EARLY COMPLEX REHABILITATION TREATMENT OF PATIENTS WITH FRACTURE OF DISTAL METAEPIPHYSIS OF THE RADIUS

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Relevance. Fractures of the distal metaepiphysis of the radial bone among all fractures range from 11% to 30%. Unsatisfactory results of treatment in patients over 70 years old are found in 44% of cases. Timely and adequate rehabilitation treatment is important for obtaining good results in the treatment of such patients.

Objective: to improve the results of treatment of patients with fractures of the distal metaepiphysis of the radial bone based on early comprehensive individual rehabilitation treatment.

Materials and methods. 97 patients with displaced fractures of the distal metaepiphysis of the radius were observed. Among them, 67 are women (69.1%), over 50 years old – 64 (66%). Used conservative treatment with a sparing technique of one-stage reduction. Upon completion of the correction, according to the indications, measures were prescribed for the prevention of neurodystrophic syndrome, depending on the likelihood of its development (according to the temperature gradient of the fingers of the extremities) in the form of drug therapy. Massage, kinesitherapy and physiotherapy began on the second day. The pain intensity was determined using a visual analogue scale. The nature of pain was determined by the DN4 questionnaire (questionnaire for the diagnosis of neuropathic pain). For subjective unified assessment of hand function in the long term after hand injury, I used a specific questionnaire DASH (Disability of the Arm, Shoulder and Hand Outcome Measure) – a questionnaire of outcomes and disability of the hand and hand.

Results. Rehabilitation treatment at admission and at the early outpatient stage was complex, individual, taking into account the periods of illness. The debris correction was painless, low-traumatic, rational fixing bandages were used. The volume of drug therapy was determined by the value of the temperature gradient of the fingers.

Conclusion. The proposed method for the rehabilitation of patients with fractures of the distal metaepiphysis of the radius is highly effective: good and satisfactory (according to the DASH scale) results were obtained in 97.8% of cases, unsatisfactory – in 2.2%.

Key words: fracture of the distal metaepiphysis of the radius, rehabilitation treatment.
marked with a dot. The starting point denotes the absence of pain – 0, followed by mild pain, moderate pain, severe pain and the end point - unbearable pain – 10. Although it seems primitive, the VAS has wide application in clinical practice and is universally recognized by clinicians.

For a subjective unified assessment of hand function in the long term after hand injury, a specific DASH questionnaire (Disability of the Arm, Shoulder and Hand Outcome Measure) was used – a questionnaire of outcomes and disability of the hand and arm. In 2005, he underwent the process of intercultural adaptation in Russian, and the Russian version is available on the website of the Institute of Labor and Health (Canada) [9]. The main section of the DASH (Disability/Symptom Scale) questionnaire consists of 30 question items related to the state of hand function over the past week. Each item has 5 answer options, scored from 1 to 5. The sum of the points for all items is then converted to a 100-point scale.

DASH rates upper limb disability from 0 - no disability (good functionality) to 100 - excessive disability [8].

RESULTS AND DISCUSSION

In all observations during the first three days in patients with fractures of the radius in a typical place, the pain syndrome had a neuropathic character (varying degrees of severity). This was due to anatomical predisposition. The carpal tunnel is a narrow tunnel formed by the bones of the wrist and the transverse wrist ligament [1]. Median nerve neuropathy with ray fractures in a typical location consists in trauma and compression of the median nerve in the canal cavity.

It is generally accepted that the predisposing factors in the development of post-traumatic neurodystrophic syndrome are vascular diseases, premorbid degenerative changes in muscle-tendon-periarticular tissues, osteochondrosis of the cervical spine, diabetes mellitus. Most of the victims had this pathology. Complete multimodal analgesia was very important in the prevention of the development of post-traumatic neurodystrophic syndrome at the initial stages. This was achieved by the following methods.

A 2% solution of lidocaine 15-20 ml was injected into the hematoma of the fracture, reduction was performed no earlier than 5 minutes later. Non-steroidal anti-inflammatory drugs were used (intramuscular injection of Dexametin 15-20 minutes before install). Later, in the acute period (up to 3-7 days), patients received tablet forms.

