Treatment of a 65 Year Old Deconditioned Female Admitted with Complications Resulting from Morbid Obesity: A Case Report

David Sarvin, SPT
Governors State University – University Park, IL

ABSTRACT

Background: Obesity is a medical diagnosis in which excess body fat has accumulated to the extent where it may have an adverse effect on health. Obesity is a growing concern among the population of adults and children living in the United States. It costs the medical industry a great deal of money each year treating these patients, especially in those individuals classified as morbidly obese (those who possess a BMI greater than 40). With unhealthy lifestyle choices more accessible than ever, it is important to understand the risk factors involved. In many cases, obesity poses serious threats to the cardiovascular system, such as hyperlipidemia, hypertension, and congestive heart failure. If untreated, these risk factors can result in stroke, heart attack, or possibly death. In severe cases, the obesity can be classified as morbid, and may require hospitalization. In this setting, the patient can be monitored, diet can be controlled, and physical therapy can try and decrease body fat and improve level of conditioning.

Purpose: The most widely used instrument to measure obesity is the Body Mass Index, or BMI. The BMI is an evidence based classification system used to categorize level of obesity. The BMI classifications are divided as follows: greater or equal to 35 indicates severe obesity, greater or equal to 40 indicates morbid obesity, and greater or equal to 50 indicates super obesity. “In the present case study, the patient had a BMI of 48 and would be classified as morbidly obese.”

The purpose of this study is to assess effectiveness of a primarily cardiovascular based treatment plan which includes elements of functional activity training on a deconditioned subject who suffers from complications resulting from morbid obesity.

Overview: In this manuscript, the history and systems review include an overview and introduction of the patient’s initial condition and function. Clinical impressions outline the opinions of the treating physical therapist, including anticipated treatment outcomes based on research. The sections on diagnoses, prognosis, and goals include the patients’ treatment outlook, and milestones to be achieved by the patient based on PLOF and minimal functional independence. The interventions and outcomes portions of this manuscript illustrate the treatment interventions, performance on certain tests and measures, and the positive effects on the patient. The discussion and conclusion sections describe the overall treatment summary, including limitations to this study and ways to improve.

Case Description

History

The patient described in this case study is a sixty-five year old Caucasian female admitted to the skilled nursing facility with complications resulting from morbid obesity, among other co-morbidities. These co-morbidities included hypertension, congestive heart failure, type II diabetes mellitus, hyperlipidemia, osteoarthritis, and unspecified gout. The patient was seeking physical therapy care to reduce risks, as well as to improve exercise tolerance in order to facilitate improved activities of daily living participation in both the household and the community. Her primary functional limitations were bed transfers, toilet and shower transfers, and ambulation. She began having problems in May 2014, where her weight and decreased level of
conditioning began limiting her functional abilities enough to miss important family and social events. A few weeks later her condition had gotten worse to the point where the patient felt a change needed to happen for her overall health, as well as her ability to tolerate functional activity. She was highly self-aware of her condition, and thus motivated to improve her condition. Her goals were to return home to see her children and grandchildren, as well as be more independent with ADLs, such as cooking and bathing. The patient is currently retired, and spends her free time at home. The patient is currently living at home with her husband, who also acts as a caregiver to assist with activities of daily living and other functional activities. The patient has 2 children, one living in the immediate area who also acts as a secondary caregiver if her husband is unavailable. The subject lives in a one-story home with wheelchair ramp access via the front door. Her prior level of function included ambulating short distances with axillary crutches in her household and using a wheelchair (with assistance from her caregiver) for community ambulation.

Medications included Norco for knee and overall musculoskeletal pain, Metoprolol to regulate cardiac function/ blood pressure, and Niaspan to assist with complications from hyperlipidemia.

**Systems Review**

Upon examination, the main complaints of the patient were bilateral knee pain, as well as the inability to tolerate ambulation and to perform functional activities without becoming fatigued. Her cardiopulmonary, integumentary, and musculoskeletal systems were impaired during examination. Her neuromuscular system presented as unaffected. These findings influenced the decision to perform a full upper and lower body examination, as well as assessing gait, transfers, bed mobility, and wheelchair mobility. Examination examples included Active Range of Motion for this patient was WNL for all motions in the UE. In the lower extremity, the patient was limited in bilateral hip flexion, hip internal and external rotation, knee flexion, and knee extension due to excess adipose tissue and pain. Values are listed in table 1.1. All UE and LE Myotomes/manual muscle tests were 4+/5 except B/L hip flexion: 4-/5, B knee extension: 4-/5. B knee flexion 4/5. Mild swelling and tenderness to palpation were present diffusely around joint line in B knees. All UE and LE dermatomes were intact to light touch. All Deep tendon Reflexes were 2+ and symmetrical in the UE and LE. Joint mobility and special tests were not performed due to tissue restrictions and pain. Pain level in B/L knees was at a 9/10 on the Numeric Pain Rating Scale (NRPS) at the time of initial evaluation.

