PHYSIOTHERAPY MANAGEMENT OF 1/3 DISTAL FRACTURE OS RADIUS DEXTRA POST IMMOBILIZATION OF GIPS USING INFRARED(IR) MODALITIES AND THERAPY TRAINING AT EFARINA HOSPITAL ETAHAM BERASTAGI

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Abstract

Physiotherapy Management in Fracture Cases of 1/3 Distal Os Radius Dextra Post Immobilization of the Cast with Infrared(Ir) Modality and Exercise Therapy at Efarina Etaham Berastagi Hospital by producing patients with a diagnosis of fracture of the 1/3 distal os radius dextra post immobilization of the cast, after being carried out for 6 times of therapy with physiotherapy modalities, namely ir for 15 minutes and exercise therapy with resisted exercise methods, hold exercise and patient education, the results obtained are a decrease in pain, reduction of edema and muscle spasm, an increase in muscle strength and an increase in the ability of functional activity.

Keywords:Anatomy, Physiology, Pathology, Problems of Physiotherapy, Physiotherapy Intervention Technology

INTRODUCTION

The number of cases of dextra radius fractures at the world level is 18% of fractures experienced by the elderly and 25% of fractures experienced by children. The incidence of this fracture is quite high, amounting to 195.2/100,000 population per year. The incidence of fractures in Koreans aged> 50 years namely 474.1/100,000 population in 2012

Radius fractures in Indonesia based on data from the Ministry of Health in 2013 showed fractures were experienced by 5.8% of the population. In the population aged > 75 years, the percentage was higher, namely, by 195.2, namely 10%. the percentage of distal radius fractures is 52.2% of the incidence of physis fractures in children aged 0-14 years. the most common causes are accidents (85%) and fall trauma (14.9%)

Existing research in Pematangsiantar regarding distal 1/3 radius fractures shows that the percentage of distal 1/3 radius fractures is around 25%. Fractures of the distal 1/3 radius can occur in children to the elderly. Fractures of the distal 1/3 can be caused by injury , traffic accidents.

Physiotherapy problems arise in the presence of pain, edema, muscle spasm, decreased LGS, and decreased functional activity ability in fractures of 1/3 distal os radius. The modalities used by the author include Infra Red (IR) and Exercise Therapy in the form of free active exercise, passive exercise , and hold relax.

In fractures of the distal 1/3 of the radius dextra, physiotherapy has an important role, including: by using IR modalities and exercise therapy aimed at reducing pain, edema, stabilizing muscle strength, increasing joint range of motion (LGS), and increasing functional abilities of the hand to the right.

Problem Objective

a. To determine the benefits of Infra Red (IR) in reducing edema and muscle spasm in cases of post immobilization distal 1/3 of the radius os.
b. To find out the benefits of exercise therapy modalities on joint range of motion (LGS), and functional activity in conditions of post immobilization distal 1/3rd radius fracture?

LITERATURE REVIEWS

A. Anatomy and Physiology

Fracture of the distal 1/3 of the radius

Fracture of the distal 1/3 of the radius dextra is a break in the connection that is in the right third of the radius bone. In clinical conditions, it can be an open fracture accompanied by soft tissue damage (muscle, skin, nerve tissue, blood vessels) and a closed radius fracture caused by an injury to the forearm, either direct or indirect trauma.

Fracture of the distal 1/3 of the radius

1. Ulna Bone
2. Radial bone
3. Hand and Wrist Bones
4. muscles
5. Arteries (Blood Vessels)
6. Hand Joints
7. Joints of hands and fingers

B. Pathology

Etiology

According to Nampira (2014) fractures of the radius bone usually occur due to direct injury to the forearm, traffic accidents, or falling with a stretched arm. Radius fractures are usually the result of severe injuries. Direct injuries are usually transverse fractures at the same height, usually in the middle third of the bone. The etiology of fractures of the distal 1/3 of the radius is caused by injuries/falls and trauma.

Fracture Pathophysiology

In principle, the amount of energy due to trauma is the pathophysiological basis for fractures of the distal 1/3 of the radius. Trauma is often in the form of fall trauma with a falling mechanism on the surface of the hand on the volar or dorsal side. The mechanism of trauma is divided into high energy and low energy trauma. The amount of energy can be help predict fracture severity.

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Signs and symptoms

the presence of signs and symptoms in fractures of the distal 1/3 of the post immobilized radius os, which include: disturbances in the ability of functional activities, weakness in the muscles, the presence of limited movement, and spasms.

