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## **Rehabilitacja w domu pacjenta po krwotoku podpajęczynówkowym i operacji tętniaka tętnicy łączącej przedniej na podstawie studium przypadku**

**Rehabilitation in the home of a patient after subarachnoid hemorrhage and anterior communicating artery aneurysm surgery on the basis of a case study**

### **Streszczenie**

Ponad połowa chorych po krwawieniu podpajęczynówkowym umiera z powodu pierwotnego krwawienia lub jego następstw, głównie skurczu naczyniowego. Natomiast w ciągu sześciu tygodni od wystąpienia krwawienia 40% przypadków kończy się zgonem pacjenta. Podstawowymi czynnikami ryzyka są: palenie papierosów, nadciśnienie tętnicze, alkohol, miażdżycza naczyń, nadwaga ciała.

W pracy przedstawiono studium przypadku rehabilitacji i opieki nad 58 - letnim pacjentem po krwotoku podpajęczynówkowym i operacji tętniaka

tętnicy łączącej przedniej. Trudności w codziennym funkcjonowaniu pacjenta wynikają z obecnej sytuacji zdrowotnej oraz konsekwencji przebytego zabiegu pooperacyjnego. Warunkiem sukcesu w usprawnianiu chorego jest systematyczny i długotrwały proces leczniczo – pielęgnacyjno - rehabilitacyjny z pełnym zaangażowaniem całego zespołu.

Celem pracy jest przedstawienie procesu rehabilitacji w domu pacjenta po operacji tętniaka tętnicy łączącej przedniej oraz efektywności działań zespołu terapeutycznego.

### **Abstract**

More than half of patients with subarachnoid hemorrhage die from the initial bleeding or its consequences, mainly vasospasm. However, within the six weeks after the bleeding onset, 40% of cases are fatal for patients. The main risk factors include: smoking, hypertension, alcohol, atherosclerosis, and body overweight.

The paper presents a case study of rehabilitation and care for a 58 - year old patient after subarachnoid hemorrhage and surgery of the aneurysm of anterior communicating artery. Patient's difficulties in everyday functioning result from the current health condition and from the consequences of the post-operative treatment. The success in improving patient's physical abilities depends on a systematic and long-term process of healing-care-rehabilitation and full commitment of the whole team.

The aim of the study is to present the process of rehabilitation at home of the patient after surgery of the aneurysm of the anterior communicating artery and the effectiveness of activities performed by the therapeutic team.

**Słowa kluczowe:** rehabilitacja, tętniak, udar krwotoczny

**Keywords:** rehabilitation, aneurysm, stroke hemorrhagic

### **Introduction**

Cerebral aneurysm arises from the brain artery walls disorders, usually in the arterial of brain basis. When the aneurysm suddenly bursts, it is followed by hemorrhage into the subarachnoid space or to the brain, which is recognized as the hemorrhage stroke. If bleeding is not extensive, pain may persist for several days. Severe

hemorrhages usually have a rapid course. This can cause severe disturbance of consciousness, and in many cases, death of the patient. Large brain aneurysms, pressing specific nerve endings can produce clinical signs such as paralysis of the muscles which move eyeballs, the pressure on the optic nerve with the reduced visual area, or progressive visual impairment. Apart from severe pain that may radiate to the neck or around the eyeball, there appear nausea and vomiting as well as loss of consciousness.

The causes of cerebral hemorrhages have a complex basis.

Following chronic hypertension there occurs arteriopathy in form of structural changes in the small resistance arterioles. They consist in the formation of microaneurysms and lipohyaline segments, which result in the weakening of the arteriole walls and in an increase of their susceptibility to a rupture. This occurs particularly in a sudden increase of blood pressure. These changes relate mainly to the arterioles supplying blood to the striatum, thalamus, and vermis cerebellum.

In the elderly, in the middle layer of small arteries there comes to the formation of amyloid angiopathy. It is the reason for the hemorrhage in the lobar-frontal, parietal or occipital location, and more rarely the cause of subarachnoid hemorrhage.

A significant cause of cerebral hemorrhages includes vascular malformations: aneurysms, arteriovenous malformations and cavernous hemangiomas. A rupture leads to subarachnoid or meningeo-cerebral hemorrhage. Sometimes there occurs intracerebral hemorrhage in the case brain tumors diagnosis - primary and metastatic, being the reason for lobar hemorrhage.

