International Journal of Nursing and Medical Investigation

International Peer Reviewed Journal

Review article

Intradialytic stretching exercises: A conservative way to reduce muscle cramps

Aakash Chavda, Shankar Singh*

Department of Medical-Surgical Nursing, Geetanjali College of Nursing Udaipur, Rajasthan, India.

Abstract

Background: Chronic kidney disease is a major health problem in developing and developed countries because of its increasing prevalence and incidence all over the word chronic kidney disease is a progressive and gradual loss of kidney function, which is commonly caused by diabetes and hypertension.If kidney stops working patients cannot sustain life without a kidney. Dialysis or Renal transplantation replacement therapy. Hemodialysis is one of the most common methods of dialysis. It is a therapy in which remove excess fluid and waste products or toxic substance from the blood through the dialyzer and to return a clear and filtered blood back to the patient hemodialysis must be continued intermittently for the client's lifetime, unless successful kidney transplantation is done. A muscle cramp is one of the most common complications occurs during hemodialysis. It is a sudden, painful, involuntary contraction of the muscle. Muscle cramps occur due to the rapid removal of sodium and inaccurate fluid from the body during hemodialysis. Intradialytic stretching exercises administered during the third and fourth hour of hemodialysis because of mostly muscle cramp occur in the third and fourth hour in dialysis session. This review aimed to introduce various intradialytic stretching exercises and their advantages to improve muscle's elasticity and muscle strength. Intradialytic stretching exercises not only improved physical function but also in improving blood circulation, depression, and quality of life. The Intradialytic stretching exercise can be given to the patients undergoing hemodialysis to prevent the muscle cramps which may the result of fluid loss during the dialysis session.

Key words: : Chronic kidney disease, dialysis, intradialytic stretching exercises

***Corresponding author:** Mr. Shankar Singh, MSc Nursing, Department of Medical-Surgical Nursing, Geetanjali College of Nursing Udaipur, Rajasthan, India (Affiliated to Geetanjali University, Udaipur) Email Id: singhshankar161991@gmail.com

1. Introduction

Chronic kidney disease is known to be a universal health problem because of its increasing prevalence and incidence all over the world. [1]The number of patients with Chronic Kidney Disease treated by dialysis and transplantation has augmented in the United States from 209000 in 1991 to 472000 in 2004.

Access this article online

Website:www.innovationalpublishers.com/Journal/ijnmi | ISSN: 2456-4656

How to cite this article: Aakash Chavda, Shankar Singh, Intradialytic stretching exercises: A conservative way to reduce muscle cramps. Int J Nur Med Inv. 2018; 3(2): 35-38.

Every year 1, 00,000 newly diagnosed patients of end-stage renal disease (ESRD) start dialysis in India [2]. in the United States, Kidney disease is affecting more than 20 million Americans and the incidence rates are expected to increase by 2 % yearly [3]. Moreover, the prevalence is expected to increase to 14.4 % in 2020 and up to 16.7 % in 2030 from 13.2 % that was obtained in 2014 [4].

Many studies have shown that hypertension and diabetes are the most common causes of chronic renal failure [5]. In ESRD the patient is unable to survive without a renal replacement therapy either dialysis or kidney transplantation [6].

Renal replacement therapy is considered a burden for the patients. It is a time consuming, costly and once the patient starts it, it may continue for years or for life [7].
Hemodialysis is commonly used as renal replacement therapy among peritoneal dialysis or kidney transplantation. More than 2 million patients are treated with hemodialysis in around 28,500 dialysis units all over the world. The goal of hemodialysis is to remove excess fluid and waste products (uremic toxins) from the blood through the dialyzer and to return a clear and filtered blood back to the patient [8].
Hemodialysis is a life-saving measure for patients with chronic kidney disease. It is an ongoing process where patients experience complications such as hypotension, muscle cramps, disequilibrium syndrome and nausea during the procedure.[9]
Muscle cramps (involuntary muscle contraction associated with severe pain) occur frequently in patients receiving dialysis. Muscle cramps can involve the legs, most commonly in the feet, but can also involve arms and hands, as well as abdominal muscles.[10]
Most commonly, hemodialysis patients complaint of waking in the night with severe pain due to cramps, which interferes with functioning in normal life, but may occur at any time [11],[12].Muscle cramp generally result from overexertion and dehydration when don't have enough fluid in the system; it leads to an electrolyte imbalance that causes muscle cramp.[13]),[14]
Stretching is a form of physical exercise in which a specific muscle or tendon (or muscle group) is deliberately flexed or stretching in order to improve the muscles and achieve comfortable muscle tone .the result is the feeling of increased muscle control, flexibility, and range of motion. Stretching is also used therapeutically to alleviate cramps. [15]
Several experts (Motedayen, Z. et al. 2014; Mihaescu, A. et al. 2013; Gołębiowski, T. et al., 2012) have proven that exercise during hemodialysis is safe, easy and shows significant changes in physical and psychological conditions, which positively influencing their social life. During hemodialysis session, patients spend 3 to 4 hours connected to dialysis machine without doing any activity. They come to dialysis 3 times a week thinking only of the length of the procedure and how bored they will be. Also, they think of the complications and the effect of dialysis. So, incorporating exercise in the dialysis not only showing physical improvement. But also has a positive psychological effect [16].