Medical diagnosis

Fracture 1/3 Distal Os Radius Dextra Post Immobilization Cast

Differential Diagnosis

a. Distal Os Radius
b. Wrist Joints
c. Os carpalia
d. Os Metacarpalia
e. Os phalanges

Bone Healing Process

When subjected to a fragment injury, bone is not only patched with scar tissue, but also undergoes gradual regeneration.

Post Immobilization

Since 1 week ago after the injury and it was recommended to install the cast. Cast installation is carried out for 4-6 months until the bones are fused. After the cast is placed, the patient is asked not to move the hand in pronation, supination, rotation. After 4-6 months, installation the cast is removed, the patient is referred to the physiotherapy clinic for treatment of therapy for 6 times with exercise therapy modalities, namely static contraction and active exercise

C. Physiotherapy Problems

Impairments

a. Painful
   Occurs due to repeated pressure and clamping so that intrafesicular pressure increases.
b. limitation of joint range of motion
   Limitation of joint range of motion is a condition in which the joint cannot be fully moved. This problem is caused by the pain and swelling felt by patients in their daily activities.
c. Decreased muscle strength and ability to function
   Decreased muscle strength occurs over a long time and occurs because the muscles are not used optimally, so disuse atrophy is common, this problem needs to be handled quickly in the form of motion exercises.
d. Oedema
   Strong contractions in spasmodic muscles, the Golgi tendon will be stimulated, muscle tension can decrease so that muscle spasms and pain can be reduced immediately.

Functional limitations: os still feels pain on pressing and lifting

Disabilities: os is able to participate in socialization but os is able to communicate well.

D. PHYSIOTHERAPY INTERVENTION TECHNOLOGY

Infrared (Infra Red)

IR rays are emission of electromagnetic waves with a wavelength of 7,700-4,000,000 A (Libriana, 2005), classification of infrared based on wavelength (1) Longwave (non-penetrating), wavelengths above 12,000A-150,0000A. The penetration power of these rays only up to the superficial layer of the epidermis, which is 0.5 mm, (2) short waves (penetrating), are waves with a wavelength between 7700-12000 A.

Infrared is one of the physiotherapy modalities that increases metabolism, vasodilates blood vessels, and reduces pain. As in the case of postoperative fractures that cause pain, infrared can be used to reduce pain. Therapeutic heat increases local and regional circulation, reduces tissue viscosity, and improves collagen elasticity. This therapy also reduces the speed of transmission of both muscle spindle receptors and peripheral pain (nociceptors).

Exercise Therapy

Exercise therapy is one of the modalities of physiotherapy using body movements both actively and passively to maintain and improve muscle strength, cardiovascular endurance and ability, mobility and flexibility, stability, relaxation, coordination, balance and functional ability. Provision of exercise therapy both actively and passively, both using tools and without using tools can have the effect of increasing adaptation to the recovery of tendon and ligament strength and can increase muscle strength, so as to maintain joint stability and increase joint range of motion.

METHODS

Physiotherapy Assessment

1. Anamnesis

Anamnesis is a question and answer about the patient's condition that can be done directly by the patient himself and by other people who know the patient's condition.

a. General history of patient identity

The identity obtained is in the form of:

Name :Mrs. Leni Simanungkalit
Age : 53 years
Gender : Woman
Religion : Christian Protestant
Work : Housewife
Address : Jalan Desa Sinuhaji No.12, Kabanjahe.

b. Special history

It is an anamnesis related to the fracture condition of 1/3 distal os radiusdextra :

1) Main complaint
   The condition of the patient feels pain and swelling in a third of the forearm bone.
2) Current medical history
   History of the present disease, it is known that since 3 days ago the patient felt pain in the forearm bone accompanied by swelling. After a long time, the tingling sensation occurs more frequently and the patient has difficulty doing household chores, such as washing, cooking, sweeping. On December 21 2019, the patient went to the orthopedic doctor, and the patient was advised to have a cast placed and treated for 3 days to healing period.
3) Past medical history
   The patient has never experienced a similar disease and has never experienced anything that triggers the disease
4) Personal history
   The patient is a housewife who does daily activities at home, such as washing, cooking, sweeping,
5) History of co-morbidities
   The patient has no other diseases
6) Family history
   There is no family history of similar disease