In the course of hematological diseases (leukemia, hemophilia, thrombocytopenic purpura) there occur clotting disorders, which is also the case when anticoagulants (heparin, acenocoumarol) and antiplatelet medicines (aspirin) are applied, leading to hemorrhagic outbreak - sometimes of multiple nature.

Haemorrhagic disorders of the brain take the following clinical forms: intracerebral hemorrhage with transient focal symptoms, usually

runs without loss of consciousness, intracerebral hemorrhage with persistent depletion symptoms and subarachnoid hemorrhage [1].

The clinical image of hemorrhagic stroke depends on its location and size:

- Hemorrhage into deep subcortical structures is most often related to the putamen or to the thalamus. With the occupation of the putamen there occurs contralateral hemiparesis or hemiplegia with dysesthesia. In the case of haemorrhage of the thalamus there dominates sensory hemiparesis disorders, symptoms are accompanied by a headache, vomiting, and in the case of extensive bleeding by increasing disorders of consciousness.
- Hemorrhage may, depending on its location, lead to hemiparesis, semi-sensory disorders, semi-amblyopia and aphasia, as well as to a headache and vomiting.
- Hemorrhage to the cerebellum is characterized by impaired balance, hemior quadriplegia ataxia, dysarthria, headache, vomiting and by rapidly growing disorders of consciousness.
- Hemorrhage to the pons—is accompanied by the quadripareisis or paralysis, impaired associations, of the eyeballs look and by a rapidly growing disorder of consciousness.
- Subarachnoid hemorrhage is characterized by a sudden intense headache, often in the occipital, meningeal symptoms, and sometimes by disorders of consciousness.

The clinical condition of the patient and the severity of subarachnoid hemorrhage is determined on the BottrrellScale of 1956 as modified by Hunt and Hess 1968. It is characterized by division into five clinical degrees:

- I - degree – the patient is conscious, headache, meningeal symptoms,
- II - the patient is conscious, severe headaches, significant meningeal symptoms, cranial nerve damage,
- III - drowsiness or obtundation, hemiparesis focal symptoms,
- IV - coma, paralysis or hemiplegia, vegetative symptoms,
- V- Coma, decerebration apex.

With the first and second clinical degree of severity of the bleeding symptoms the patient is directed within 24-48 hours to a centre, where after the performance of angiography and identification of an aneurysm the patient is subject to surgery treatment. In the third, fourth and fifth degree - surgical treatment is postponed until improvement occurs [1].

In the case of identifying a brain aneurysm, immediate targeted treatment should be applied. The course of possible disorders is unpredictable and there is always a risk of a rupture. With the conservative treatment of a bleeding aneurysm, the mortality rate in the case of massive bleeding is very high, 80-90%. Treatment of this type must lead to decompression and surgical draining of the hematoma. Often, there is a need for early surgery before significant brain swelling develops. Another solution in the treatment is to operate on at the beginning of the second week of the disease, in the cases where an improvement in breathing, general condition of the patient and in the state of consciousness has been achieved.

Deep disorders of consciousness, impossible to control shock, severe diabetes, uremia - are absolute contraindications to a surgery. The results of surgical treatment of hemorrhage in the case of contraindications are not very effective. According to the statements of some authors mortality during surgery treatment ranges 25 - 70% [2].

One of the key elements in dealing with the patient after a stroke is to provide continuous, comprehensive complex psychomotor rehabilitation adapted to patient's abilities. According to the definition, rehabilitation is a process through which people with disabilities resulting from a stroke or other illness regain their abilities to function. If their full regaining is not possible to achieve, they gain then optimal physical, mental, social and professional chances, and can return to the appropriate environment compliant to their choice. Rehabilitation is not only improving the disabled person. Its scope covers all the elements affecting the quality of life, including the res-

toration of relations between patients, their families and friends. Rehabilitation includes, apart from physical fitness, the psychological, emotional and social realm of patient's functioning. Patient after a stroke expect that as a result of rehabilitation the maximum degree of physical and mental independence will be achieved. The patient should strive to achieving functional independence not only in a hospital environment, but above all, at home and in their social group. This means that the treatment should include every aspect of life, becoming a part of routine activities.

