Case Study

Home-based Physical Therapy Following Tricuspid Valve Repair (TriClip): A Case Study

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Abstract

Background and Purpose: This case study describes the home-based physical therapy rehabilitation of a patient following a novel, less invasive tricuspid valve repair surgery using a TriClip system.

Case Description: The patient is an 82 years old female presenting with heart failure secondary to tricuspid regurgitation and underwent successful TriClip implantation. She was discharged home 2 days after surgery with a home health physical therapy referral.

Intervention: A comprehensive home health physical therapy program consisting of progressive exercises, patient education, strength, balance, and endurance training was implemented.

Outcomes: Improvement was noted in patient outcome measures including 2 min walk test, Timed Up and Go (TUG), 2 min step test on discharge as compared to the initial assessment. It demonstrated the positive impact of home-based physical therapy on a patient's participation in activities of daily living following TriClip implantation.

Discussion: With a reduction in the number of days in the hospital and the popularization of less invasive surgeries, early intervention with home-based health physical therapy is crucial for optimizing functional outcomes and patient recovery. This case study suggests the importance of tailored rehabilitation in this patient population.

Keywords: Physical therapy, TriClip, Heart Failure, Home health therapy, Rehabilitation, Case study.

Background/Purpose

Tricuspid valve disease, primarily Tricuspid Regurgitation(TR), is a widespread condition that has a complex pathophysiology. It has been one of the leading causes of heart failure (HF) and mortality in recent years [1.] In this case the patient's TR was likely secondary to cardiomyopathy and chronic atrial fibrillation. TR can have a significant impact in a patient's life as it can lead to mild to severe HF [2.] Severe TR can lead to right ventricular dysfunction by exacerbating HF symptoms, creating a vicious cycle [3.] Current clinical practical guidelines (CPGs) for HF lack specific recommendations for managing patients with significant TR, representing a clinical gap in clinical practice.

New minimally invasive techniques have been developed and studied over the last decade. Transcatheter Tricuspid Valve Intervention (TTVI)

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using coaptation devices, such as TriClip, MitraClip and PASCAL have gained popularity in the recent years [2]. A 2024 systematic review conducted on these three devices showed Triclip to be superior in treating patients suffering from severe TR [4].

Studies conducted by Kitamura et al, showed improvement in quality of life and functional capacity post TTVI. In this study a 36 item short form health survey (SF-36) and Minnesota Living with heart failure questionnaire (MLHFQ) were evaluated at baseline and 1 month follow up visits. It concluded correlation with reduction in TR with improvement in MLHFQ and SF-36 scores [5]. There are limited studies to evaluate the impact of structured physical therapy rehabilitation protocols, especially in home settings. This study aims to address this gap by exploring if a structured home-based physical therapy program improves recovery after a TriClip procedure in patients with severe TR.

Patient Profile

Patient is 82 y.o. overweight female (BMI: 26) residing in a two-level private home with her husband. She has been using a front wheel walker for her mobility due to weakness and fatigue since the past 2 years. While no steps are required for home entry, the patient requires stairs to reach the bedroom. Patient had been suffering from severe HF symptoms for the past 2 years and her symptoms had progressively worsened over the last few months. Her symptoms included shortness of breath when performing ADLS like walking, stair climbing, dressing and showering. She also had increased swelling in bilateral ankle and feet along with weakness.

Patient was referred for home health physical therapy following correction of tricuspid regurgitation using TTVI procedure using TRiclip coalition.

Past Medical History: Atrial fibrillation, type 2 diabetes, cardiomyopathy, valvular heart disease (severe TR).

This patient was further considered unstable, as evidenced by the knowledge deficit related to medications, safety, infection, and wound care. Physical therapy was required for gait training, endurance training, and muscle strengthening.

Prior Level of Function: Patient had increased swelling in her feet and reduced endurance. She had difficulty going up the stairs to her bedroom and had been sleeping in the living room for 3 months.

Patient Goals

1. Patient wants to be able to climb stairs independently to be able to sleep in her bedroom.
2. Patient wants to get back to walking longer distances without any assistive devices.
3. Patient wants to get back to participating in all her Activities of Daily LIving (ADL) independently without fatiguing.

Timelines of significant events are depicted in the table below.

Table 1. Significant events

Day	Events
0	TTVI using TriCLip for TR.
3	Discharged home with PT referral
4	PT evaluation
16	PT reevaluation
30	Home health PT discharge, referred to cardiac rehabilitation.

