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Practical Experience Implementing Supervised Exercise Therapy for Peripheral Artery Disease in Urban and Rural Minnesota

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Introduction

Although numerous studies have demonstrated the effectiveness of treadmill-based supervised exercise therapy (SET) in improving pain-free and total walking distance and quality of life in individuals with peripheral artery disease (PAD), historically this treatment has not been widely available outside of research settings. Last year's decision by Centers for Medicare and Medicaid Services (CMS) to cover up to 36 sessions of SET over a 12-week period for beneficiaries with symptomatic PAD (1) has enabled greater implementation of this effective treatment in clinical settings. An additional 36 sessions are available over an extended period with a new referral from a health care provider. At the University of Minnesota, we have been implementing SET in both urban and rural clinical settings since 2015. In this column, we provide examples of two patients who have participated in SET through these programs, highlighting their experiences and tips for those considering implementing SET for individuals with PAD at their own institutions.

Case 1 – Supervised Exercise Therapy Implementation in Urban Minnesota

Initially implemented as part of a randomized controlled trial of walking exercise in PAD, SET has been offered clinically in the Fairview Health System in the Twin Cities metropolitan area since 2015. SET began as a treatment option for patients offered through a self-pay phase III cardiac rehabilitation program, but with CMS reimbursement is now more widely available at five cardiac rehabilitation sites. These sites, located in Burnsville, Edina, Wyoming, Princeton, and Minneapolis, are all located within a 50-mile radius of the University of Minnesota. Patients referred to SET in the Fairview Health System perform up to 36 sessions of SET distributed over 12 weeks. Assessments of physical function and walking are performed prior to starting the program and upon completion of the 12 weeks of exercise training. Assessments include the six-minute walk test (6-MWT) and Timed Up-and-Go test (TUG). The 6-MWT is a submaximal, self-paced physical function test in which

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individuals are asked to cover as much ground as possible in a six-minute period. The TUG test measures balance and mobility and is performed by recording the time required for the patient to rise from a seated position, walk three meters, turn around, and return to sitting. Since beginning in early 2015, approximately 110 patients have participated in the program.

Assessment.

“Carol” is a 69 year old female, retired educator who was referred to SET in the Twin Cities metropolitan area. At the time of the referral, she had a history of hypertension, hypercholesterolemia, and rheumatoid arthritis. A former smoker who quit about 17 years prior, “Carol” had a 17.5 pack year history of smoking. Her PAD symptom onset was thought to be about 20 years prior, but it was not diagnosed until about two years ago. Her resting ankle-brachial indices (ABIs) were 0.75 and 0.85 in the left and right legs, respectively. Despite mild disease bilaterally, she only reported experiencing unilateral symptoms (left leg) described as a cramping/aching sensation in calf, thigh, and buttock, with an onset of claudication approximately at three blocks and maximal walking distance of four blocks. She had not had any revascularization procedures. Prior to beginning SET, her total distance on the 6-MWT was 1249 feet.

Exercise Prescription.

Given her high performance on the 6-MWT, treadmill walking was selected as her primary mode of exercise. Over the first two sessions, her treadmill prescription was adjusted to find the treadmill grade and speed at which she experienced claudication that was moderate to severe in about 8–10 minutes. After this adjustment period, her starting prescription was 2 mph at 5% grade (3.9 metabolic equivalent of task [METs]). Over the course of the 12 weeks, this prescription was incrementally adjusted, adding 0.5 to 1% grade on the next session once she was able to complete bouts of greater than 10 minutes without experiencing moderate to severe claudication.

Troubleshooting.

One problem that “Carol” encountered during the course of her participation in SET was uncontrolled hypertension. As blood pressures were measured both before and during exercise at each session, staff were able to flag her initially very high (low 200s over 90s) exercise blood pressures. This was addressed quickly by notifying the referring provider and RN coordinator. Additional blood pressure medications were added and dosages adjusted over the course of several weeks, with close monitoring from the SET staff until her resting and exercise blood pressures were well controlled.

Program Outcomes.

After completion of 34 sessions over the course of 12 weeks, “Carol” was able to walk at 2.1 mph and 9.5% grade (5.4 METs) for each of her bouts. At 12 weeks, her 6-MWT distance increased to 1387 feet (11% increase). “Carol” was then able to obtain a referral for a second set of 36 sessions from her provider and over those sessions was further able to increase her workload, walking at 2.3 mph and 13% (6.9 METs) at the completion of those sessions. Upon completion of SET, she planned to continue walking for exercise a couple of times a

week to maintain the progress she had made, but was most excited about getting back to dancing, which she felt was possible given the improvements in function she had experienced.

