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San Marcos, Summer 2020

Research Day, San Marcos Campus

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Summer 8-19-2020

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### Recommended Citation

Lyall, Desiree and Owens, Maura, "The Effectiveness of Home Health Physical Therapy Following Diagnosis of Acute Respiratory Failure Secondary to Covid-19: A Case Report" (2020). *San Marcos, Summer 2020*. 4.

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# The Effectiveness of Home Health Physical Therapy Following Diagnosis of Acute Respiratory Failure Secondary to Covid-19: A Case Report

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### INTRODUCTION

- ◆ Coronavirus Disease (Covid-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first reported on December 31, 2019.<sup>1,2</sup>
- ◆ The characteristic manifestations of Covid-19 are fever and respiratory tract symptoms/signs. Covid-19 can have many extra-respiratory symptoms including cardiac, gastrointestinal, renal, hepatic, neurological, and hematological.<sup>3</sup>
- ◆ Patients with at least one comorbidities like diabetes or hypertension are at higher odds to be hospitalized.<sup>2</sup>
- ◆ Knowledge of Covid-19 is rapidly changing. Therefore, there is limited understanding on the sequelae, presentation, treatment, and long-term outcomes.<sup>1</sup>
- ◆ Research and guidelines have recommended respiratory rehabilitation, strengthening, aerobic reconditioning, and functional rehabilitation.<sup>1,4,5</sup>

### PURPOSE

The purpose of this case study is to describe the effects of home health physical therapy involving gait training, respiratory exercises, disease process education and rehabilitation exercises for strength, endurance and balance in the treatment of a patient with a diagnosis of acute respiratory failure secondary to Covid-19.

### CASE DESCRIPTION

#### Patient Profile

- ◆ 73 y/o male retired
- ◆ PMH: Hypertension
- ◆ 18 day hospital stay due acute respiratory failure with hypoxia
- ◆ Covid-19 positive
- ◆ Received COVID-19 convalescent plasma and completed 4 days of Remdesivir
- ◆ Active problems in the hospital were shortness of breath, acute kidney injury, pneumonia both lungs, spontaneous hematoma of R hip, and cirrhosis of liver
- ◆ Discharged on 3 L/min continuous O2 via nasal canula

#### Body Structure/Function Impairments

- ◆ Decreased strength B UE and LE
- ◆ Decreased balance
- ◆ Decreased activity tolerance and endurance

#### Activity Limitations

- ◆ Ambulation
- ◆ Stairs
- ◆ Driving
- ◆ ADL/IADLS
- ◆ Functional Mobility

#### Participation Restrictions

- ◆ Unable to work around home
- ◆ Unable to go on evening walks with wife
- ◆ Unable to play with grandkids and participate in family activities
- ◆ Difficulty with community ambulation

### Methods

#### Frequency and Duration

- ◆ Two visits a week for 3 weeks and one visit a week for 3 weeks.
- ◆ Duration varied from 30 mins to 1 hour.

#### Interventions

- ◆ **Patient Education**
  - ❖ For monitoring of vitals, adequate hydration, energy conservation, oxygen tank usage and safety.
- ◆ **Respiratory exercises**
  - ❖ Incentive spirometer, diaphragmatic breathing, and pursed lipped breathing up to 30 times a day to tolerance.
- ◆ **Physical Therapy Visit Focus**
  - ❖ Longer duration ambulation on level and unlevel surfaces with vitals monitoring.
  - ❖ Gait training with assistive device
  - ❖ Activity ceased when SPO2 reached <90%.
  - ❖ Patient instructed to perform pursed lipped breathing and diaphragmatic breathing to facilitate return of vitals to resting.
- ◆ **Home Exercise Program**
  - ❖ Home exercise program of seated marching, seated resisted knee extensions, standing calf raises, standing toe raises, and partial squats.
  - ❖ Patient instructed to ambulate for at least 30 ft per hour with monitoring of SPO2 and heart rate.

### Results

Functional Limitations	Initial	Re-Eval
Dressing	Requires Mod A	Requires Sup
Grooming/ Showering	Requires Mod A and use of shower chair	Requires Sup and use of shower chair
Walking	120 ft with 4ww and CGA On 3 L/min of O2 via Nasal Cannula	600 ft -800 ft with no AD and Sup. On 1 L/min of O2 via Nasal Cannula
Outcome Measure	Initial	Re-Eval
MMT	3+/5 B UE and B LE	4/5 for B UE and LE
30 Sec Sit-to-Stand	2 with use of UE	13 with use of UE
6-Min Walk Test	120 ft (Activity ceased at 3 min due to SP02 of 80% on 3 L/min)	600 ft ( Completed 6-mins with SPO2 of 97% on 1 L/min)
6-Min Walk no O <sub>2</sub>		200 ft (Activity ceased at 3 min due to SP02 of 84%)
Tinetti	14/28	20/28
Incentive Spirometer	1200 for 2 inhalations (activity ceased due to coughing episode)	1700 for 3 inhalations (with no coughing)

### OUTCOMES

- ◆ Improvement in body/ structure function deficits as noted by MMT and Tinetti score.
- ◆ Improvement in activity tolerance, endurance, and ambulation as noted by 6-min walk test.
- ◆ Improvement in respiratory status as noted by incentive spirometer, decreased amount of coughing, and ability to titrate oxygen dependence.
- ◆ Improvement in ADL/IADL as patient continues to require intermittent caregiver assistance for dressing, grooming, bathing, food, and medications.
- ◆ Patient able to tolerate ambulation and resting with out supplemental oxygen for short durations.
- ◆ Patient is now able to take short walks with wife around neighborhood.
- ◆ Son able to move out of parents home allowing patient and wife to live with intermittent caregiver support vs 24 hour care.

### CONCLUSION

- ◆ For a patient with a diagnosis of acute respiratory failure secondary to Covid-19 diagnosis home health physical therapy was an effective treatment option to facilitate return to prior level of function.
- ◆ This case study supports previous research and recommended treatment guidelines for the effectiveness of gait training, respiratory exercises, disease process education and rehabilitation exercises for strength, endurance and balance.<sup>1,4,5</sup>
- ◆ This patient was able to make functional improvements from home health physical therapy in a 6-week time frame.
- ◆ Limitations of this study is patient received multi-disciplinary approach with the addition of occupational therapy and skilled nursing.
- ◆ Further research is needed for effectiveness of physical therapy after Covid-19 positive test based on comorbidities, treatment received during hospital stay, complications during hospital stay, and with or without intubation.

### CLINICAL RELEVANCE

- ◆ The information gained from this case study can help guide clinical decisions and assist with creating a plan of care for a patient post-hospitalization due to acute respiratory failure secondary to a Covid-19.
- ◆ Home health physical therapy focused on gait training, respiratory exercises, disease process education and rehabilitation exercises for strength, endurance and balance can promote return to PLOF.<sup>1,4,5</sup>

### Resources

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