Clinical Findings

The patient underwent home health physical therapy assessment on day 3 post-surgery. As per the physical therapy assessment, the patient appeared to require assistance for most of her ADLs. She required help performing tasks like dressing, showering, and getting on and off the toilet. Patient was able to walk 120 ft using a walker and required a rest break after that. She had an antalgic gait pattern due to slight pain around the surgical site.

Vitals within normal limits (WNL) pre physical therapy evaluation: BP 126/78 mmHg, HR 72 bpm, RR 14 breaths/min, SpO2 98% on room air. Patient

has reduced strength in bilateral lower and upper extremity muscles of 4-/5.

She reported a 2/10 pain in her groin area along the surgical site while walking. She required minimal assistance (minA) to get up from her recliner because of soreness at the surgical site.

The patient required Contact Guard Assistance (CGA) and a walker for ambulation with cues to lift the legs higher while walking and standing straight.

She had a Timed Up and Go (TUG) score of 48 seconds (Normal value < 13.5sec) using a front-wheeled walker (FWW), putting her at a high risk of falls [6]. The patient was able to walk for 2 min inside the house using a walker covering a distance of 120 feet, with a modified Rate of Perceived Exertion (mRPE) score of 6/10 (hard) [7].

Vitals WNL post physical therapy evaluation: BP 132/82 mmHg, HR 82 bpm, RR 16 breaths/min, SpO2 99% on room air.

Objective measurements during initial assessment and patient centric goals are depicted in Table 2.

Table 2. Objective measurements and goals.

Objective Measurement	Impairment	Clinical Reasoning	Goals
2min walk test	Patient was able to tolerate walking for 120ft in 2 mins using a walker and CGA, mRPE 6/10, SpO2>90%	To assess for exercise capacity and functional endurance when performing ADLs[6].	Patient will be able to walk for 300ft in 2 mins with or without an AD with mRPE<2/10 to be able to walk to the car without getting tired.
Transfers	Patient required minA for her transfer from the recliner	Required assistance due to slight pain in the surgical site.	Patient will be able to perform transfers Independently in 1-2 weeks
TUG test	28 seconds	Indicated patient being at risk of falls based on her age[7].	Patient will be able to perform a TUG test in <14 seconds in 4 weeks.
Stairs	Unable to perform during Initial assessment	To be able to maneuver 12 stairs and get to her bedroom.	Patient will be able to walk up 12 steps Independently with mRPE<4/10 at the end of 4 weeks.
2 min step test	Tested on Week 2 (reassessment) 46 reps, mRPE:5/10	To assess for aerobic capacity [8].	Patient will be able to perform >60 reps with mRPE <4/10 to show improved aerobic capacity based on her age

Keywords: CGA, contact guard assistance; mRPE, modified rate of perceived exertion; AD: Assistive device; TUG: Timed up-and-go.

Physical Therapy Intervention

Patient received home health physical therapy 2 times a week for 4 weeks to address the above mentioned deficits following a TTVI surgery.

After the initial assessment, the patient and the PT worked collectively to set goals, focusing on the following:

1. Improving strength and mobility allowing her to partake in her ADLs.
2. Increase walking distance and walking without any assistive device.
3. Improving balance and endurance so that she could climb stairs and sleep in her bedroom.

All therapy sessions monitored the signs and symptoms of HF, as shown in Table 3 [3.] Vitals, pain and mRPE were checked pre, mid and post exercises each session.

Table 3. Definitions of Zone Colors Associated With Clinical Manifestations and Physical Therapist Recommendations.

Zone Color	Signs and Symptoms	Physical Therapist Recommendations
Green zone	• No shortness of breath • No swelling • No weight gain • No chest pain • No decrease in your ability to maintain your activity level	Continue activity and therapy as tolerated.
Yellow zone	• Weight gain of 2–3 lbs in 24 hrs • Increased cough • Peripheral edema: increased distal extremity swelling • Increase in shortness of breath with activity • Orthopnea: increase in the number of pillows needed	Symptoms may indicate an adjustment in medications and therefore warrants communication with the physician
Red zone	• Shortness of breath at rest • Unrelieved chest pain • Wheezing or chest tightness at rest • Paroxysmal nocturnal dyspnea: requiring to sit in chair to sleep • Weight gain or loss of more than 5 lbs in 3 days • Confusion	Symptoms indicate overt decompensation and an immediate visit to the emergency department or physician office.