Stroke is a major cause of disability in the adult population. Rehabilitation of the patient is time consuming, costly and requires professional preparation of the therapeutic team members. It is an active and ongoing process that begins during patients' hospitalization and is also continued after their return home. Treatment of stroke is initially focused on saving the patient's life and their subsequent improvement. It is important to start the patients and to return them to vertical position. With hemorrhagic strokes one should be even more careful than in dealing with patients with ischemic stroke. The period of immobilization in ischemic strokes lasts 2-3 days, after the embolism for three weeks, whereas after hemorrhagic stroke about 3-4 weeks. Getting the patient up should be cautious due to the likelihood of a recurrence of bleeding. The fastest verticalization is implemented after stroke generated the occurrence of blood clots, a little later after embolism, and the latest after strokes. In the case of hemorrhage sitting the patient is implemented in week 5, whereas getting up and verticalization at week 6 after the stroke [1].

The aim of the study is to present the process of rehabilitation at patient's home after surgery of anterior communicating artery aneurysm and the effectiveness of medical actions.

### **Case presentation**

The patient being a man aged 58, living in the city with his wife. Children grown up, self-independent. By last January profes-

sionally active. He worked in a large plant, at the production line. He did not smoke cigarettes, but overused alcohol, drinking every day. Often he wasted his whole salary on alcohol which resulted in further social problems. In family life there prevailed a period of peace and stability because the patient had stopped drinking. The period of abstinence lasted for five years, but the patient returned to the habit again.

In January this year the patient was admitted to hospital with the diagnosis: massive subarachnoid haemorrhage from anterior communicating artery aneurysm. On admission, the patient was conscious, sleepy, with limited logical-verbal contact, without apparent paralysis, Glasgow Coma Scales = 12 points (Eye 3, Verbal 4, motor 5) Hunt Hess III group - that is, drowsiness or lightheadedness focal hemiparesis symptoms. The CT scan of the head [3] - a massive SAH (Eng. Subarachnoidhemorrhage) with a puncture to the ventricular system (IV group by Fisher), angio-CT ACoA aneurysm (anterior communicating artery - lat. arteria communicans anterior). The patient was hospitalised for urgent surgery. The procedure was performed on the first day of being in hospital. By means of right-sided pterional craniotomy, anterior communicating artery aneurysm was clipped. The perioperative course was complicated because of patient's higher temperature.

The patient in general and neurological condition as on admission without paresis, periodically mentally and physically stimulated, was transferred to the neurosurgery ward for further treatment. The patient was conscious, but verbal contact was not possible. He was breathing through a tracheoscopic tube, in the airway moderate retention of secretions was found. The patient was fed by means of a nasogastric tube, with high protein and energy diet applied. The patient stayed in bed on an anti-decubital mattress, to avoid changes to the skin. The patient used the Foley catheter.

The interview made it possible to establish that the family presented an incomplete caring capacity—other persons' involvement

is necessary, as the patient has to be provided with a continued nursing care. In the assessment of the patient on the Barthel Scale 0 points were indicated. Although the patient's wife is not employed anywhere, but she is systematically treated due to complaints regarding the backpain. Patient's housing situation was assessed as 10 points including three categories: A –a very good situation 0-4 points B. Good situation : 5-10 points. C - bad situation: 11-25 points.

In February, the patient had the PEG installed. The surgery was carried out without any complications and the probe was clear. The patient was fed with the Nutrison Protison and Nutrison Protein Plus industrial diet.

On the discharge day from hospital there was performed again CT of the head without contrast that showed that there were postoperative visible changes after the anterior communicating artery aneurysm surgery in the skull bones on the right side and 1-2 vascular clips projected in the artery. As compared to the previous test, a clear progression of ischemic changes particularly large in both parietal lobes, and to a lesser extent - the frontal and occipital ones. Currently, clearly extended ventricular system (Huckman Index approximately 1. Venticle III 17-19mm) with the characteristics of leakage of cerebrospinal fluid, which indicates active hydrocephalus. Posterior fossa structures within normal limits. Mucosal thickening in the left maxillary sinus and in the sphenoid sinus.

Possible complications in the current situation of the patient can be divided into early and late.

The early include:

- vascular spasms,
- cerebral edema, cytotoxic or vascular,
- death,
- epileptic seizures,
- cardiovascular disorders,
- neurogenic pulmonary edema,
- water and electrolyte disorders.

Late complications include:

- swelling of the brain,
- epileptic seizures,
- normotensive hydrocephalus.

