



## ROLE OF PHYSIOTHERAPY POST RENAL TRANSPLANTATION - A CASE REPORT

**Mrunali Dinesh Kerkar**

Pursuing Masters of physiotherapy in cardiorespiratory disorders, Shri Dharmasthala Manjunatheshwara college of physiotherapy under Shri Dharmasthala Manjunatheshwara University, Karnataka

**Dr. Pooja Kesharwani**

Associate Professor, Shri Dharmasthala Manjunatheshwara college of Physiotherapy Karnataka

**ABSTRACT** **Introduction:** Renal transplant has become successful kidney replacement procedure, allowing patients with end-stage renal disease to lead a near-normal life. Even successful kidney transplant recipients (RTRs) suffer from hypertension (HTN), coronary heart disease, skin cancer, diabetes, bone disease, and a variety of infections. Physiotherapy treatment protocol is important for early diagnosis of co morbidity and to provide initiation to renal rehabilitation program. Physical activity is of particular importance not only in chronic kidney disease, but also after transplantation. Hence this study was taken. **Methodology:** A case of chronic kidney disease was reported to SDM hospital, Karnataka and planned for renal transplant. Patient underwent physiotherapy intervention for 2 weeks in ICU set up post-transplant in the form of chest and limb physiotherapy along with early mobilization. **Results:** The improvement in Endurance, quality of walking along with reduction in dyspnea and fatigue was seen. **Conclusion:** Post renal transplant physiotherapy treatment improved pulmonary as well as cardiac endurance and also enhances quality of life

**KEYWORDS :** Post Renal Transplant, Exercises, Rehabilitation.

### INTRODUCTION

Organ transplantation (OT) is one of the most successful advances in modern medicine. For patients with end-stage renal disease, transplantation is usually the only chance of survival.<sup>1</sup> Over the last two decades, kidney, heart, liver, and lung transplants have become common, successful, and has gradually improved. Kidney transplants are the most common.<sup>2</sup> Renal transplant has become successful kidney replacement procedure, allowing patients with end-stage renal disease to lead a near-normal life under appropriate medical, psychological, and social conditions.<sup>3</sup>

Even successful kidney transplant recipients (RTRs) suffer from hypertension (HTN), coronary heart disease, skin cancer, diabetes, bone disease, and a variety of infections. Cardiovascular events have been presented as one of the leading causes of death in renal transplant recipients.<sup>4</sup>

Medications alone cannot efficiently reduce all cardiovascular risk. It does not enhance work capacity and quality of life (QOL) including psychological problems. All this may be improved with renal rehabilitation post renal transplant.<sup>5</sup>

Renal rehabilitation is a “a long-term comprehensive program consisting of exercise therapy, diet therapy and water management, drug therapy, education, psychological/mental support, etc., to alleviate physical/mental effects based on kidney disease and dialysis therapy, prolong the life expectancy, and improve psychosocial and occupational circumstances.”<sup>6</sup>

As with any intra-abdominal procedure, patients undergoing kidney transplant have impaired postoperative pulmonary function due to general anesthesia and diaphragmatic inhibition. Postoperative muscle weakness and reduced exercise tolerance are also frequently seen after surgery and may have an important impact on a patient's quality of life.<sup>7</sup> Physical activity is of particular importance not only in chronic kidney disease, but also after transplantation. The positive effects of moderate endurance training are described in terms of reducing cardiovascular risk and improving cardiac pumping function. In addition, it can improve daily physical function and reduce the onset of muscle breakdown and weakness. Overall, patients with kidney disease can achieve relief of depression and a significant improvement in quality of life. Incorporating physical activity after a kidney transplant is very important.<sup>6</sup>

### METHODOLOGY

This is a single case report to study the effectiveness of Physical therapy intervention on physiological outcome in a patient with renal transplantation. The study was conducted at SDM medical college and hospital Dharwad, the subject was taken from a renal transplant

intensive care unit.

### Case report

A 37-year-old male patient came to our hospital complaining of edema that was Spreading to elbows (both sides) and thighs (both sides), a generalized rash and boils all over body, and abdominal pain that was extending to the back. He had swelling of his legs for the past two years, but he ignored it.

Two years later, when these symptoms began to worsen, he consulted a nephrologist and was diagnosed with stage 5 chronic kidney disease with abnormal test results (serum creatinine-6.2mg/dL) (Normal serum creatinine value in male adults – 0.6-1.2mg/dL).

After being diagnosed with end-stage renal disease, he underwent hemodialysis for 11 months and underwent a living donor (mother) kidney transplant (modified right Gibson incision) on June 15, 2022. He was a nonsmoker, a known case of hypertension (HTN) for 9 years, and was taking the medications for same. A planned allograft kidney transplant (a kidney willingly donated by his mother) was performed after HLA typing and a negative Center for Disease Control and Prevention cross match. Subject was monitored in the ICU for 15 days prior to discharge.

After discharge, regular laboratory assessments at every week were advised for 3 months and exercise diary was maintained for 7 days, also on 7<sup>th</sup> day of every week telerehabilitation was done for progression and modification of exercises along with follow up every 15 days on OPD basis.

### Physiotherapy intervention

#### Procedure

Patient from the transplant ICU referred for physiotherapy was enrolled in the study after the patient / caregiver obtained informed consent.

In the institutional setting, patient underwent chest and limb physiotherapy from postoperative day 1 to 15 days.

Post-operative day 1<sup>st</sup>-2<sup>nd</sup> patient performed breathing exercises such as diaphragmatic breathing exercises, pursed lip breathing along with segmental breathing exercises, ankle toe movements, hip and knee range of motion exercises, incentive spirometry (600 cc/sec). Patient was made to sit edge of bed with support.

