International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2023: 1.843

Physiotherapy Management of Femoral Neuropathy After Kidney Transplantation - A Case Report

Dr. Vasanti M Chaudhary[1], Dr. Harda H. Shah[2], Dr. Nirali Vakani[3], Dr. Brijesh Patel[4]

[1]MPT Student (Transplantation Rehabilitation), IKDRC-ITS College of Physiotherapy, Civil Hospital Campus, Asarwa, Ahmedabad, Gujarat, India
Email: vasantichaudhary1999[at]gmail.com
[2]Senior Lecturer (MPT PhD), IKDRC- ITS College of Physiotherapy, Civil Hospital Campus, Asarwa, Ahmedabad, Gujarat, India
Email: hardahshah[at]gmail.com
[3]Lecturer (MPT), IKDRC- ITS College of Physiotherapy, Civil Hospital Campus, Asarwa, Ahmedabad, Gujarat, India
Email: nsvakani[at]gmail.com
[4]Lecturer (MPT), IKDRC- ITS College of Physiotherapy, Civil Hospital Campus, Asarwa, Ahmedabad, Gujarat, India Gujarat University of Transplantation Sciences, Ahmedabad, India
Email: indianbrij[at]gmail.com

Corresponding Author: **Dr. Harda H. Shah**

Abstract: ***Introduction: Kidney transplantation is a cost-effective and lifesaving surgical procedure in persons with End stage kidney disease. Femoral neuropathy is rare but serious complication of kidney transplantation. We report physiotherapy management of femoral neuropathy after kidney transplantation. Case presentation: A 41-year-old male with end stage kidney disease who underwent orthotropic cadaveric kidney transplantation in right iliac fossa on 8th September 2023. Patient was referred for physiotherapy on post operative day one. Patient had a complain of pain in right inguinal region, pins-needle sensation in right thigh, difficulty in straightening right leg from knee. Conclusion: The prompt use of appropriate physiotherapy can lead to early recovery in rare incidence of femoral neuropathy after kidney transplantation.***

Keyword: Physiotherapy, Femoral neuropathy, kidney transplantation, Manual muscle testing, Neuro muscular electrical stimulation

1.Introduction

Chronic kidney disease (CKD) is defined as the presence of structural and functional renal dysfunction for at least 3 months and characterized by reduced glomerular filtration rate, albuminuria, renal morphological changes, tubular dysfunction.(1) It is a under-recognized public health crisis that affects about 17% of the Indian population.(2) Kidney transplantation is accepted as the first choice treatment of chronic renal failure.(3)

It is a cost effective and life saving surgical procedure in patient with end stage kidney disease and is also associated with significant risk of complications. The most common types of complications are infective diseases that affect more than 90% of individuals.(4) In Post transplantation is the neurological Complication ,the common ones are cerebrovascular diseases, peripheral neuropathy, epilepsy, and central nervous system infections.

The peripheral neuropathies described after transplantations are not life-threatening conditions but could cause severe morbidity and effect patients' quality of life.

Femoral nerve palsy(FNP) after KT is a rare but serious complication that can compromise postoperative recovery and prolong the hospital stay. This type of neurological complication is estimated to occur in about 2% of the recipients.(4)

FNP can cause gait disturbances due to motor dysfunction of the quadriceps muscle, resulting in deterioration of a patient's quality of life.(5)

In this case report, we will discuss about femoral neuropathy after kidney transplantation and it's physiotherapy management.

2.Case Presentation

We report a case of 41 year old male who underwent orthotopic cadaveric renal transplantation for chronic kidney disease. Before transplantation, patient was on dialysis via left side Brachio-cephalic arterio-venous fistula and walking independently. Patient underwent kidney transplantation surgery. The kidney was transplanted in the right iliacfossa on 8th sept, 2023. Patient was on routine triple immunosuppressant, antibiotic and antiviral therapy. Laboratory and clinical findings of allograft function after surgery were excellent. After surgery patient's hemodynamic parameter and kidney function were improved. However, patient had complained of pain in right inguinal region, difficulty in walking and felt sensation of pins-needle in right thigh. On pain evaluation - at medial aspect of right thigh (VAS score was 8/10). Aggravating factor was limb movement, walking and relieving factor was Rest. Physical examination revealed weakness of right quadriceps and hip flexor muscles (MMT grade 2), right hip flexion ROM (0-50), knee extension ROM (135- 30 with trick movement), Paresthesia in right thigh (L3 -L4 dermatome). Berg balance score was 42/56 which suggested low risk of falling.