Auxiliary therapy included the use of calcium and vitamin D3 preparations (Calcium D3 Nycomed, 1 tablet 2 times a day for 30 days), B vitamins (Neurobion, Duovit), alpha-lipoic acid antioxidants (Berlition) or Actovegin. The obligatory component was the use of the Keltikan polypeptide. A drug containing cytidine monophosphate and uridine monophosphate is indicated for the treatment of neuropathic pain with lesions of the peripheral nervous system. It improves axonal and neuronal regeneration. He was taken 1 tablet 3 times a day for 2-3 weeks. In order to reduce muscle tone, the muscle relaxant medocalm was used. A long-term, damper, with increasing effort, traction of fragments was performed.

Upon completion of the correction, according to the indications, measures were prescribed to prevent neurodystrophic syndrome (NDS), depending on the likelihood of its development (according to the temperature gradient of the fingers of the extremities (Fig. 1, Table 1).

For further immobilization, plaster casts were most often used. However, although they have a number of advantages and are most widely used in everyday practice, they are not without drawbacks. They are not very hygienic; they do not fix the fragments firmly enough. Therefore, in 32 cases we used modern plastic bandages made of hard polymer plaster Scotchcast.

| Gradient T,°C | Probability of NDS development | Scope of preventive treatment |
|---------------|--------------------------------|------------------------------|
| 0.4±0.09°C    | small                          | Anesthetic therapy Dexketoprofen, Vitamins of group B and C, Ca and Vitamin D3, polypeptides (Keltikan). |
| 1.3±0.1°C     | average                        | Pain therapy Dexketoprofen, Vitamins of group B and C, Ca and Vitamin D3, polypeptides (Keltikan), muscle relaxants (Mydocalm), antioxidants alpha-lipoic acid (Berlition), Solcoseryl, Actovegin. |
| 1.9±0.1°C     | high                           | Anesthetic therapy Dexketoprofen, Vitamins B and C, Ca and Vitamin D3, polypeptides (Keltikan), muscle relaxants (Midocalm), antioxidants alpha lipoic acid (Berlition), Solcoseryl, Actovegin, anticonvulsants Gabapentin – 300 mg at night or Pregabaline (Lyrics) – 150 mg/day, decongestants Troxevasrin 900 mg/day and Lioton 1000 ointment. |
| 2.2±0.5°C     | inevitable occurrence          | Pain therapy Dexketoprofen, Vitamins B and C, Ca and Vitamin D3, polypeptides (Keltikan), muscle relaxants (Midocalm), antioxidants alpha lipoic acid (Berlition), Solcoseryl, Actovegin, anticonvulsants Gabapentin – 300 mg per night Lyrica) – 150 mg/day, decongestants Troxevasrin 900 mg/day and Lioton 1000 ointment. |

Note: NDS – neurodystrophic syndrome
Fig. 1. Carrying out thermometry with a thermometer Thermofocus 01500A3

Strips of plaster were glued to the skin of the fingers longitudinally, threads were laid on them. The latter are fixed with circular bandages. Thus, the traction force is evenly distributed over the entire surface of 1-2-3 fingers. Traction does not cause painful sensations; patients are assessed by patients at 3.8±0.09 points on the VAS scale (easily tolerated pain).

Rough manipulations were not performed. After matching the fragments in the position of slight stretching and slight flexion or extension of the hand, the fragments were fixed with plastic or plaster (if it was impossible to use plastic) bandages. After 2 weeks, if necessary, a staged removal of the hand to the mid-physiological position was carried out. After 4-6 weeks, after X-ray control, the bandage was removed, and further active rehabilitation treatment was carried out.

A short bandage from Scotchcast to the metacarpophalangeal joints holds the fracture of the distal metaepiphysis of the radius well and makes it possible to move the fingers from the first day.

The objectives of medical physical culture in the first immobilization period were: general strengthening and psychoemotional tonic effect on the body; improvement of blood circulation and tissue trophism; prevention of muscle atrophy and joint contracture.

To solve these problems, certain complexes of physical therapy were used. The specific gravity of the exercises was as follows. About 75% were exercises for other segments of the musculoskeletal system, movements in the joints of the injured limb free from immobilization, and breathing exercises. Self-care exercises with a healthy hand were included.

