

KINETOPROPHYLAXIS VIA SWIMMING IN THE MYOCARDIAL INFARCTION

Elena Rață¹
Daniela Crăciun¹
Cătălina-Alexandra Curelușă¹
Alexandra Păstrăvanu¹

¹*University of Stefan cel Mare Suceava, Romania*

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Abstract: The purpose of the study is to emphasize the importance of the swimming and aquatic practice in diminishing the consequences of the myocardial infarction, as well as the improvement of life-quality. The results of the kinetotherapy program endorsed regaining a considerable part of the previous physical capacity, as well as the fast reinstatement of the human being in the social and professional life.

Introduction

The main role of kinetotherapy in the cardiac pathology is of paramount importance due to the fact that the myocardial infarction has seen a scale of expansion in the last years, especially among adults and elders.

In a medical key, swimming has gained multiple use and benefits and can be defined as the art of harmonizing the functions of the respiratory apparatus with combined movements, performed in the aquatic environment, in order to confer the body propulsion and a continuous equilibrium in a specific period of time. This way, swimming contributes to the development of the pulmonary capacity and the physical resistance of the sportsmen, their harmonious development, the prophylaxis and the therapy of the cardiovascular disorders, their medical recovery and recreation.

The recovery or rehabilitation of the people with heart condition is defined by the World Health Organization as an ensemble of measures whose purpose is that of restoring and amelioration of the physical and mental condition of the patients thus giving them the opportunity to reintegrate on their own within the society. This way, the kinetotherapist has the essential role of implementing a customized, controlled,

progressive, supervised treatment program, including among its objectives the mental recovery of the patient, as well.

The instruments of the medical physical culture are of major importance as far as the disorders of the cardiovascular apparatus are concerned. Their role is demonstrated by the plurality of physical - pathological observation regarding the influence of the physical exercise on human organism.

Among the most frequent pathologies of the cardiovascular system there is the *myocardial infarction*, defined as the mortification of a certain part of the cardiac muscle due to the reduction or the stopping of the blood circulation in one of the branches of the coronary artery through a blood clot, which is transported to the heart through the blood circuit.

The kinetotherapist's goal, through the rehabilitation program, is to optimize the activity of the cardiovascular apparatus, the purpose of the physical exercise contributing, at the same time, to the functional recovery of the coronary system and the myocardium, as well. The specialist will guide himself, in his process of recovery, by the stage of mobilization of the people suffering from this disease, established by the International Society of Cardiology (ISC) in the following manner:

- ✓ **Stage 1** involves making a series of easy movements of the limbs, enhancing the execution of ADLs (Activity Daily Living) after a short period of time;
- ✓ **Stage 2** involves positioning in a breech position, without any support;
- ✓ **Stage 3** adds both mobilization from the breech position at the edge of the bed and the switch to the armchair;
- ✓ In **Stage 4** the patient is allowed to move;
- ✓ **Stage 5** includes free-work exercise, under the direct supervision of the therapist;
- ✓ In **stage 6** the patient is allowed to do intense work – climbing a floor;
- ✓ **Stage 7** involves walking outdoors maximizing this way the distance, compared to the previous stage;

Under no circumstances is to be omitted the respiratory gymnastics which, through specific exercise, both diaphragmatic and thoracic leads to a precocious recovery.

Material and methodology

The assumption (hypothesis) of the paper was defined as follows: Can the physiotherapist positively influence the recovery of a person after a myocardial infarction by implementing a therapeutic swimming program?

The main purpose of the paper is to demonstrate that through hydrokinetotherapy there can be increased the effort capacity thus enriching the quality of the life.

Recovery through hydrokinetotherapy begins after 3 months from the debut of the myocardial infarction. The specialist tries to restore the patient as much as the previous physical capacity, according to the functional potential of the heart.

While creating the treatment schedule, the kinetotherapist takes into consideration a series of pre-established objectives:

- 1.Choosing the most efficient methods in order to shorten the recovery period;
- 2.Raising the patient's interest regarding physical activity;
- 3.Raising the capacity of maximum effort;
- 4.Mental recovery of the patient by regaining self-esteem, reintegration within the society and professional reorientation;
- 5.Reducing disease relapse;
- 6.Reestablishing the physiological equilibrium of the patient;
- 7.Raising the life expectancy;

This study was conducted with one patient (C.V) aged 50, diagnosed with acute myocardial infarction who was subject of a coronarography which attested that an artery or a part of it does not function accordingly, at maximum capacity. As a consequence, it was established, in order to extend the life expectancy, the installation of a coronary stent.

