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Pre-rehabilitation of patients before surgery - proposed procedure

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Abstract

Objectives. Surgical procedures are one of the invasive treatment methods in modern medicine. Procedural medicine develops from year to year. The method of invasive treatment depends primarily on the disease entity. Mostly, it will be minimally invasive surgery. Regardless of the invasive nature of the procedure, the patient requires temporary immobilization, which is associated with postoperative complications.

Material and methods. A review of the available literature and own observations were used for the study.

Results.

The available literature primarily focuses on the number of postoperative complications and the relationship between their occurrence and preoperative prophylaxis. There are numerous references in the literature concerning the emergence of respiratory and circulatory failure after surgery, especially in obese patients and patients with comorbidities.

Conclusions.

The implementation of pre-rehabilitation is necessary as a prevention of postoperative complications.

Key words: improvement, complication, prevention

Introduction:

Surgical treatment is primarily associated with radical treatment, but also with the possibility of complications. General risk factors for complications in surgically treated patients are related to [1,2,3]:

• decreased activity or immobility in the preoperative period

• surgery, drugs used during anesthesia

• postoperative pain

• immobilization in the postoperative period.

Decreased activity before surgery is most often associated with patients' anxiety. Anxiety is associated with diagnosis and uncertainty about the success of treatment. Depression of mood resulting from anxiety may turn into depression and the patient's reluctance to participate in everyday life at the current level. In some cases, prior to surgery, immobilization of the patient is required to stabilize the patient's condition. This condition exacerbates the patient's anxiety about regaining fitness after surgery.

The procedure itself requires the patient to be immobilized, which is related to the method of carrying out the procedure. The method of using anesthesia is also important in the aspect of subsequent quick rehabilitation of the patient [2].

After each surgical procedure, there is pain associated with traumatization of tissues and position during the surgical procedure. The postoperative pain itself also negatively affects the patient's return to activity, which is associated with immobilization after the procedure.

Sometimes immobilization after surgery is necessary - mainly in the case of orthopedic surgery, where it is necessary to temporarily immobilize parts of the body[3].

The consequences of immobilization are [3]:

- impaired lung ventilation

This impairment is related to the patient's supine position, which makes it difficult for the patient to breathe in. Chest mobility disorders are another cause of impaired lung ventilation. Ventilation disorders are also associated with pain in the postoperative wound, weakening of the respiratory muscles, especially after general anesthesia. Disorders of diaphragm movements - associated with peristalsis paralysis with abdominal distension, low efficiency of the abdominal press, supine position and pressure on the diaphragm of the abdominal cavity are another factor causing impaired ventilation.

- **loss of muscle mass**

Catabolism is intensified as a consequence of the surgical trauma. The system focuses on repairing damage at the expense of the entire system. In addition, there is a limited supply of nutrients to the body, associated with the lying position and the use of treatment.

- **muscle weakness**

Lack of daily activity results in muscle atrophy related directly to muscle catabolism, but also as a result of inactivity and lack of a stimulus to stimulate the muscle.

- Increase in the activity of the coagulation system - increasing the risk of venous thrombosis.

One day of immobilization clearly activates the coagulation system, which, under favorable conditions and additional diseases, may cause deep vein thrombosis. In many centers, thromboprophylaxis is carried out from the first days of the patient's stay in the surgical ward. During the first three days of bed rest, diuresis increases and fluid volume decreases. Further immobilization causes, inter alia, negative nitrogen balance, increased blood fibrinogen concentration, increased plasma fibrinolytic activity and shortened blood clotting time [1-3].

Objective:

The main aim of the work is to present the benefits of improving patients before surgery - the implementation of pre-rehabilitation. A literature review was used to achieve the goal.

Review of the literaturę

In the analyzed literature, the main goal and task of physiotherapy in surgery is:

• Prevention of postoperative complications and consequences of surgery

• Treatment of postoperative complications and functional disorders [1-5].

In order to achieve the above-mentioned goals, it is necessary to implement, first of all, prophylaxis, i.e. improving the patient before the procedure, so that the complications after the procedure are as small as possible.