Exercises for the injured hand accounted for about 25%, first in isometric and physiological modes, passive and then active exercises for the fingers began. Physiotherapy exercises for the 1st finger were carried out separately – its withdrawal simultaneously with extension of 1-4 fingers, flexion in the metacarpophalangeal and interphalangeal joints. Attention was drawn to the condition of the fixation bandage in this area – the hole was sufficient for free movement, the edges did not injure the skin. The appearance of significant pain and pronounced edema indicated an excessive load; tolerable pain and slight swelling – about the optimal load. Figure 2 shows a diagram of a set of exercises proposed by Dobyns JH, 1975, modified and widely used by other authors (Strafun S.S., 2015, Timoshenko S.V., 2010 Vinnik A.V., 2016 Naumenko L.Yu., 2012) for FDMERB fractures from the early stages.

Straight 2-4 fingers were bent in the metacarpophalangeal joints, at the same time the unbent 1 finger was brought to them. Subsequently, with unbent metacarpophalangeal joints, sginal-extension movements in the interphalangeal joints were performed, the exercise ended by squeezing the fingers of the injured limb into a fist. The exercise was accompanied by raising the extended arm vertically upward, lying or standing. When bending the fingers, a soft rubber ball or foam sponge was used as a countermeasure.

After removing the fixation bandage, kinesiotherapy was performed in the second (postimmobilization) period. Its peculiarity was the change in the proportion of general strengthening exercises up to 25%. At the same time, 75% were special exercises for the injured hand. The tasks of physical therapy at this stage were:
restoration of the function of the injured hand, mobility in the joints; elimination of muscle atrophy.

For this, the following kinesitherapy means were intended. General developmental and breathing exercises were carried out individually, with and without sports equipment. In the first days after removing the gauze bandage, both passive and passive-active movements were used for the injured hand; active for all joints with a gradual increase in the range of motion and dosage of each exercise.

Immediately after the end of immobilization, gymnastics was performed for the wrist, elbow and shoulder joints. Exercises for the wrist joint included the following exercises: active flexion, extension, radial and ulnar bone deviation, as well as rotational movements of the hand and forearm. Began exercises «stretching» – rapprochement of bent and unbend brushes with increasing efforts. In the future, they began to perform exercises with the resistance of the healthy hand or the hand of the methodologist, exercises with resistance (using an elastic rubber bandage or expander), stretching exercises. Exercise in young patients with weights or with apparatus gave good functional results.

The task of kinesiotherapy in this period is the complete restoration of the impaired hand function. Household and labor rehabilitation was carried out. The proportion of elements of occupational therapy increased. Exercises were prescribed and performed that imitated actions in everyday life and in the process of work (turning on the light, hammering nails, opening doors, lacing, bulkheading small objects, brushing teeth, etc.).

Games were used that restored muscle strength, movement in joints, and coordination.

In case of FDMERB fractures, massage was prescribed from 2-3 days after the injury, after the acute inflammatory processes subsided. During the period of immobilization of the forearm with a plaster or plastic bandage, massage of the upper-thoracic reflex-segmental areas was used, as well as massage of the damaged upper limb – shoulder and hand – stroking, rubbing and kneading the raised arm; massage of the entire healthy symmetrical limb using all massage techniques. The massage was performed in kinesiotherapy.

In the second and third periods, massage of the para-vertebral zone and the injured limb is continued. First, the segments above the fracture were massaged – shoulder girdle, shoulder, then the damaged area – forearm and distal part – hand. Forearm massage was performed as follows. First, stroking and rubbing of soft tissues was performed, then longitudinal, lumbar kneading of the muscles, stretching and compression at a fast pace. All methods of intensive massage at the site of the fracture were alternated with stroking. The massage ended with general stroking of the injured limb and active movements.

In the first period, patients with FDMERB used ultraviolet irradiation, Peiler-therapy with the Bioptron device (Fig. 3), longitudinal calcium electrophoresis, UHF, magnetotherapy.