2. Anamnesis systems
   Anamnesis system obtained information for the system:
   1) Head and neck, no complaints
   2) Cardiovascular, no complaints
   3) Respiration, no complaints
   4) Gastro intestinal, no complaints
   5) Urogenital, no complaints
   6) Musculoskeletal, there is pain in the right wrist
   7) Nervorum, there is a feeling of thickness and tingling in the right wrist
3. Physical examination

The physical examination carried out included checking vital signs, inspection, palpation, movement checks, functional abilities, cognitive checks, and specific checks.

a. Examination of vital signs
   Examination of vital signs is an examination that includes measurement of blood pressure, pulse, respiration, subhu, height, and weight. For the examination carried out on December 17, 2019, blood pressure data were obtained 120/78 mmHg, pulse 80 times, respiration 18 times, height 150 cm, body weight 40 kg.
b. Inspection
   Inspection is an examination by looking and observing in cases of fractures of the distal 1/3 of the dextra radius os. Inspections that need attention are:
   1) The general condition of the patient is good

2) There are no signs of inflammation
3) There is no muscle atrophy around the wrist

c. Palpation
The patient feels pain on pressing and the patient feels swelling

d. Percussion
Are not done

e. Auscultation
Are not done

4. Motion Check

a. Active motion check
In active motion examination to obtain information about the presence of motion pain, muscle strength, movement coordination. In this examination the patient is asked to make movements in all directions of the range of motion, namely wrist flexion, wrist extension, ulnar deviation, and radial deviation. And from this examination the patient can moving the right wrist in all planes of motion with full ROM without any complaints at the end of the movement.

b. Passive motion check
In passive motion examination to determine the presence of motion pain or tenderness, end feel of the wrist joint. On examination the movement is carried out in full by the therapist in all directions of the motion field, namely wrist extension flexion, ulnar deviation, and radial deviation movements which are carried out in full by the patient with resistance from therapist. And it was found that it could move in all directions, namely in flexion, wrist extension, wrist abduction and adduction, ulnar and wrist deviation, and there were few complaints of pain.

5. Functional ability

This functional ability examination aims to determine the patient's ability to carry out daily activities and those related to the environment. Functional abilities include:

a. Basic functional capabilities
Patient was able to grip, flex and extend, as well as radial and ulnar, right wrist deviation.

b. Functional activity
Patients can do eating activities using their hands without pain, are able to cook, wash clothes, sweep, but in the long term they experience pain.

c. Activity environment
The patient's activity environment is not supportive for healing because many activities are done by hand, such as washing clothes, sweeping

6. Specific Examination

a. Wrist extension test
Full extension pressure on the hand and then flexion, text with shoulder extension and wrist extension. Finger extension text. Finger extension text and emphasis on folding the thumb for 5-10 seconds.

b. Phalen's flexion test
   A positive test if there are symptoms of a thick, sore, and prickly feeling in the fingers, especially the thumb, pricked finger, and middle finger after 60 seconds.
c. Tinel's test
   This test supports the diagnosis if there is paresthesia or pain in the distribution of the median nerve when percussion is carried out in the carpal tunnel with the hand slightly dorsiflexed.
d. thenar test
   Inspection and palpation reveal atrophy of thenar muscles.
e. Measuring the degree of pain with the VAS (Visual Analog Scale)
   That is the measurement of the degree of pain by indicating one point on a line of the pain scale. A straight line 10 cm long, one end of the pain scale line indicates no pain marked with the number "0" while the other end shows pain, while severe pain is marked with the number "10". The length of the line from the point where there is no pain to the point indicated indicates the amount of pain. From this examination the results obtained:
   Manual Muscle Test (MMT)
   Score 0: slight contraction (vision and palpation),
   Score 1: slight contraction, no movement
   Value 2: full ROM movement, gravity elimination position,
   Value 3: full ROM movement, position against gravity,
   Score 4: full ROM movement, defying gravity with moderate resistance,
   Value 5: full ROM movement, position against gravity with maximum resistance.

7. Cognitive, intra personal, and interpersonal examination
   a. Cognitive examination found that the patient's memory was good, able to understand and follow the therapist's instructions.
   b. Interpersonal examination shows that the patient has a passion for recovery so he is diligent in coming to therapy.
   c. Intrapersonal examination is known that the patient can cooperate and communicate well with the therapist.
8. Physiotherapy Problems
   a. Impairment: there is tenderness in the wrist joint, there is muscle spasm, there is swelling, there is a decrease in muscle strength.
   b. Functional limitations: OS has not been able to lift heavy objects
   c. Disability: os is able to participate in socialization and os is able to communicate
9. Physiotherapy Plan Program
   a. Short Term Goals: reduce pain, relax muscles, reduce spasms and edema
   b. Long Term Goals: maximize the ability of functional activities and increase the range of motion of the joints.
      Implementation of Physiotherapy

