

Effects of Exercise in Pulmonary Rehabilitation on a Patient with Uncontrolled Symptomatic Asthma

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Introduction

There are more than 25 million Americans currently living with asthma. Asthma is a chronic respiratory disorder of the airways characterized by airway inflammation, episodic bronchospasm, and airway hyperresponsiveness to allergens and irritants. Symptoms of asthma include episodic and reversible bouts of wheezing, shortness of breath, coughing, and chest tightness. Asthma is typically controlled with inhaled pharmacotherapy and patient education regarding self-management, avoidance of irritants, and aerobic exercise. Pulmonary rehabilitation (PR), a treatment approach originally designed for patients with chronic obstructive pulmonary disease, is a multidisciplinary intervention that can be useful to manage uncontrolled cases of asthma.

Patient History/Systems Review

- 71 y.o. female with longstanding history of asthma
- Referred to PR due to shortness of breath with activities, deconditioning and fear of activities
- PMH: Sarcoidosis that remained stable throughout episode of care, hypertension, a single transient ischemic attack, osteoporosis and depression

Examination

- Resting vitals - BP 150/80 mmHg, HR 78 bpm, O₂ saturation 98% room air
- 6MWT - ambulated 336.8 m no rest breaks, BP 140/70 mmHg, HR 92 bpm, O₂ saturation 91-94% room air, RPE 2/10 (indicates slight breathlessness)
- SOBQ questionnaire scored 23/120 indicating shortness of breath affected activities of daily living
- CAT questionnaire scored 11/40 indicating symptoms affected quality of life
- MMRC questionnaire scored 2/4 indicating that the patient walked slower than people her own age on level ground
- PHQ-9 questionnaire scored 2/27 suggesting minimal depressive symptoms

Clinical Impression

- Diagnosis/Problem List: asthma with associated shortness of breath, fear of activities and deconditioning
- 6MWT revealed desaturation of O₂ and shortness of breath during ambulation on level ground
- Outcome questionnaires indicated that the patient's symptoms were affecting their ADLs and quality of life
- Negative prognostic factors included fear of activity, sedentary lifestyle and history of depression
- Patient was referred for PR treatment under supervision of respiratory therapists

Intervention

- 10 sessions twice a week for 5 weeks
- Initial session focused on teaching the patient pursed lip and diaphragmatic breathing techniques to use during activities of daily living and while exercising
- Patient participated in Theraband strengthening for the upper body 10 minutes per session
- Aerobic exercise equipment used each session included the treadmill, Upper Body Exerciser (UBE) and Nu-Step
- Patient educated to begin a home walking program for 20 minutes a day, 3 times a week
- Patient educated on use of a expiratory muscle trainer (Resistex) 20 minutes per day and to increase resistance as tolerated
- Participated in 10 group education classes covering a variety of pulmonary disease specific topics
- Given an education manual for home to review all educational material given over the POC



Images from Google Images

Outcomes

| Resting Vitals | Initial Evaluation | Post Intervention |
|---------------------------|--------------------|-------------------|
| BP (mmHg) | 150/80 | 118/70 |
| HR (bpm) | 78 | 73 |
| O ₂ Saturation | 98% (room air) | 99% (room air) |

| 6MWT Results | Initial Evaluation | Post Intervention |
|---------------------------|------------------------------|--------------------------|
| Ambulation Distance (m) | 336.8 no rest breaks | 412.1 no rest breaks |
| BP (mmHg) | 140/70 | 128/84 |
| HR (bpm) | 78 | 73 |
| O ₂ Saturation | 91-94% (room air) | 98-99% (room air) |
| RPE | 2/10 (slight breathlessness) | 0/10 (no breathlessness) |

| Outcome Questionnaires | Initial Evaluation | Post Intervention |
|------------------------|--------------------|-------------------|
| SOBQ | 23/120 | 4/120 |
| CAT | 11/40 | 4/40 |
| MMRC | 2/4 | 1/4 |
| PHQ-9 | 2/27 | 1/27 |

| Aerobic Exercise Tolerance | Initial Evaluation | Post Intervention |
|----------------------------|--------------------------|---------------------------|
| Treadmill | 6 min at 1.5 mph | 14 min at 2.3 mph |
| UBE | 6 min at level 2 | 12 min at level 4 |
| Nu-Step | 6 min at 4/10 resistance | 14 min at 6/10 resistance |
| Total Time | 18 min | 40 min |

Discussion

- Patient had a significant increase in duration and intensity of aerobic exercise tolerated
- Patient ambulated 75.3m farther on 6MWT with essentially no drop in O₂ saturation
- Primary limitations of this case report include not having before and after intervention pulmonary function test results and the patient's low RPE during the 6MWT suggest they did not put forth their best effort.
- This case report demonstrates the efficacy of PR for a patient with uncontrolled symptomatic asthma
- Further investigation is needed into what role physical therapists should take in the management of the asthmatic population going forward