In the second, post-immobilization, period, they sought to restore the full range of motion in the joints, restore the strength and endurance of the arm muscles. We expanded the range of physiotherapeutic agents. Physiotherapy treatment is aimed at creating a background, facilitates the conduct of kinesitherapy. To eliminate residual trophic disorders, microwave therapy, magnetotherapy, darsonvalization, laser therapy, Peiler-therapy were used. We used phonophoresis – ultrasound at a dosage of 0.6-0.8 watts/cm2 with Fastum gel and Lyoton 1000.

In cases of persistent dysfunction of the hand, repeated courses were prescribed using therapeutic mud and hydrotherapy – radon or hydrogen sulfide baths; prescribed sanatorium treatment.

Studies of the results of rehabilitation treatment of patients with FDMERB fractures show the following. Multimodal anesthesia, differentiated and reasonably applied drug therapy, sparing reduction, early kinesitherapy made it possible to eliminate pain syndrome by day 7 in the vast majority of victims. Rehabilitation treatment included painless correction of
displaced fragments, rational fixation dressings, early kinesiotherapy, massage, and physiotherapy.

The functional results of treatment of patients with FDMERB fractures according to the DASH scale indicate the following. Good and satisfactory results were obtained in 97.8%, with 2.2% of cases being unsatisfactory. Clinical observation is shown in Figure 4.

This testifies to the high efficiency of the use of complex rehabilitation: rational low-traumatic correction and fixation of fragments; individual drug therapy, determined using the method of predicting the likelihood of developing post-traumatic stress stress (temperature gradient) and conducting early kinesiotherapy, massage and physiotherapy, taking into account the period of treatment and individual characteristics.

CONCLUSIONS

The proposed method of rehabilitation of patients with FDMERB fractures is highly effective: good and satisfactory (on the DASH scale) results were obtained in 97.8% of cases, unsatisfactory – in 2.2%.

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РАННЕЕ КОМПЛЕКСНОЕ РЕАБИЛИТАЦИОННОЕ ЛЕЧЕНИЕ БОЛЬНЫХ С ПЕРЕЛОМОМ ДИСТАЛЬНОГО МЕТАЭПИФИЗА ЛУЧЕВОЙ КОСТИ

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Актуальность. Переломы дистального метаэпифиза лучевой кости среди всех переломов составляют от 11 % до 30 %. Неудовлетворительные результаты лечения у пациентов старше 70 лет встречаются в 44 % случаев. Важным для получения хороших результатов при лечении таких больных является своевременное и адекватное реабилитационное лечение.

Цель: улучшить результаты лечения больных с переломами дистального метаэпифиза лучевой кости на основе раннего комплексного индивидуального реабилитационного лечения.

Материалы и методы. Наблюдали 97 пострадавших с переломами дистального метаэпифиза лучевой кости со смещением. Среди них 67 женщин (69,1 %), старше 50 лет – 64 (66 %). Использовали консервативное лечение с щадящей техникой одномоментного вправления. По завершении коррекции по показаниям назначалась меры по профилактике нейродистрофического синдрома в зависимости от вероятности его развития (по данным градиента температуры пальцев конечностей) в виде медикаментозной терапии. Массаж, кинезотерапию и физиолечение начинали с второго дня. Сила боли определялась по визуально-аналоговой шкале. Характер боли определялся опросником DN4 (опросник для диагностики нейропатической боли). Для субъективной унифицированной оценки функции кисти в отдаленные сроки после травмы кисти использовали специфический опросник DASH (Disability of the Arm, Shoulder and Hand Outcome Measure) – опросник исходов и неспособности руки и кисти.

Результаты. Реабилитационное лечение при поступлении и на раннем амбулаторном этапе было комплексным, индивидуальным, с учетом периодов болезни. Коррекция обломков была безболезненна, малотравматична, использовались рациональные фиксирующие повязки. Объем медикаментозной терапии определялся по значению градиента температуры пальцев.

Вывод. Предложенный метод реабилитации больных с переломами дистального метаэпифиза лучевой кости является высокоэффективным: хорошие и удовлетворительные (по шкале DASH) результаты получены в 97,8 % случаев, неудовлетворительные – в 2,2 %.

Ключевые слова: перелом дистального метаэпифиза лучевой кости, реабилитационное лечение.