9).

Outcome measures:

- Falls efficacy scale (FES) is an international measure of fear of falling or concerns of falling. It is a 16-item questionnaire useful to assess the fear of falling with score 16(minimum) to 64 (maximum)
- Balance outcomes: Single Leg Stance Test (SLS): The Single Leg Stance (SLS) Test is used to assess static postural and balance control. Inability to perform a single leg stance for at least 5 seconds is a predictor of injurious falls. The test should be performed with eyes open and hands on the hips. Instruct the patient to stand on one leg unassisted. Begin timing when the patient's foot leaves the ground. Stop the time the patient's foot touches the ground and/or when their hands leave the hips(10).
- Dynamic balance was assessed using the Fullerton Advanced Balance Scale (FABS). The test uses both dynamic and static balance under different situations to identify balance deficits in cancer patients. The test consists of 10 activities that challenge different aspects of balance, such as standing with eyes closed, reaching forward, turning, stepping, and standing on one leg. Each activity is scored on a 5-point scale from 0 to 4, where higher scores indicate better performance. The total score ranges from 0 to 40, with a score of 25 or lower indicating a high risk of falls.

		
<p>Static balance -Sitting on Swiss ball</p>	<p>Standing balance- Standing on a wobble board</p>	<p>Tandem walking stance</p>

Results:

Following the initiation of a structured physiotherapy program tailored to the patient’s oncological and physical status, significant improvements were observed in balance and fall risk reduction. Baseline assessment using the single leg stance test and Fullerton Advanced Balance (FAB) Scale were 4 sec and 13 respectively. After four weeks of individualized physiotherapy intervention, including balance training, proprioceptive exercises, functional strengthening and ergonomics for prevention of fall the both the outcome measures showed improvements with score 10 sec and 28 respectively. The Fall efficacy scale score was 12 indicating a substantial enhancement in balance and a reduction in fall risk.

The patient reported no falls during the treatment period, in contrast to three to five documented falls in the month preceding physiotherapy. Subjective feedback indicated improved confidence during ambulation and daily activities.

Discussion:

This case study emphasizes the positive effects of a tailored physiotherapy program on improving balance and reducing the risk of falls in a patient undergoing cancer treatment. Balance problems and a higher likelihood of falling are common among cancer patients due to various factors(11). These include chemotherapy-induced peripheral neuropathy (CIPN), fatigue, muscle weakness, deconditioning, and changes in their sense of body position (proprioception). These issues can significantly hinder their ability to function independently and negatively impact their quality of life(12).

Exercise is known to improve quality of life, including reducing fatigue, and may also lessen the anxiety associated with cancer recurrence. Beyond these established benefits, ongoing research is investigating whether exercise can extend the period without the disease returning and lower the risk of recurrence and death. Exercise may help survivors cope physically and mentally with completing their treatment. Additionally, it might reduce or prevent long-term and late-occurring side effects of treatment(8).

The treatment plan in this case was centered around the patient's needs and focused on specific goals, following the American College of Sports Medicine's (ACSM) daily exercise recommendations. Balance exercises, such as tandem walking, using a wobble board, and responding to perturbations on a therapeutic gym ball, all stimulate the proprioceptive system and aid in training to overcome balance impairments. Mirror therapy has also been shown to be very effective in improving balance(13). Along with this focus on balance, standard therapy goals like managing fatigue, aerobic exercise, and relaxation techniques were also included in the patient's training.(14)

The improvements seen in the static and dynamic balance test scores suggest that physiotherapy played a vital role in enhancing the patient's ability to control their posture and their mobility(15). These findings align with existing research that supports using balance and strength training to lower the risk of falls in cancer survivors, especially those receiving chemotherapy known to affect the nerves. Notably, the patient reported no falls during the four weeks of the intervention, which is a significant change from the multiple falls experienced before starting therapy. This highlights the potential of early physiotherapy intervention in preventing falls and aiding functional recovery. The incorporation of exercises that challenge proprioception and dynamic balance likely contributed to better coordination between the nerves and muscles and increased confidence in performing daily activities(16).

Achieving significant improvements in complex health conditions like cancer requires consistent exercise. In this case, the patient's motivation, positive attitude, and being a physiotherapy student themselves were contributing factors to the success of the therapy. Furthermore, the improved scores on the FABQ (Fear-Avoidance Beliefs Questionnaire) indicate a greater sense of self-efficacy, which is crucial for long-term commitment to rehabilitation and physical activity. Since falls can be both physically and psychologically damaging, this improvement underscores the comprehensive benefits of physiotherapy. Considering the improved scores after the rehabilitation, we educated the patient not to overlook any symptom and to adhere to home exercise protocol taking into consideration termination criteria and the red flags.

Conclusion:

The successful improvement in symptoms in this 22-year-old female patient underscores the critical role of physiotherapy in optimizing complications of cancer treatment. Tailored interventions, including Balance exercises, Fall prevention ergonomics, Aerobic training, Fatigue management, and education, were pivotal in facilitating recovery and enhancing overall well-being. Goal-directed mobilization

requiring close multidisciplinary collaboration, effectively addressed these challenges, ensuring safe and effective patient movement.

This case study emphasizes the importance of customized rehabilitation programs tailored to the unique needs of patients with Hodgkin lymphoma. Continuous monitoring and early intervention, combined with addressing the psychological well-being of the patient, provided a holistic approach to recovery. Ultimately, the study demonstrates the profound impact of physiotherapy in aiding full and efficient recovery, reducing complications, and enhancing the QoL, serving as a model for optimizing complications in patients with Hodgkin lymphoma.

Future Scope:

While the results are encouraging, limitations include the single-patient design and short follow-up period. Larger studies are needed to generalize these findings and evaluate long-term outcomes.

Patient review:

I started physiotherapy because I was struggling with balance and had a higher risk of falling, especially during daily activities. Since beginning my sessions, I've noticed a huge improvement. My balance has gotten much better, and I feel more stable and confident while walking, climbing stairs, and doing exercises. The physiotherapy exercises really helped strengthen my legs and core, and I've learned how to control my movements better. I'm no longer worried about falling like I used to. I'm really thankful for the guidance and support I received – it's made a big difference in my everyday life.

Consent:

Informed oral and Written consent was obtained from patient for documentation, pictures taken during the treatment and for publication of the case report.

Checklist:

CARE checklist was followed for writing the Case report.

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