Recommendations for the patient in the discharge card:

Decubital prevention, vital parameters monitoring, changing dressings round the PEG, looking after the tracheotomy tube, suctioning secretions from the bronchial tree using electric sucker.

The model of patient's rehabilitation at home resulted from the identified problems regarding the patient and his family.

I. As a result of subarachnoid hemorrhage there followed a complete and prolonged immobilization of the patient.

Aim of improvement - prevention of adverse effects of immobilization.

Actions:

- the use of an electrically controlled bed, allowing the use of different positions during rehabilitation,
- the use of appropriate facilities (rollers, wedges, supports, ladders, tapes) that allow to lay the patient properly and functionally, preventing skin abrasions, contusions and improve comfort of laying [8],
- Use anti-bedsore mattress of variable pressure,
- prevention of pressure ulcers by systematically varying the patient' position, by a physiotherapist, a wife or a nurse, depending on who is staying at the time with the patient [8],
- due to the emergence of pressure ulcers – laser therapy was applied,
- preventing the appearance of contractures, muscle atrophy, mobility restrictions by applying exercise and laying positions [8],
- carrying out systematic rehabilitation at least 3-4 times a day,

- chest percussion,
- applying massage to stimulate blood circulation and nutrition of the skin,
- drawing attention of the family to the need for systematic actions related to the health of the whole body of the patient (oral hygiene, shaving, washing head, hair cutting, moisturizing and nourishing the skin of the patient with particular emphasis on areas prone to pressure, abrasions, sores, to making beds carefully, folds and roughness aligning, taking care of clean and dry underwear, pajamas and bedding),
- • analysis of the way the family follows the recommendations on nutrition (application of high protein, high-energy diet, in order to prevent pressure sores as a result of deproteinization and malnutrition).

II. Lack of acceptance of disability and loss of control over one's own body.

Aim of improvement - showing the patient and the immediate the effects of work of the entire team, providing support to patients and their families, positive motivating.

Actions:

- motivating the family to overcome difficulties, not taking hope away from them,
- help in finding the sense of life of the patient and his family,
- neuropsychological rehabilitation [9],
- making the family and the patient aware of the disease, consequences,
- planning the improvement and rehabilitation with the patient's family,
- explaining to the family and patient doubts associated with the disease, treatment and rehabilitation,
- if necessary, the use of professional psychiatric and psychological assistance[10],

- possible use of drugs prescribed by the doctor to improve mood and well-being of both the patient and caretakers [11],
- making social and professional integration easier [12],
- passive exercises, exposure to yellow light from bioptron lamp as antidepressant.

### III. Neurogenic disorders of urine associated with subarachnoid hemorrhage.

Aim of improvement - prevention of abnormal complications.

Actions:

- drawing attention of the family to the activities related to prevention of urinary tract infections (taking care of personal hygiene of the patient, potency of the Foley catheter while following principles of asepsis and antisepsis, proper nutrition of the patient),
- introduction of rehabilitation of bladder automatism (hyper-reflexive) by: suprapubic tapping, passive flexion of the lower limbs [13],
- in the case of autonomous bladder (a-reflexive) performing exercise strengthening stomach muscles, the muscles of the pelvis and abdomen [13].

### IV. The risk of thromboembolism caused by prolonged immobility of the patient.

Aim of improvement - prevention of complication.

Actions:

- improvement of lower and upper limbs, carrying out passive exercise to improve circulation,
- prevention of contractures in the hip, knee, shoulder and elbow joints,
- massage of upper and lower limbs towards the heart,
- laying of the lower and upper limbs higher to facilitate the venous blood return to the heart [1].

### V. The risk of complications from the respiratory tract.

Aim of care - Preventing complication.

Actions:

- using laying positions, facilitating expectoration of secretions from the bronchial tree [13],
- chest percussion in order to clean the bronchial tree,
- degumming residual secretions from the bronchial tree using electric sucker,
- passive breathing exercise [8].

VI. The possibility of hemodynamic changes due to the aneurysm post surgery condition.

Aim of care – preventing the emergence of disorders that could threaten the patient's life.

Actions:

- monitoring vital signs parameters [1],
- controlling diuresis,
- observing the appearance of the patient's skin, its color, temperature of the body, the appearance of edema.