In terms of functional activities, the patient was at a level of Max assist x 2 for both transfers and bed mobility upon initial examination. She demonstrated the ability to ambulate ten feet using axillary crutches at first assessment, and wheelchair mobility was indicated to be at a level of max assist. For a baseline outcome measurement, the Timed Up and Go (TUG) test was chosen. The patient scored an average of 19.84 seconds with the use of axillary crutches to maintain balance and safety.

**Clinical Impressions**

Based on the patients’ desire to participate, as well as the interventions prescribed at first, it was determined she was a good
Table 1.1: ROM results from Initial Examination

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Flexion</th>
<th>Extension</th>
<th>Lateral Flexion</th>
<th>Rotation/Dev</th>
<th>IR/ER</th>
<th>Abd/Add</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical</td>
<td>AROM: WNL</td>
<td>AROM: WNL</td>
<td>AROM: WNL B/L</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Shoulder</td>
<td>AROM: WNL B/L</td>
<td>AROM: WNL B/L</td>
<td>N/A</td>
<td>N/A</td>
<td>AROM: WNL B/L</td>
<td>AROM: WNL B/L</td>
</tr>
<tr>
<td>Elbow</td>
<td>AROM: WNL B/L</td>
<td>AROM: WNL B/L</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Wrist/Hand</td>
<td>AROM: WNL B/L</td>
<td>AROM: WNL B/L</td>
<td>N/A</td>
<td>AROM: B/L</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Hip</td>
<td>AROM: 40 deg R, 45 deg L (limited by soft tissue/weakness) PROM: 60 deg B/L</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>AROM: 20 deg B/L (limited by soft tissue/weakness) PROM: WNL B/L</td>
<td>AROM: WNL B/L</td>
</tr>
<tr>
<td>Knee</td>
<td>AROM: 72 deg R, 78 deg L (limited by soft tissue) PROM: 84 deg R, 86 deg L</td>
<td>AROM: 4 deg ext B/L PROM: 0 deg B/L</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Ankle/Foot</td>
<td>(Dorsiflexion) AROM: WNL B/L (Plantarflexion): AROM : WNL B/L</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Inversion/Eversion: WNL B/L</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Table 1.2: Dermatomes, Myotomoes, and Reflexes from Initial Examination

<table>
<thead>
<tr>
<th>Myotome</th>
<th>C1-3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
<th>T1</th>
<th>L1-2,</th>
<th>L3</th>
<th>L4</th>
<th>S1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>4+/5</td>
<td>4+/5</td>
<td>4+/5</td>
<td>4+/5</td>
<td>4+/5</td>
<td>4+/5</td>
<td>NT</td>
<td>4-/5</td>
<td>4/5</td>
<td>4/5</td>
</tr>
<tr>
<td>Left</td>
<td>4+/5</td>
<td>4+/5</td>
<td>4+/5</td>
<td>4+/5</td>
<td>4+/5</td>
<td>4+/5</td>
<td>4-/5</td>
<td>4/5</td>
<td>4/5</td>
<td>4/5</td>
</tr>
</tbody>
</table>

Reflexes: UE bilateral (C5-7) reflexes were 2+ (normal) and symmetrical. LE bilateral reflexes (L3 and S1) were 2+ and symmetrical.

Dermatomes: All bilateral UE and LE dermatomes were intact to light touch.