Case 2 – Supervised Exercise Therapy Implementation in Rural Minnesota

This case study highlights the progress made by a rural farmer who participated in SET as part of the PAD PRAIRIE Initiative: Promoting Healthy Aging and Mobility in Rural Minnesota (PRAIRIE). PRAIRIE is a four-year grant (Margaret A. Cargill Foundation) with the objective to raise awareness, increase detection, and provide therapeutic exercise treatment for patients with PAD. The process began with establishing partnerships with independent hospitals in rural west central Minnesota to begin teaching providers and nurses how to effectively identify PAD in their patient population and subsequently teaching rehabilitation staff to deliver a SET program. PRAIRIE participants perform 12–14 weeks of SET, two to three times per week in a rural cardiac rehabilitation setting. Pre and post assessments are performed before starting the program and upon completion or prior to peripheral (re)-intervention, when possible. Additionally, follow-up assessments are performed at 6, 9, and 12 months. Assessments include the Short Physical Performance Battery (SPPB), 6-MWT, the Walking Impairment Questionnaire (WIQ), Peripheral Artery Disease Quality of Life Questionnaire (PADQOL), Profile of Moods Questionnaire (POMS), and the Patient-Reported Outcome Measurement Information System Quality of Life questionnaire (PROMIS – 29). A total of 79 patients have participated in SET in this setting since 2015.

Assessment.

“John” is a 67-year-old male full-time farmer. He described sharp pain in his left calf and hip, which began in 2017. Non-invasive testing revealed bilateral ABIs of 0.62. Toe brachial indices were 0.42 (right) and 0.35 (left). He had a medical history of coronary artery disease with a drug eluting stent placed in 2014, type two diabetes, hypertension, current smoker (5–6 cigarettes/day $\times$ 35 years = approximately 10 pack/year history), and open reduction and internal fixation of the left hip (2017). “John” relied on a cane for ambulation around his home prior to participating in SET. He was referred to SET by his primary care provider as “prerehabilitation” to prepare him for another surgery for his left hip. Due to the extent of discomfort in his left hip, he was prescribed seated recumbent cross-training on the NuStep T5 Recumbent Cross Trainer (Ann Arbor, Michigan) instead of traditional treadmill walking. The NuStep has been prescribed for approximately 86% of participants in the PAD PRAIRIE Initiative SET program, most of whom performed multi-modal exercise. Only 13% of participants were able to use the treadmill as their sole source of aerobic exercise during SET. At his baseline assessment, he reported “some difficulty” walking one half-block and “much difficulty” walking two blocks on the WIQ, a PAD-specific subjective functional self-assessment of community-based walking ability. His 6-MWD was 900 feet at baseline. “John” reported that he was no longer able to get into his tractor due to his leg and hip discomfort and was concerned that he would become unable to farm given his limited ability to raise his legs onto the tractor.

Exercise Prescription.

“John’s” initial exercise prescription was set by the cardiac rehabilitation nurse and the patient, driven by what felt comfortable and elicited an aerobic response. “John” experienced claudication on the NuStep. Some individuals with symptomatic PAD do not experience claudication from this exercise modality. Because he was symptomatic on the NuStep, his exercise prescription was driven by his rating of claudication as opposed to rating of perceived exertion. He was given an initial NuStep prescription of level 5 workload. He pedaled at approximately 70–75 steps per minute (SPM) exercising at approximately 32 watts (3.1 METs). “John” completed two bouts of exercise during the first SET session, lasting 22 minutes and 14 minutes, respectively. He reported 2/5 claudication and 4/10 (moderate intensity) rating of perceived exertion for his first bout and 3/5 and 4/10 for his second bout.

“John’s” exercise intensity was increased each day for the first week (from level 5 to level 7) to elicit a claudication rating between 3–4/5 (“moderate pain or discomfort”). The prescription was steadily increased over the course of the next four weeks, adjusting the prescription to maintain claudication ratings in the target zone of 3–4/5. He reached a steady prescription of approximately 50–60 SPM, 75 watts, on level 9 to 10 by week four (3.7 – 4.0 METs). He consistently performed two to three bouts of exercise, lasting 10–20 minutes per bout and incrementally increased the duration of his exercise bouts. Upon completion, “John” was performing two bouts of exercise for an accumulated total exercise time between 40–45 minutes. “John” reported that he believed SET was helping his walking.

Troubleshooting.

“John” reported significant hip stiffness throughout the course of his therapy. This was slightly alleviated by ensuring he performed a warm-up and cool-down. Therapy was more tolerable when he began performing hip stretches before and after therapy, in addition to the warm-up and cool-down. Had he not experienced this stiffness, he may have had a slightly more aggressive increase in exercise prescription.

Program Outcomes.

Approximately six weeks into the program, “John” reported that he no longer needed his cane to walk. At post-testing, he reported that he was able to continue farming. He participated in the harvest and in the late fall began unsupervised exercise at the adjoining hospital community wellness center. His 6-MWT improved at 12-weeks from 900 feet to 1030 feet; at six-months follow-up to 1110 feet, and to 1160 feet at nine-months follow up (29% improvement from baseline). He avoided an additional hip surgery by participating in SET. He continued to exercise independently at the community wellness center and continued farming.

Conclusion and Recommendations

These cases highlight the well-documented benefits of SET and illustrate the nuance and tailoring necessary in the exercise prescription when working with this diverse patient population. Care should be taken to provide ongoing evaluation of exercise modality,

duration, and intensity. Both patients experienced setbacks due to other comorbid or coexisting conditions, which are common in this population. Both programs included an emphasis on educating patients of the importance of continued exercise following SET and helped prepare individuals to successfully implement an independent exercise program. With CMS expansion of reimbursement for SET for patients with symptomatic PAD, these two programs may serve as exemplars for other institutions as they develop and implement programs in their own communities.

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