Taking into account that the patient suffered a surgical intervention, there were no chances of initiating appropriate tests and the initial evaluation consisted of registering the blood pressure values, the heart rate and the respiratory rate.

Therefore, the patient was present to the recovery program with the following values: blood pressure – 142/89 mmHg, heart rate – 100 bpm, respiratory rate – 22 breaths per minute.

The recovery of the patient began immediately after the intervention, but the swimming program developed in the USV Natation and Kinetotherapy Complex, during a – 8 week – period of time (5th of October – 29th of November). The frequency of the sessions was twice

per week , each session lasting initially 15 minutes, but reaching in the end almost 30 minutes.

Each session had the following structure:

- warm-up of the organism outside the swimming pool;
- practicing some simple, easy exercise in the water;
- the scheduled swimming program;
- respiratory exercise (respiratory gymnastics);

The scheduled therapy program was the following:

a) Warm-up of the organism outside the swimming pool

Region	Initial position	Exercise	Repetitions
Head and Neck	-standing with bent arms, hands on hips and legs apart;	T1 – head flexion; T2 – return; T3 – head extension ;T4 – return;	Twice
	– same as the previous exercise;	T1 – lateral tilt to the right; T2 – return; T3 – lateral tilt to the left; T4 – return;	Twice
	– same;	T1 – turning the head to the right; T2 – return; T3 – turning the head to the left; T4- return;	Twice
Superior limbs	– standing with stretched forward;	T1-T4 – shearing arms; T5-T6 – arms extension, elbows bent with an arch; T7-T8 – extension arms stretched with an arch;	Twice
	– standing with your arms at your sides, legs apart;	T1-T4 –forward alternative arms rotations; T5-T8 – backwards alternative arms rotation;	Twice
	– same;	T1-T4 – forward simultaneous arms rotations ; T5-T8 – backwards simultaneous arms rotation;	Twice
Body Trunk	– standing with bent arms, hands on hips;	T1-T2 – trunk tilt to the right with an arch; T3-T4 – same to the left; T5-T6 – twisting trunk to the right	Twice

		with an arch; T7-T8 – same to the left.	
	– standing with your arms at your side;	T1-T2 – trunk flexion to 90 degrees, trunk extension arms with an arch; T3-T4 – trunk extension, trunk extension arms with an arch; T5-T6 – trunk flexion, heading the ground with the hands, with an arch; T7-T8 – same as in T3-T4;	Twice
	– standing with bent arms, hands on hips;	T1-T4 – basin spins to the right; T5-T8 – basin spins to the left;	Twice
Inferior limbs	– standing with your arms at your side;	T1-T2 - semilunge to the right, hands on hips ; T3-T4 –semilunge to the left, hands on hips; T4-T8 – same.	
	– standing with stretched forward;	Easy genuflexions until 90 degrees.	Five times
	– standing slightly apart;	Knee spins to the left and to the right; complete spin of the ankle; standing on the tiptoes.	Twice

Table no. 1 – Exercise for body warm-up

b) Easy, simple exercise performed in water:

1. Walking on tips.
2. Walking with lifting up a knee at 90 degrees.

c) Swimming program – weeks 1st-3rd imply patient familiarizing with the treatment program and the aquatic environment as following:

1. Aquatic breathing – the patient is trained to breathe correctly according to the phases of aquatic breathing (inspire, expire, apnea).
2. Float on the back.
3. Slide on the back.
4. Initiation in the Bras procedure – 2x10 meters.
5. Initiation in back Crawl procedure – 2x10 meters.

d) Respiratory gymnastics:

1. Return through slow, profound, inspire/expire walk.
2. Inspiring by carrying arms sideways an expiring return.
3. Expiring on the water surface provoking small waves.

In the 4th-6th weeks of treatment, the schedule of the sessions is adjusted under the following aspects: the distance accomplished by the patient is prolonged while swimming, reaching to 2x15 meters in back Crawl procedure and 2x15 meters in Bras procedure.