An indication of stretching exercise

Patients with muscle cramp during hemodialysis
Limited range of motion
Muscle shorting
Athletic individuals

Contraindication of stretching exercise

Patients with upper and lower limb pathology

Uncooperative individuals
A client with nerve injury
Joint instability
Vascular injury
Excessive pain [17]

Types of stretching exercises
Static stretching exercise

Static stretching is performed by placing the body into a position whereby the muscle (or group of muscles) to be stretched is under tension. Both the antagonist, or opposing muscle group and the agonist, or muscles to be stretched are relaxed. Then slowly and cautiously the body is moved to increase the tension of the muscle (or group of muscles) being stretched. Static stretching is a very safe and effective form of stretching with a limited threat of injury. It is a good choice for beginners and sedentary individuals.

Proprioceptive neuromuscular facilitation stretching exercise

It is a more advanced form of flexibility training that involves both the stretching and contracting of the muscle group being targeted.PNF stretching was originally developed as a form of rehabilitation and for that function, it is very effective. It is excellent for targeting specific muscle groups, and as well as increasing flexibility, (and range of movement) and improves muscular strength.

Isometric stretching:

Isometric stretching is a form of passive stretching similar to PNF stretching, but the contractions are held for a longer period of time. Isometric stretching places high demands on the stretched muscles and is not recommended for children or adolescents who are still growing.

Ballistic stretching:

Ballistic stretching is an outdated form of Stretching that uses Rapid swinging, bouncing and rebounding movements to force a body part.

Dynamic stretching:

Dynamic stretching uses a controlled, soft bounce or swinging motion to move a particular body part to the limit of its range of movement. The force of the bounce or swing is gradually increased but should never become radical or uncontrolled.

Passive (or Assisted) Stretching:
This form of stretching in which through the help of another person or apparatus is used to further stretch the muscles. Due to the greater force applied to the muscles, this form of stretching is slightly more hazardous.

Active stretching:

Active stretching is performed without any aid or assistance from an external force. This form of stretching involves using only the strength of the opposing muscles (antagonist) to generate a stretch within the targeted muscle group (agonist). [18]

Intradialytic stretching exercises

S.N	Exercise	Description
1	Calf stretch	To Stretch the gastrocnemius muscle -Extend the knee, place the other hand on top of the ankle and push in the opposite direction for 5 minutes. To Stretch the soleus muscles - Flex the knee, place the other hand under the calf and push in the opposite direction for 5 minutes.
2	Leg Exercises	Flexion of leg In a lying down position bend the joint, move the lower leg towards the back of the thigh.- resulting in a decrease of angle.
		Extension of leg In a lying down position straighten the joint; move the lower leg away from the back of the thigh. The flexion and extension carried out for 10 times - resulting in an increase of angle.
		Medial Rotation (Internal Rotation) of leg In a lying down position rotary movement around the longitudinal axis of the bone toward the center of the body; with the knee bent, turning the lower leg inward.
		Lateral Rotation (External Rotation) of leg In lying down position the legs are moved rotary movement around the longitudinal axis of the bone away from the center of the body; with the knee bent, turning the lower leg outward. The rotation is carried out 5 times
3	Ankle Movement	In a lying position with affected leg stretched out in front. Push the foot downwards to point toes. Pull foot gently upwards, back towards the body until you feel a stretch in the back of the calf. Return to the start position.- to improve circulation
4	Arm Exercises	Elbow flexion / extension Place the arms down at side with elbows straight. Bend the elbow and bring the hand up to touch the shoulder. Repeat 5 times
		Wrist circles Rest the forearm firmly on the table top and hang the wrist over the edge of the table. Move the wrist in circles to the right and to the left.Repeat 5 times.
		Ball fisting in arms Hand squeezes can be performed with a stringy ball. Squeeze as hard as possible for five seconds before releasing. Aim for 10 repetitions in each set.- to promote circulation

General precautions of intradialytic stretching exercise

Don't force stretch to the point of pain
Avoid overstretching of a weak muscle
Avoid forceful stretching of muscles
Avoid High-intensity short-duration stretching
Avoid stretching edematous tissue