Intervention

A tailor-made physiotherapy protocol was planned and was followed twice a day focusing on improving and maintaining the neuro-musculoskeletal status along with post kidney transplantation physical functional improvement. Tailormade physiotherapy protocol is mentioned in figure 1

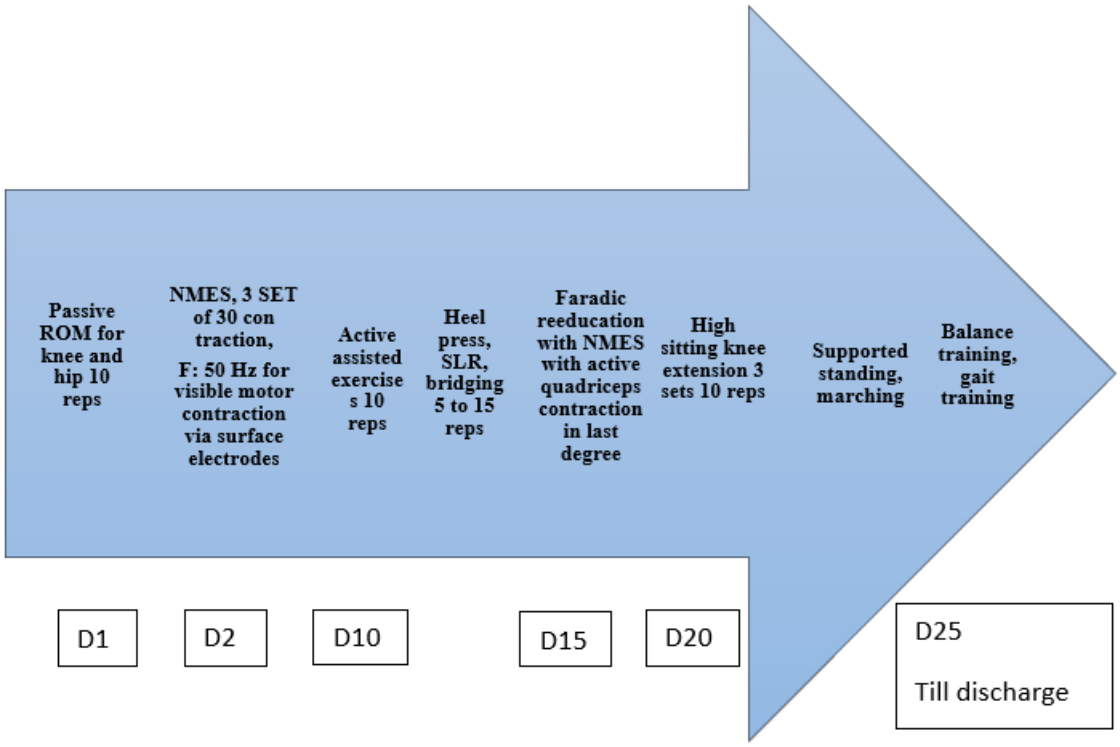

Figure 1: Tailormade physiotherapy protocol

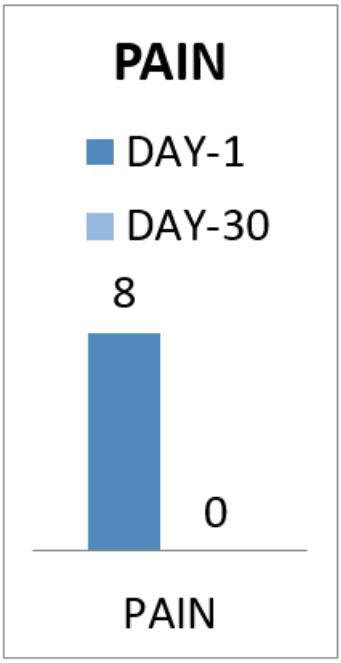

Figure 2: Graph showing decrease in Pain

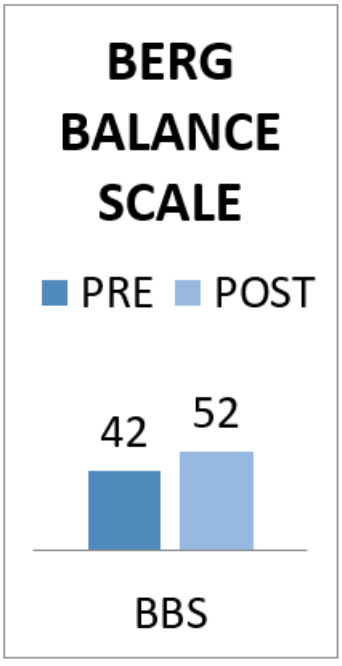

Figure 3: Graph showing increment in BBS

3.Result

By the end of the fourth week, the patient demonstrated notable improvements across various measures. His knee extensor and hip flexor muscles strength was improved (Grade 5) (show in figure 4), ROM of knee extension also improved from (135-0) and hip flexion (0-120) was