a) Therapy 1 on 13 February 2020 with the modality of IR technology was carried out for 15 minutes, then exercise therapy for 10 minutes.
b) Therapy 2 on 20 February 2020 with the modality of IR technology was carried out for 15 minutes, then exercise therapy for 10 minutes.
c) Therapy 3 on February 27 2020 with the modality of IR technology was carried out for 15 minutes, then exercise therapy for 10 minutes.
d) Therapy 4 on March 5 2020 with the modality of IR technology was carried out for 15 minutes, then exercise therapy for 10 minutes.
e) Therapy 5 on March 12 2020 with the modality of IR technology was carried out for 10 minutes, then exercise therapy for 10 minutes.
f) Therapy 6 on March 10 2020 with the modality of IR technology was carried out for 10 minutes, then exercise therapy for 10 minutes.

RESULTS AND DISCUSSION

Contents Results and Discussion

The following is a graph of the progress of the problem in patients with fractures of the distal 1/3 of the dextra radius after immobilization using certain parameters.

Provocation Test	T3	T5	T6
Phalen test	+	+	-
Test thinel	+	-	-
thenar test	-	-	-
Test wrist flexion	+	-	-

Infrared is one of the physiotherapy modalities that increases metabolism, vasodilates blood vessels, and reduces pain. As in the case of postoperative fractures that cause pain, infrared can be used to reduce pain. Therapeutic heat increases local and regional circulation, reduces tissue viscosity, and improves collagen elasticity. This therapy also reduces the speed of transmission of both muscle spindle receptors and peripheral pain (nociceptors).

therapeutic effects found in infrared (ir) therapy, namely:

1) relieve pain (reduce/relieve pain),
2) muscle relaxation,
3) vasodilation of blood vessels so as to increase blood supply, and
4) Eliminates metabolic waste products
5) effect on muscle tissue,
6) increase body temperature,
7) effects on sensory nerves
8) improve metabolic processes.

The primary goal of an exercise therapy program is to restore function, performance, muscle strength, and endurance to pre-injury levels. Muscle atrophy and loss of muscle strength due to not being used ranges from 5% per day to 8% per week (Kuncara, 2011).

Contents of Discussion Results

The patient, Mrs. L. Simanungkalit, who was 53 years old, had a fracture of 1/3 of the distal os of the dextra radius post immobilization of the cast. The patient feels pain, muscle spasms, swelling, decreased range of motion of the joints, and ability to perform functional activities. After being treated for 6 times of therapy using the ir modality and exercise therapy, the patient feels a reduction in pain, muscle spasms, swelling, increased range of motion of the joints, and functional ability in the forearm of the right hand.

CLOSING

Conclusion

From the description that has been explained in the previous chapter, starting from the cause, the course of the disease until the implementation of therapy, it can be concluded that a fracture of the distal 1/3 of the radius dextra is a break of 1/3 of the right radius bone connection. In indirect trauma, the twisting force (usually a fall on the hand) results in a spiral fracture with both bones at different levels. Additional rotational deformities can be inferred by traction on the muscles attached to the radius: these are the biceps and supinator muscles in the upper third, the pronator teres in the middle third. , pronator quadratus in the lower third. Circulation and swelling of the muscles in the forearm can cause circulatory disorders.

It can also be concluded that patients with a diagnosis of fracture 1/3 distal os radius dextra post immobilization cast, after 6 times of therapy with physiotherapy modalities namely ir for 15 minutes and exercise therapy with resisted exercise method, hold exercise and patient education, the results obtained namely the decrease in pain, reduction of edema and muscle spasm, an increase in muscle strength and an increase in the ability of functional activity.

Suggestions

a) For Patients

Patients are expected to follow the physiotherapy program regularly, namely doing exercises at home from physiotherapy such as active flexion-extension, wrist pronation-supination, ulnar-radial deviation, as taught by physiotherapists correctly to support the patient's recovery.

b) For families

The patient's family is expected to continue to provide mental encouragement to the patient to carry out the therapy program, as well as to give confidence to the physiotherapist in helping the patient's healing and recovery process to be better and faster

c) For physiotherapists

Before providing treatment or physiotherapeutic action, the physiotherapist should start with an examination that is appropriate to the patient's condition and at the time of making the diagnosis must be correct and accountable

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