On post-operative day 3<sup>rd</sup> patient made to walk within ICU for 1 round [97.92mts] (Rate of Perceived Exertion-10/10). Everyday exercises were revised and were followed for 2 days, with walking intensity:

(Rate of Perceived Exertion -10/10) each session lasting for 30minutes-2 times a day.

From post-operative day 5<sup>th</sup> -10<sup>th</sup> exercises were progressed based on the patient's exercise capacity. Dynamic quadriceps with 10sec hold for 5 repetitions were started along with thigh lifts for 10 repetitions. Diaphragmatic breathing exercise, pursed lip breathing exercise, segmental breathing exercises, incentive spirometry with holds for 5 secs (I:900cc/sec and E:600cc/sec) were continued. Stacked breathing exercise was started. Patient was mobilized in ICU for 8-9 rounds [114.24mts] (Rate of Perceived Exertion -7/10).

From post-operative day 11<sup>th</sup> - 14<sup>th</sup> strengthening exercises to bilateral upper limb (with 1kg dumbbell) along with lower limb were started. Diaphragmatic breathing exercises, pursed lip, segmental breathing exercises, incentive spirometry (I:1200cc/sec and E:600cc/sec) with 5 sec holds were done. Patient made to walk around the ICU for 11-13 rounds [ 122.4mts] (Rate of Perceived Exertion -5/10).

From post-operative day 14<sup>th</sup> -16<sup>th</sup> all the exercises were revised along with that home exercises and home care was taught. Patient made to walk for 13-15 rounds [163.2mts] (Rate of Perceived Exertion -1/10).

In the community-based session patient performed a series of aerobic exercise and resisted exercise based on his exercise capacities by self-monitoring the Target heart rate (THR) initially up to 50% and progressing to 55% to 60%.

From day 16<sup>th</sup> chest care continued, limb care such as active range of motion to upper limb and lower limb, strengthening for bilateral upper (with 1kg dumbbell) and lower limb were also continued. Patient was followed up after every 15 days on OPD basis. Also, the exercise diary was maintained for 7 days to have check on all exercises performed at home. Telerehabilitation was done on every 7<sup>th</sup> day of week for any modification and progression needed in exercises.

Quality of life was assessed using SF-12 before as well as after transplant (post discharge -during community rehabilitation period), along with Fatigue Severity Scale which was assessed before transplantation, during hospital stay phase as well during community phase.

**Table 1 Type of exercises and frequency of exercises given in ICU**

Exercises					Frequency
Day 1-2	Day 3-5	Day 5-10	Day 11-14	Day 14-16	2 * 30 mins.
1. Breathing exercises- diaphragmatic breathing exercises; pursed lip breathing, and segmental breathing exercise; incentive spirometer [I:600; E:600].	1. Breathing exercises- diaphragmatic breathing exercises; pursed lip breathing, and segmental breathing exercise; incentive spirometer [I:600; E:600].	1. Breathing exercises- diaphragmatic breathing exercises; pursed lip breathing, and segmental breathing exercise; incentive spirometer with 5secs hold [I:900; E:600].	1. Breathing exercises- diaphragmatic breathing exercises; pursed lip breathing, segmental exercises; incentive spirometer with 5secs hold [I:1200; E:600].	All exercises were revised. Home Exercises and home care was taught. Ambulation for 13-15 rounds (163.2mts) (RPE-1/10)	
2. Ankle toe movements, alternate leg slides, AROM for upper limb.	2. Ankle toe movements, alternate leg slides, AROM for upper limb.	2. Dynamic quadriceps with holds 5sec*10. Thigh lifts*10	2. Dynamic quadriceps with holds 20sec*10. Thigh lifts 5sec*20		
	3. Edge of bed sitting.	3. Stacked breathing exercise.	3. Stacked breathing exercise.		
	4. Dynamic quadriceps.	4. Ambulation for 8-9	4. Upper limb strengthenin		

5. Spot marching on place.	rounds(114.24mts) (RPE- 7/10)	with 1 kg dumbbell.		
6. Patient ambulated for 1 round (97.92mts) (RPE-10/10).		5. Ambulation for 11-13 rounds (122.4mts) (RPE- 5/10).		

\*Note: RPE – Rate of perceived exertion

**Table 2 Quality of life (SF-12)- before as well as after transplant (post discharge -during community rehabilitation period).**

Before transplant	After transplant (post discharge-community phase)
Score – 29/100	Score – 32/100

**Table 3 Fatigue Severity Scale -before transplantation, during hospital stay phase as well during community phase.**

Before transplant	After transplant (During hospital stay)	After Discharge (during community phase)
Score- 5/7	6/7	2/7

**DISCUSSION**

The main goals of physiotherapy after renal transplantation are prevention and treatment of post-op complications, improving lung function and promotion of physical activity.

In this case study of post renal transplantation, physiotherapy management focused on early rehabilitation within ICU set up in the form of chest and limb physiotherapy along with early mobilization.

The further renal rehabilitation was explained by means of long-term goals to improve his endurance and quality of life.

The limitation of this study was that it was a single case study, long-term follow-up was not considered, and the patient was not under physiotherapy supervision at the community stage.

Further research may target large sample populations, long-term follow-up, and community rehabilitation under the supervision of a therapist.

**CONCLUSION**

The early physiotherapy management is effective in renal transplant patients to prevent post-op complications and to improve respiratory muscle strength as well as cardiac endurance and it also helps to reduce dyspnea, fatigue and to improve quality of life.

**Source of Funding- Self**

**Conflict of Interest- Nil**

**Ethical Clearance - Not applicable for –A case Report**

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