Prophylaxis related to pulmonary ventilation disorders includes:

• Maintaining proper lung ventilation

• Increased mobility of the chest and diaphragm

• Increasing the strength of the respiratory muscles

• Stimulation of an effective cough

Maintaining proper lung ventilation is related to breathing exercises. During breathing exercises, special attention is paid to the phase of maximum exhalation[5.6].

1. Passive exercises - performed without the patient's participation, eg with passive movements of the upper limbs.
2. Active-passive exercises - performed by the patient with the partial help of a physiotherapist, eg breathing is performed actively with passive movements of the lower and upper limbs.
3. Exercises assisted by active movements of the upper and lower limbs.
4. Slow-active exercises - performing correct breaths in the most convenient positions.
5. Exercise with resistance during inhalation, exhalation, or both.

Resistance may be caused by the positioning position (e.g. lying backwards makes it difficult to inhale, while standing - to exhale), the environment (water), the physiotherapist's hand, accessories (sandbags), incorrect limb movements and increased resistance in the expiratory tract (e.g. exhalation). through the tube)

body position	**inspiration**	**exhaust**
lying back - legs straight	difficult	facilitated
side lying	increased diaphragm work closer to the ground increased mobility of the chest further from the ground	
Lying back – Trendelenburg position	facilitated	difficult
sitting	facilitated	difficult
standing	More facilitated	More difficult
lying back - legs bend	obstructed work of the diaphragm increased work of the intercostal muscles	

Ryc 1. Relationship of the patient's body position and breathing [3].

Before starting breathing exercises, it is necessary to learn how to do them properly. They should start with exhalation. The ratio of the time to breathe in, always done with your nose, and breathe out through your mouth, should be 1: 2, sometimes even 1: 3.

In order to prevent venous injuries it is necessary to:

• ensure proper venous outflow from the lower limbs,

• maintain the proper function of the muscle pump of the lower extremities,

• apply early start-up and upright positioning.

In the prevention of postoperative deep vein thrombosis, factors of its pathogenesis and methods are taken into account, which allow to accelerate blood outflow, reduce its viscosity and protect the vascular endothelium from damage[2,5]:

a) pharmacological,

b) physical.

The first are low molecular weight heparins, now they are used routinely, which significantly reduced the incidence of these complications.

The use of physical methods is equally effective. They can be divided into [3,6]:

• open,

• passive.

The first ones include active exercises of the lower limbs, especially anticoagulant exercises, and quick upright standing.

Passive methods include [2,4]:

• passive exercises of the plantar and dorsal flexion of the feet in the range of 30 ° at a pace of 15 per minute;

• bandaging the lower limbs;

• elastic stockings with decreasing medial pressure of 20 mm Hg;

• elevation of the lower limbs above the level of the heart, which doubles the rate of outflow of venous blood;

• electrostimulation of the calf muscles;

• external intermittent pneumatic compression under a pressure of 30-50 mm Hg, carried out from the procedure until the beginning of walking.

Procedure proposal

When planning the patient's pre-rehabilitation, one should be guided by possible complications after the procedure. In planning pre-rehabilitation, it is necessary to assess the patient, including:

• History of underlying disease

• Assessment of the efficiency of the respiratory and circulatory systems
• Assessment of the patient's overall fitness
• Assessment of the patient's body structure
• Become familiar with the type and extent of the planned surgery
• Establishing indications and contraindications for rehabilitation

It can be used:

Breathing exercises as a prophylaxis of pulmonary complications

• learning the path of diaphragmatic or costal breathing depending on the planned procedure
• 3-4 repetitions over several sets
• prolonged exhalation (2-3 longer than inhalation)

Exercise for effective coughing

• carried out in the position of approaching the muscle attachment in the area of the planned surgical incision
• carried out in a position that improves the mechanics of breathing - half-sitting or sitting position with bent lower limbs in the hip and knee joints
• 3-4 coughs on the exhale

Anticoagulant exercise

• alternating rhythmic dorsal flexions and plantar feet with a frequency of approx. 16 / min repeated every half hour

Exercises to improve the patient's general fitness, especially the function of muscles and joints involved in breathing, and exercises adapted to the identified posture defects.

Conclusion

The implementation of pre-rehabilitation of patients for whom surgical treatment is planned may have a positive effect on the reduction of complications occurring after the procedures. Rehabilitation of the patient should be a procedure introduced before each planned surgery.

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