Table 1.3: Resting Cardiopulmonary Data from Initial Examination

<table>
<thead>
<tr>
<th>BP: 132/86 (controlled by medication)</th>
<th>Pulse Rate: 82 bpm</th>
<th>Respiratory Rate: 18</th>
<th>O2 sat: 95%</th>
</tr>
</thead>
</table>

Table 1.4: Description of functional activity tolerance at initial examination (level of assist based on FIM scoring)

<table>
<thead>
<tr>
<th>Functional Activity/Test</th>
<th>Gait (distance)</th>
<th>Transfers</th>
<th>Bed Mobility</th>
<th>Wheelchair Mobility</th>
<th>TUG Score</th>
<th>Pain Level (NPRS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance/Level of Assist</td>
<td>10 ft c axillary crutches</td>
<td>Max assist x2</td>
<td>Max assist x2</td>
<td>Max assist</td>
<td>19.84</td>
<td>9/10</td>
</tr>
</tbody>
</table>
candidate to benefit from skilled physical therapy. Based on the data from tables 1.1-1.4, the patient is appropriate for the target interventions to improve bed mobility, gait training with axillary crutches, and to improve cardiovascular exercise tolerance. The assessment of these three key areas will be crucial in determining the success of the current interventions, progressing toward goal achievement, and recommending the appropriate time for discharge. For the patient to be successful, research based on previous patient treatments and subjective information from the patient suggest the ability to walk safely for at least 70-75 feet with axillary crutches to facilitate household and short distance community ambulation. Functional abilities would suggest the patient achieve the level of minimal or stand-by assistance in both bed mobility and transfers.

**Diagnosis, Prognosis, & Goals**

The patient has been diagnosed with morbid obesity. The patient presented with a good prognosis to return to her community and home environments with an improved level of cardiovascular function. This is demonstrated by the patients’ strong desire to return home and increase her level of independence. Her work ethic during treatment indicated the desire to meet challenges and achieve goals set by therapists.

Short-term goals included an ambulation distance with axillary crutches from 10 feet to 30 feet with a level of contact guard. This would facilitate an improvement in functional abilities and the ability to safely maneuver in her home environment. Another goal established for the patient was achieving a level of min. assist with bed mobility. Techniques for bed mobility were made specific to the patient by helping her utilize the pull bar attached to her bed and also focused on functional tasks. The final goal established prior to treatment was achieving minimal assistance level with transfers. Each one of these goals has a 2-3 week completion timeline.

Long-term goals are goals that are to be achieved in approximately 4-6 weeks of care. In this patient case, the long-term goals were similar to the short term goals. The patient’s goal was to ambulate to 70 feet with a level of stand-by assist. This would encompass the longest the patient described she would have to travel to reach a different area of her property. Her bed mobility and transfer goals were at a level of stand-by assist prior to the completion of care. It was important to remember the degree of morbid obesity and the stress being put on the knees and to not make the goals unattainable.

Table 2.1 (found on pg. 59) illustrates goal progression and indicates that all short and long term goals were met.

**Interventions**

The interventions used have been deemed appropriate to the patient case by my initial examination as well as through research studies. Many factors were considered when deciding which specific interventions would be beneficial to the patient, including ability to perform and tolerate exercise, safety, and which activities were functional to her specific activities of daily living. Treatment was focused on cardiovascular-based interventions with functional improvements in mind. There was an aim to decrease body fat, improve functional exercise tolerance, and facilitate an overall better quality of life. Improvements in these areas gave the patient the best opportunity to make progression, as supported by research. Each intervention’s progression and eventual outcomes are included in Table 2.1. Examples of treatment interventions included the following.
Bed Mobility & Transfers Training

At initial examination, one of the first impressions of the patient was her difficulty with bed mobility and transfers. With this patient, these were two essential functional skills to address with a considerably deconditioned patient. We started intervention immediately in order to try and prevent the formation of pressure ulcers, which are major concerns for obese patients confined to bed rest. Initially, the patient required maximal assist x 2 with each of these. Initially, thirty minutes was spent daily for practicing each of these. By the fourth week of treatment only fifteen minutes of treatment were used in favor of progressing towards more functional activities. However, with patient education on proper mechanics, encouragement, and practice the patient was able to achieve a level of minimal assist in both bed mobility and transfers (supine-sit, sit-stand) by the end of the third week of treatment sessions. Based on these promising results and the positive relationship established with the patient, she was then further able to perform bed mobility and transfers at a level of stand by assist by the end of the seventh week.