The advantage of intradialytic stretching exercises

Increases the functional capacity of the body
Improves muscle strength of body
Reduce muscle cramp in arm and legs
Improves overall health and physical fitness of patients
Increases blood flow to the body [17]

Nurse's role after intradialytic stretching exercises

Make the patients comfortable in a supine position
Assess hemodynamic parameters such as heart rate, blood pressure, and respiration
Assess for joint stability in all extremities
Assess range of motion in all extremities
Assess severity of muscle spasm in the calf muscle
Assess any injury or trauma
Avoid overstretching of a muscle

Conclusion

Intradialytic stretching exercises help to reduce the level of muscle cramps. Regular stretching exercises for a week will reduce the level of muscle cramps and also prevent the occurrence of cramps during hemodialysis. There is clear that a need for effective education regarding stretching exercises recognition and appropriate intervention strategies in muscle cramps in hemodialysis patients. Nurses, in partnership with patients, relatives, and another health professional can

help to empower the individual to manage muscle cramps.

References

[1] Ballew, S. H., Mcmahon, B., & Grams, M E. Kidney Failure and ESRD in the Atherosclerosis Risk in Communities Study: Comparing Ascertainment of Treated and Untreated Kidney Failure. American Journal of Kidney Diseases 2016, 66(2):231- 239.

[2] Modi GK, Jha V. The incidence of end-stage renal disease in India: a population-based study. Kidney international. 2006 Dec 2; 70(12):2131-3.

[3] Lee ML, Sherrod B. Improving patients' knowledge about kidney failure. Nursing2018 Critical Care. 2015 Jan 1; 10(1):41-8.

[4] Martini,F. Fundamentals of anatomy and Physiology. Benjamin Cummings, San Fransisco. 2004:1-16.

[5] Almutary H, Bonner A, Douglas C. Chronic kidney disease in Saudi Arabia: a nursing perspective. Middle East J Nursing. 2013 Dec; 7(6):17-26.

[6] Levey AS, Coresh J, Balk E, Kausz AT, Levin A, Steffes MW, Hogg RJ, Perrone RD, Lau J, Eknoyan G. National Kidney Foundation practice guidelines for chronic kidney disease: evaluation, classification, and stratification. Annals of internal medicine. 2003 Jul 15;139(2):137-47.

[7] Rayner, C, Imai, E. Approach to Renal Replacement Therapy. Comprehensive Clinical Nephrology, Fifth ed. Elsevier Inc;2016.

[8] Kotanko, P, Kuhlmann, M K, Levin, N W . Hemodialysis : Principles and Techniques, Elsevier Inc. 2016 .1067–1074.

[9] Abali C, Adejumo O, Chukwuonve I, Ogahs O, Okwuonu CG. Awareness level of kidney functions and diseases among adults. J Ame Sci 2013; 25:158-163.

[10] Holley. Muscle cramps in dialysis patients. J CANNT 2012; 25(3).

[11] Culebras, A. Restless leg syndrome. diagnosis& treatment, 2001 Feb – 15,32 (3):281-3.

[12] Bogam RK, Fry JM, Schmidt MH Carson SW, Ritchiesy. Ropinirole. In the treatment with restless legs syndrome :ausbased randomized, double bind, placebo controller trial .Mayoclinproc 2006 jan,81(1) :17 -27.

[13] Parviz, K., Mohammad, M., saeed, Ghanbar et al. Randomized double bind Placebo controlled trial of supplementary vitamin E C & their combination for treatment of hemodialysis cramps.nephrology dialysis transplantation 7: 1448 -1451.

[14] Cirignotta F, Mondini S, Santoro A, Ferrari G, Gerardi R, Buzzi G. Reliability of a questionnaire screening restless legs syndrome in patients on chronic dialysis. American journal of kidney diseases. 2002 Aug 1; 40(2):302-6.

[15] Lekha J, Abraham E.J., G Malarvizhi et al. Effectiveness of intradialytic stretching exercise on prevention and reduction of muscle cramps among patients undergoing hemodialysis .J Nur Hea Sci. 2017April;6(2):47-53.

[16] Motedayen Z, Nehrir B, Tayebi A, Ebadi A, Einollahi B. The effect of the physical and mental exercises during hemodialysis on fatigue: a controlled clinical trial. Nephro-urology monthly. 2014 Jul; 6(4).

[17] Kisner C, Colby LA. Therapeutic exercise: Foundations and techniques.6th ed. New delhi: Jaypee brothers Medical Publishers 2013:73-113.

[18] http://stretchcoach.com/articles/stretching/