Adapted from Shoemaker, M. J., Dias, K. J., Lefebvre, K. M., Heick, J. D., Collins, S. M. (2020). Physical therapist's clinical practice guidelines for the management of individuals with heart failure. *Physical therapy*, *100*(1), 14-43 [3.]

Strengthening

Gentle ROM exercises progressed to isotonic exercises, followed by progressive resistance exercises as tolerated. Exercises were initiated with 10 reps and 3 sets and progressed as tolerated up to 20 reps x 3 sets using resistance bands or weight bearing exercises. Exercises included:

In sitting position: ankle pumps, hip abduction, long arc quadriceps, sit to stands.

Standing position: heel raises, marching, hip abduction, hip extension, mini squats. All standing exercises were performed at the kitchen sink for safety. A Home Exercises Program (HEP) was given in the first session, and was updated each session.

Patient was advised to perform all exercises 3 times a day as tolerated.

Gait Training

Patient was able to walk using a walker for the first 2 weeks, and then slowly progressed to walking with the cane for a week followed by walking without any assistive device safely and independently. Gait training involved working on pre-gait activities like static standing balance, weight shifts, standing marching. Patient required cues to lift legs higher and to be closer to the walker while walking to improve gait pattern. The patient was able to participate in stair climbing progressively from 2 to 12 steps. She was able to meet her goal of sleeping upstairs in her bedroom by the end of three weeks. This was a facilitator in further motivating the patient and boosting her confidence to meet the remaining goals established in the plan of care.

Endurance

Exercises in sitting and standing progressed slowly, as tolerated, with increasing repetitions and time. Exercises progressed from seated marching x 1 min to standing marching x 2 mins on discharge. Initial two weeks of therapy focused on improving exercise tolerance. On the 2nd week reassessment, she was able to participate in 2 min step test after demonstration and cuing with a score of 46 reps and mRPE of 6/10 (N>or=60)[8].

The walking time was increased progressively from 2 to 10 min at discharge. All exercises were performed according to HF guidelines monitoring the mRPE scale.

Patient was educated regarding activity pacing and was advised to participate in all exercises and activities accordingly.

Follow up and Patient Outcomes

Patient showed steady improvement towards all her goals with Physical Therapy interventions. No complications were noted, and the patient was able to participate regularly in all her home exercises.

A detailed description of the outcome measures at the initial assessment, reassessment, and discharge is depicted in Table 4.

Table 4. Summary of outcome measures at different stages of rehabilitation.

Objective tests	Initial Assessment	Re-Assessment (2 weeks)	Discharge (4 weeks)
2min walk test	120ft	220ft	300ft
TUG test	28 seconds	18 seconds	12 seconds
Transfers	min A	SBA	Independent
Gait	CGA with FWW	SBA with Cane	Independent w/o AD
2 min step test	Not tested	46reps mRPE:6/10	62 reps,mRPE:5/10

Keywords: TUG, timed up and go; minA, minimum assistance; SBA, standby assistance; CGA, contact guard assistance; FWW, front wheel walker; AD, assistive device; mRPE, modified rate of perceived exertion.

Functional tests like transfers and gait were assessed at all three periods which showed progressive improvement. Patient required minA to get up from her recliner initially and was able to stand up from all surfaces independently. She was independent with all ADLs and was able to walk without any AD. Objective measures like 2 min walk test which was done to assess for functional capacity showed progressive improvement over each session with her being able to walk for 300 ft from 120 ft during the initial assessment showing improvement in functional capacity [9].

Patient was able to complete her TUG test in less than 12 seconds by discharge putting her at low risk of falls [10].

She was able to participate in a 2 min step test only after 2 weeks during the reassessment where she could perform 46 reps with a mRPE score of 6/10. By the time of the discharge the patient had improved endurance and could perform 62 reps and a mRPE of 5/10. This test score shows improvement in her aerobic capacity [11].

The patient mentioned feeling "her best self" since the past 3 years on discharge and updated her goals to get back to hiking. She was advised to have a follow-up visit with her cardiologist and to continue her rehabilitation with a cardiac rehabilitation program.

Discussion

The case study highlights improvement in her functional activity participation and overall quality of life after home health PT following TTIV with TriCLiP. The patient's improvement in ambulation, stair climbing and ADL independence signifies the importance of early PT intervention. The significant functional improvement aligns with previous studies which have shown improvement in quality of life of patients after TTIV surgery [5].