Gait Training

One of the most underlying and functional activities the plan of care focused on was improving her ability to walk using axillary crutches. Gait training has benefits towards both functional activity and cardiovascular conditioning. Referring back to Table 1.4, the patient was able to tolerate 10 ft. of ambulation using axillary crutches at baseline. Initially, after short distance ambulation, her level of oxygen saturation would decrease quickly to the 86-90% range, while her heart rate would spike to 115-120 bpm. Gait training was performed once daily, 6 times a week, for fifteen minutes each session. With daily treatment sessions, she began making considerable progress by the third week. Her ambulation distance increased to thirty feet prior to fatigue, and the patient exhibited better balance and muscular control. By the completion of care, the patient ambulated approximately 70 feet prior to fatigue and spikes in vitals. This was in part due to patient education on the importance of physical therapy, safety, and maintaining a positive attitude during treatment. The patient used a gait belt with a two person contact guard for the first one to two weeks of therapy, then progressed to one person contact guard, and eventually stand-by assist by the completion of treatment. The patient also was asked to maneuver around certain obstacles that would mimic a home setting during the higher level gait training. Overall, the functional gains made and the level of weight loss would indicate this was an effective method of treatment.

Cardiovascular Training

In addition to gait training improving fitness levels, cardiovascular exercise was also performed with an aim to decrease body fat percentage and risk factors and to improve overall quality of life. Cardiovascular exercise has been shown by numerous research studies to have positive effects, such as weight loss, decrease in body fat percentage, and overall improvements in patient participation, each of which aided treatment. With this patient, an Omni cycle exercise bicycle was the method of cardiovascular exercise. Studies have shown it can be as effective as conventional exercise training. This type of intervention is appropriate for patients who cannot safely and effectively perform higher-level interventions. With the patient seated in her wheelchair, she performed fifteen minutes of lower extremity exercise, followed by fifteen minutes of upper extremity conditioning. Her overall vitals were monitored during treatment using a pulse oximeter to ensure patient safety and
monitor exertion. This intervention was performed daily for each of the seven weeks of patient care. Initially, the patient was only able to perform this intervention on level 1 at 57% activity. By the end of week three, she was able to perform at level 2 with 78% activity. Once the seventh week of treatment commenced, the patient had improved all the way to level three at 94% activity. Overall, her gains in cardiovascular function were a marked improvement, which had lasting effects on therapy outcomes.

**Balance/Neuromuscular Re-education Training**

In addition to the primary interventions, balance and neuromuscular re-education training was performed once the patient was safely able to demonstrate the functional ability to ambulate. In an article entitled “Effect of 5 weeks horizontal bed rest on human muscle thickness and architecture of weight bearing and non-weight bearing muscles”, research explains the detriments of bed rest for deconditioned patients, including atrophy and weakness. It further explains how bearing weight through the limbs for strengthening purposes is an important step in treatment. This alternate stepping with emphasis on weight shifting exercise was performed daily in the final two weeks of treatment inside the parallel bars. Fifteen minutes was dedicated towards alternate stepping, with ten repetitions on each lower extremity. Once again, vitals were monitored using a pulse oximeter to ensure safety during exercise. The treatment strategies in just two weeks were essential to help retrain the muscles of the lower extremity, which had been severely deconditioned after years of limited use. Although muscle strengthening was not reassessed with regularity due to not being the primary focus of care, during week six the patient had improved to 4+/5 in all bilateral upper extremity and lower extremity manual muscle testing. This increase in muscle strength helped facilitate improved balance during ambulation and other functional activities.

**Outcomes**

In addition to the measurable gains outlined in the interventions section, outcome measures are important to achieve another measure of effectiveness of the interventions and treatment plan. The two outcome measures used were the TUG (timed up-and-go) test, as well as the NPRS, or Numeric Pain Rating Scale. Both outcome measures are widely used and supported by research. The TUG test produced adequate test-retest reliability (0.56), and excellent Interrater Reliability (.04 seconds difference). Minimum detectable change (MDC) and minimal clinically important difference (MCID) have not been established. Minimum Detectable Change was a change of 3 points for the NPRS. MCID was a decrease in 1.14 points on the NPRS. The test retest reliability was adequate (0.63) for assessing the patient once a week.

Referring to Table 2.2, these tests were administered either weekly or bi-weekly to assess progress. The TUG scores improved overall at each re-assessment, to a level of 14.32s. This would indicate the patient is at a high risk for falls but can safely ambulate short distances. The NPRS was assessed at each session, and the week’s overall scores were averaged to assign one number per week. Table 2.2 indicates the level of pain the patient experienced did not significantly decrease, however she did make minimal to moderate improvements to a level of 6/10.

