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IMPACT OF AEROBIC EXERCISE ON CARDIAC HEALTH IN LIMB-GIRDLE MUSCULAR DYSTROPHY TYPE 2: A CASE STUDY

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INTRODUCTION & AIM

INTRODUCTION: Limb-girdle muscular dystrophies (LGMDs) are a diverse group of progressive skeletal muscle disorders that are genetically determined, with the pelvic or shoulder girdle muscles being primarily affected. The pathology of the muscles is generally characterized by centrally located myonuclei, necrotic and regenerating fibers, and an increase in the variation of fiber size. Fat and fibrous tissue replace muscle as a result of long-term cycles of muscle fiber degeneration and regeneration. From early infancy to late adulthood, symptoms may manifest. The dystrophin-associated glycoprotein complex, the sarcomere involved in the homeostasis of these protein complexes are frequently observed at the affected site.

Different muscular dystrophies vary in skeletal vs. cardiac muscle involvement, requiring tailored management. Cardiac impact in LGMD2 subtypes remains poorly understood due to recent molecular diagnoses.

AIM : To evaluate the impact of aerobic exercises on functional outcomes in a patient with LGMD2.

METHOD

A 42-year-old woman with autosomal recessive LGMD2 has been insidiously presenting with exertional dyspnea, fatigue, syncope episodes for 2 months and progressive proximal muscle weakening in all four limbs for 22 years. Her milestones and birth history were typical. There was no evidence of a positive family history.

Clinical Presentation: The Patient Exhibited a myopathic pattern on electromyography, biopsy-confirmed muscular dystrophy, bradycardia on ECG, and an ejection fraction of 59% on 2D echocardiography.

Clinical examination(Baseline and after 4 weeks)

-MMRC Scale
-Multidimensional Fatigue Inventory (MFI)
-Muscular Dystrophy Rating Scale
-Astrand-Rhyming Cycle Test
-WHOQOL-Brief Questionnaire

Intervention (5 days/week for 4 weeks):

Warm-up (10 min): Stretching, scapular sets, spirometry

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Main (30 min): Cycling (20 min), Walking (10 min)

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Cool-down (10 min): Pranayama, Anulom-Vilom, Shavasana, Activity pacing education

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Continuous Monitoring done during exercise:

- Modified Borg Scale (Exertion), Pulse Oximeter (Heart rate, oxygen saturation)

RESULTS & DISCUSSION

After four weeks of aerobic exercise, including cycling and walking, the patient showed significant improvements in endurance, aerobic capacity, and reduced fatigue levels. Aerobic exercise **c**ardiotonically enhances the heart, improves oxygen delivery, and enhances circulation. Yoga boosts cardiorespiratory function through breathing and postures, while pacing prevents overexertion by balancing activity and rest. Together, they enhance cardiovascular health, energy efficiency, and overall well-being.

Outcome measures	Pre Test Values	Post Test Values
Modifies Medical Research Council (MMRC)	Grade +2	Grade +1
Multidimensional Fatigue Inventory	71/100	54/100
Muscular dystrophy rating scale -Mobility domain -ADL domain -Arm function domain -Impairment domain	 66% 66% 56% 88%	 72% 75% 60% 93%
Chest expansion	2cm	3.1cm
Astrand-Rhyming cycle ergometer test	1.20(L.min-1)a	2.30(L.min-1)a
WHOQOF-Brief Questionnaire	57 /100	78/100

Our findings align with Nandanwar et al. (2024), who reported improved endurance and aerobic capacity in a 25-year-old female with Limb-Girdle Muscular Dystrophy following physiotherapy. Similarly, yoga and breathing exercises in our study enhanced endurance and reduced fatigue levels, suggesting a shared mechanism of improved cardiorespiratory function. These results reinforce the role of non-pharmacological interventions in symptom management, highlighting the need for further research on their long-term benefits.

CONCLUSION

Aerobic exercise enhances functional capacity, promotes chest expansion, and mitigates episodes of fatigue, collectively contributing to an improved quality of life

FUTURE WORK / REFERENCES

1) **Wicklund MP, Kissel JT. The limb-girdle muscular dystrophies. Neurologic clinics. 2014 Aug 1;32(3):729-49.**

2) **Sveen ML, Thune JJ, Køber L, Vissing J. Cardiac involvement in patients with limb-girdle muscular dystrophy type 2 and Becker muscular dystrophy. Archives of neurology. 2008 Sep 8;65(9):1196-201**