## **Discussion**

The model of rehabilitation in the home of the patient's after the subarachnoid hemorrhage and the surgery of an aneurysm of the anterior communicating artery was created on the basis of a case study. There were taken into consideration and analyzed typical symptoms of subarachnoid bleeding, which might include: electrifying headache (reported by patients as if they had been kicked in their head [4], or the worst pain in life lasting from a few seconds to several minutes). This pain often pulses towards the occiput [5], where one third of patients do not experience any other symptoms besides the characteristic headache. Suarez indicates that in one out of ten patients who come to the doctor with similar headaches there is later diagnosed subarachnoid hemorrhage. There may appear vomiting, and 1 out of 14 patients has epileptic seizure. Other symptoms of hemorrhage also include confusion, decreased consciousness or even

coma, neck stiffness and other meningeal signs [6]. However, Murray Long more indicated that the stiffness of the neck usually occurs about six hours after the occurrence of bleeding [7].

A good model of rehabilitation in the patient's home after subarachnoid hemorrhage and anterior communicating artery aneurysm surgery is closely linked with external and internal factors. Improvement is the starting point for further actions aimed at improving each activity. Systematic training is of great importance, as otherwise the progress of achievements in improving the patient will be inhibited or even reversed [14].

In the illustrated case, the efficiency of patient's functioning is very limited. Assessing the progress of the patient in the scope of therapeutic-nursing-rehabilitating activities one should always refer to the initial situation and notice the changes made. This shows therefore the degree of implementation of guidelines of the model of care adopted by the therapeutic team and implemented in the case of the patient after subarachnoid hemorrhage and anterior communicating artery aneurysm surgery. According to Dolińska - Zygmunt and Besowski this process is a great challenge for the entire therapeutic team. It is labor-intensive, requiring high psycho-emotional resistance [10,12]. Full cooperation of the caregiver with medical staff is suggested. Its effect being a positive impact on physical and mental condition of patients and their families.

In the case of the described patient, the healing - rehabilitation process in the patient's home will be carried out throughout his whole life. Only the intensity of this process will be subject to changes, which will depend on the physical condition of the patient as well as on involvement in the care of his care takes.

## **Conclusions**

Patient after subarachnoid hemorrhage and the surgery of aneurysm in the right connecting artery, who is in a domestic environment re-

quires constant assistance of another person in the performance of all daily activities.

### **Recommendations for nursing practice**

The patient requires a long-term process of improvement and constant nursing and medical care, including systematic health checks.

### **Bibliografia/Bibliography:**

1. Nowotny J. Podstawy kliniczne fizjoterapii w dysfunkcjach narządu ruchu MediPage Warszawa 2006: 167-174.
2. Dowożenka A, Wald I, Członkowska A. Neurologia kliniczna. PZWL Warszawa 1980: 82-85.
3. Prusiński A. Neurologia praktyczna. PZWL, Warszawa 2011: 230-243.
4. van Gijn J., Kerr R.S., Rinkel G.J. Subarachnoid haemorrhage. Lancet. 2007; 369(9558): 306-18.
5. Feigin VL, Rinkel GJ, Lawes CM, et al. Risk factors for subarachnoid hemorrhage: an updated systematic review of epidemiological studies. Stroke. 2005; 36: 2773-2780.
6. Suarez J.I., Tarr R.W., Selman W.R. Aneurysmal subarachnoid hemorrhage. New England Journal of Medicine. 2006; 354(4): 387-96.
7. Longmore M., Wilkinson I., Turmezei T., Cheung C.K. Oxford handbook of clinical medicine for PDA. Oxford University Press, 2007: 841.
8. Kuch J. Rehabilitacja. PZWL, Warszawa 1989: 81.
9. Talar J. Neurorehabilitacja u progu XXI wieku. Katedra i Klinika Rehabilitacji, AM Bydgoszcz 2003:32-42.

10. Dolińska-Zygmunt G. Podstawy psychologii zdrowia. Wyd. Uniwersytetu Wrocławskiego, Wrocław 2011:315-329.
11. Shen P. Step by step massage for pain relief. Wyd. Delta, Warszawa 1996: 8-13.
12. Besowski S. Aktywna rehabilitacja. Problemy rehabilitacji społecznej i zawodowej. PZWL, Warszawa 1992: 38-47.
13. Kwołka A. Rehabilitacja medyczna. Urban & Partner, Wrocław 2003: 11-50.
14. Laidler P. Rehabilitacja po udarze mózgu. Wydawnictwo Lekarskie PZWL, Warszawa 1994: 128-149.