In terms of goals, the patient achieved each milestone of short-term and long-term goals set forth. Therapists provided encouragement to achieve each goal in the allotted timeframe, and the patient was determined to work hard to improve. Also, the patient expressed she did not want to
**Table 2.1: Intervention Summary**

<table>
<thead>
<tr>
<th>Week</th>
<th>Gait Training</th>
<th>Bed Mobility</th>
<th>Transfers</th>
<th>Cardiovascular</th>
<th>Balance/Neuro-Re-Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Initial Exam)</td>
<td>10 feet</td>
<td>Max. Assist x2</td>
<td>Max. Assist x2</td>
<td>Level 1 @ 57% activity</td>
<td>Not tested</td>
</tr>
<tr>
<td>2</td>
<td>15 feet</td>
<td>Mod. Assist</td>
<td>Max. Assist</td>
<td>Level 1 @ 96 % activity</td>
<td>Not tested</td>
</tr>
<tr>
<td>3</td>
<td>30 feet</td>
<td>Min. Assist</td>
<td>Min. Assist</td>
<td>Level 2 @ 78% activity</td>
<td>Not tested</td>
</tr>
<tr>
<td>4</td>
<td>50 feet</td>
<td>Min. Assist</td>
<td>Min. Assist</td>
<td>Level 2 @ 98% activity</td>
<td>Not tested</td>
</tr>
<tr>
<td>5</td>
<td>60 feet</td>
<td>Contact guard</td>
<td>Contact guard</td>
<td>Level 3 @ 60% activity</td>
<td>Not tested</td>
</tr>
<tr>
<td>6</td>
<td>65 feet</td>
<td>Contact guard</td>
<td>Contact guard</td>
<td>Level 3 @ 86% activity</td>
<td>10 steps bilaterally</td>
</tr>
<tr>
<td>7</td>
<td>70 feet</td>
<td>Stand-by Assist</td>
<td>Stand-by Assist</td>
<td>Level 3 @ 94% activity</td>
<td>10 steps x 2 bilaterally</td>
</tr>
</tbody>
</table>

**Table 2.2: Outcomes Summary**

<table>
<thead>
<tr>
<th>Week</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUG (seconds)</td>
<td>19.84</td>
<td>N/A</td>
<td>16.12</td>
<td>N/A</td>
<td>15.01</td>
<td>N/A</td>
<td>14.34</td>
</tr>
<tr>
<td>NPRS</td>
<td>9/10</td>
<td>9/10</td>
<td>8/10</td>
<td>8/10</td>
<td>7/10</td>
<td>6/10</td>
<td>6/10</td>
</tr>
</tbody>
</table>
disappoint and focused on improving her quality of life. In the therapists’ professional opinion, the patient was displaying marked improvements and benefitting greatly from physical therapy treatment.

Discussion/Conclusion

The purpose of this study was to examine the outcomes using a cardiovascular-based treatment program for a 65-year old deconditioned patient with complications resulting from morbid obesity. Treatment for this patient was functionally based as well. Interventions included gait training, cardiovascular training, bed mobility and transfer training, and balance/neuromuscular training. The aim of treatment was to promote weight loss, improve cardiovascular function and quality of life, and decrease risk of serious medical conditions stemming from being morbidly obese. Based on the data, patient response, adherence to treatment, and positive outcomes indicate that this is an effective plan of care for patients with complications from morbid obesity. This is consistent with the treatment of other cases with similar patients. However, at times, things outside of the control of the physical therapist need to be addressed in order to move forward.

One factor other than physical therapy which may have affected treatment was psychosocial issues. The patient did occasionally have a day in which she was not in good spirits, which is understandable for someone with her condition. One could empathize with the patient when she described she was feeling depressed or upset. She also missed her infant granddaughter, as well as her children and her husband. However, I believe the thought of being around them was a positive motivating factor during her care. Another treatment issue is the fact that the patient is currently covered by Medicare, which can have profound effects on coverage and therefore treatment. Effects include cap restrictions on therapy, exemptions for the obese, and others.

Limitations of this case report include only having one subject for which to base my conclusions upon. ROM and strength were not regularly assessed after initial examination, due to focusing treatment on more pertinent issues. However having that information would have strengthened my conclusion as well. Therapists felt the patient was unsafe or unable to perform many of the other outcome measures, and the performance of these outcome measures may have been able to improve the construct validity of this study.

Further research may be warranted to further validate my assertion that these interventions are both appropriate and effective for morbidly obese patients. There may also be different strategies to treating patients with morbid obesity, and some research supports the efficacy of accelerated training. There can be different methods of ultimately attaining the same goal.

The conclusion that this treatment plan displays beneficial results is warranted based on the data, patient response and adherence to treatment, and positive outcomes.
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References