This case study contributes to the literature by demonstrating the effectiveness and feasibility of a structured home-based physical therapy program.

The length of hospital stay has reduced considerably over the past decade [12]. With new interventions and less invasive surgeries, the FWWlength of hospital stay is bound to be reduced even further. Early home based therapy as demonstrated in this case study is becoming crucial for optimal recovery.

Home health physical therapy is a unique branch of PT in which care is provided in the patient's own environment. Postsurgical education, care, environmental modifications, and rehabilitation are some of the most important factors to consider in improving overall patient outcomes. Studies have shown that patients have fewer instances of rehospitalizations and improved overall results after receiving physical rehabilitation after hospitalization for heart failure [13].

Future research to develop standardized rehabilitation protocol for patients undergoing Triclip procedure and to evaluate for long-term impact of home health PT on quality of life and functional outcomes is warranted.

Conclusion

This study contributes valuable evidence supporting the efficiency of early home based rehabilitation following TTIV with TRiClip procedure. It shows how a structured home based physical therapy program has a positive impact on a patients quality of life and functional recovery. Future research to develop standardized rehabilitation protocols for patients undergoing Triclip procedure is warranted.

Declaration of Patient Consent

The authors certify that they obtained all appropriate patient consent forms. In this form, the patient provided consent for her clinical information to be reported in the journal. The patient understands that her name and initials will not be published, and due efforts will be made to conceal her identity; however, anonymity cannot be guaranteed.

Conflict of Interest: There is no conflict of interest.

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References

1. Asmarats L, Taramasso M, Rodés-Cabau J. Tricuspid valve disease: diagnosis, prognosis and management of a rapidly evolving field. Nat Rev Cardiol. 2019 Sep;16(9):538-54.
2. Muntané-Carol G, Alperi A, Faroux L, Bédard E, Philippon F, Rodés-Cabau J. Transcatheter tricuspid valve intervention: coaptation devices. Front Cardiovasc Med. 2020;7:139.
3. Shoemaker MJ, Dias KJ, Lefebvre KM, Heick JD, Collins SM. Physical therapist clinical practice guideline for the management of individuals with heart failure. Phys Ther. 2020 Jan 1;100(1):14-43.
4. Balata M, Gbreel MI, Hassan M, Becher MU. Comparative analysis of MitraClip/TriClip and PASCAL in transcatheter tricuspid valve repair for tricuspid regurgitation: a systematic review and meta-analysis. BMC Cardiovasc Disord. 2024 Dec;24(1):557.

5. Kitamura M, Kresoja KP, Balata M, Besler C, Rommel KP, Unterhuber M, et al. Health status after transcatheter tricuspid valve repair in patients with functional tricuspid regurgitation. Cardiovasc Interv. 2021 Dec;14(23):2545-56.
6. Barry E, et al. Is the Timed Up and Go test a useful predictor of risk of falls in community dwelling older adults: a systematic review and meta-analysis. BMC Geriatr. 2014;14:1-14.
7. van der Zwaard S, et al. Validity and Reliability of Facial Rating of Perceived Exertion Scales for Training Load Monitoring. J Strength Cond Res. 2023 May 1;37(5):e317-e24.
8. Poncumhak P, et al. Predictive Ability of the 2-Minute Step Test for Functional Fitness in Older Individuals with Hypertension. Ann Geriatr Med Res. 2023 Sep;27(3):228-34.
9. Leung AS, Chan KK, Sykes K, Chan KS. Reliability, validity, and responsiveness of a 2-min walk test to assess exercise capacity of COPD patients. Chest. 2006 Jul;130(1):119-25.
10. Arnold CM, Faulkner RA. The history of falls and the association of the timed up and go test to falls and near-falls in older adults with hip osteoarthritis. BMC Geriatr. 2007;7:1-9.
11. Chow JJL, Fitzgerald C, Rand S. The 2 min step test: A reliable and valid measure of functional capacity in older adults post coronary revascularisation. Physiother Res Int. 2023 May;28(2):e1984.
12. Lagoe RJ, Abbott JH, Littau SA. Reducing hospital lengths of stay: a five-year study. Case Rep Clin Med. 2021 Jun;10(6):160-7.
13. Kitzman DW, Whellan DJ, Duncan P, Pastva AM, Mentz RJ, Reeves GR, et al. Physical rehabilitation for older patients hospitalized for heart failure. N Engl J Med. 2021 Jul 15;385(3):203-16.