At the end of the program – weeks 7th – 8th, session less between 30-35 minutes, this period of time was being enough for the patient to swim twice each procedure, while swimming the length of the swimming pool – 2x25 meters.

Results analysis and interpretations

At the end of the hydrokinetotherapy, there were registered, in comparison with the normal values, the following changes:

	NORMAL VALUES	INITIAL VALUES	VALUES OBTAINED AFTER TREATMENT
BLOOD PRESURE	129/85 mmHg	142/89 mmHg	132/83 mmHg
HEART RATE	60-80 bpm (beats per minute)	100 bpm	85 bpm
RESPIRATORY RATE	16-18 bpm (breath per minute)	22 bpm	19-20 bpm

Table no. 2 – Comparison regarding normal values, initial values and the ones obtained after treatment.

The differences between the values that the patient has registered before starting hydrokinetotherapy program and the ones from the end of the treatment were significant and they can be, therefore, observed in the following diagram (Diagram no. 1). These changes to better are the most

appropriate tests for the patient with this type of pathology. Thus, the main propose of this paper has been accomplished.

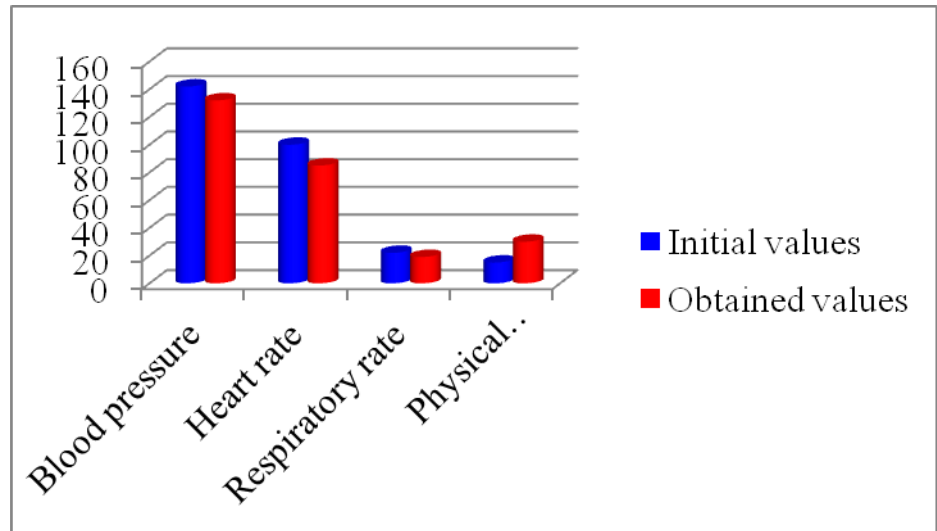


Diagram no. 1 – Comparison between the registered initial and final results

Conclusion

Due to the recovery program, the patient diagnosed with acute myocardial infarction, after he had the coronary stent implanted, enriched his life standard through hydrokinetotherapy as follows:

1. The period of physical activity (effort capacity) increased from 15 minutes/session to 30-35 minutes/session.
2. The blood pressure came back to normal from the initial value of 142/89 mmHg to 132/83 mmHG.
3. The heart rate modified from 100 bpm to 85 bpm.
4. The respiratory rate modified from 22 breaths per minute to 19-20 breaths per minute.
5. Mentally speaking, the patient became more optimistic, confident in his own forces and willing to reintegrate in the professional activity.

It is recommended in the future for the patient to practice physical activities and swimming as to prevent similar situations, to adopt a balanced diet and a healthy lifestyle. The health of the heart is mostly influenced by physical activity, so as it becomes indispensable to the enrichment of life quality in the given conditions.

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KINETOPROFILAXIE PRIN ÎNOT ÎN INFARCTUL MIOCARDIC

Cuvinte cheie: *kinetoterapie, înot terapeutic, infarct miocardic.*

Rezumat: Studiul a avut ca scop evidențierea rolului exercițiilor acvatice și înotului în ameliorarea consecințelor date de infarctul miocardic și îmbunătățirea calității vieții. Rezultatele programului de hidrokinetoterapie au avut în vedere recâștigarea unei părți cât mai mari din capacitatea fizică anterioară și reintegrarea cât mai rapidă în viața socială și profesională.