improved, berg balance scale was 42 and which improved to 52 from baseline (show in figure 3) and pain was reduced: VAS score (8-0). (show in figure 2)

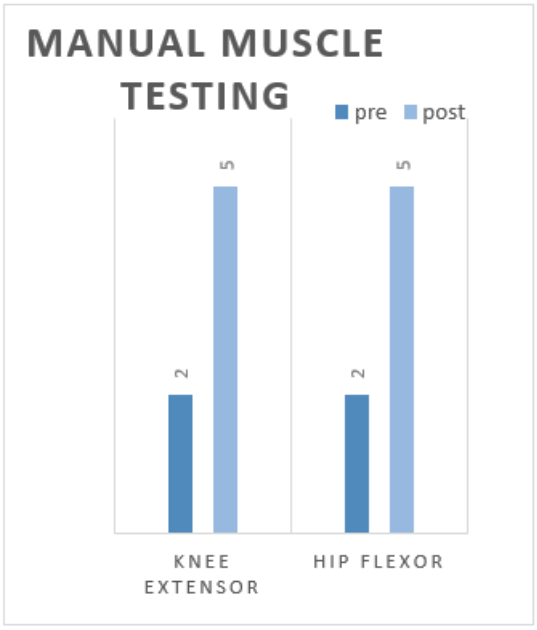

Figure 4: Graph showing increment in muscle power

4.Discussion

Post transplantation neurological complications are common, with rates ranging from 30% to 60%.[6] In a recent study about neurological complications after renal transplantation, the incidence of adverse neurological events was 4.8%. The complications found in the decreasing order were encephalopathy in almost half of the patients, cerebrovascular diseases, peripheral neuropathy, epilepsy, and central nervous system infections. [7] The peripheral neuropathies described after transplantations are not life-threatening conditions but could cause severe morbidity, prolong hospital stay and limit patients' quality of life.[8] The femoral neuropathy is estimated to occur in about 2% of the recipients.[9]

The Femoral Nerve is the largest branch of the lumbar plexus (L2 to L4), and is chief nerve of the anterior compartment of thigh. The Femoral Nerve descends in a shallow groove between the iliac and psoas major muscle. Therefore, it is vulnerable to damage by retractor injury due to its anatomical position. Previous studies have reported three mechanisms to explain the cause of FNP following KT: physical compression, traction or impinging damage, and ischemic injury of the FN. [10]

Khalek M et al (2016) conducted a study and they saw a significant increase in the nerve conduction velocity after 3 months of treatment application of exercise when compared with the control group. [11] Electrical stimulation has been shown to increase intraneuronal cAMP in DRGs and nerve growth factor (NGF) in Schwann cells a studied by T Gordon et al (2009).[12]

James P. Celebrezze et al (2000) conducted a 4 case report and they saw The prompt and early physiotherapy in timely fashion is necessary for femoral neuropathy.[13]

Murat Guntel et al (2020) conducted a case study and they saw Early rehabilitation programs in form of passive, active-assistive, or active quadriceps exercises and transcutaneous electrical stimulation given for recovery in idiopathic femoral nerve palsy after kidney transplant.[14] physiotherapy significantly contributes to restoring functional independence and enhancing the patient's quality of life.

5.Limitation

Future investigations could employ a randomized controlled trial methodology with a larger and more diverse sample size.

The nutritional status of patient was not taken into consideration during rehabilitation.

6.Conclusion

From this case study, we concluded that the 4 week of supervised early rehabilitation program in form of passive, active-assisted, or active exercises of lower limb with NMES helps to get early recovery in femoral nerve palsy after kidney transplantation.

Follow-Up:

Patient had been re-educated for Home based exercises with self-monitoring and in contact with physiotherapist. Also, she has been advised to follow up regularly in physiotherapy OPD with each post-transplant visit at Institute.

Declaration by Authors

Source of Funding: None.

Conflict of Interest: None.

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