

UNIVERSITY OF MEDICINE AND PHARMACY OF CRAIOVA
DOCTORAL SCHOOL

**SECONDARY KINETO-PROPHYLAXIS IN APPROACHING
DYSLIPIDEMIA AND ITS IMPLICIT CARDIOVASCULAR
RISK**

SUMMARY

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CONTENTS

INTRODUCTION.....	3
CURRENT STATE OF KNOWLEDGE.....	5
1. Dyslipidemia – dual pathogen condition: disease and cardiovascular risk factor. Definitions and concepts.....	5
2. Dyslipidemia etiology and epidemiology.....	5
3. Dyslipidemia physiopathology.....	5
4. Screening, prophylaxis and treatment of dyslipidemia	5
5. Cardiovascular risk in dyslipidemia	5
6. Means of metabolic modulation via striated muscle fibre.....	6
PERSONAL CONTRIBUTIONS.....	6
7. Study premises and research objectives.....	6
8. Material and method.....	6
9. Results.....	7
10. Discussions.....	7
11. Conclusions.....	8
12. Bibliography	
13. Annexes	

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INTRODUCTION

As a result of perspective changes in etio-pathogenesis of cardiovascular diseases, there has been a growing interest in their primary prophylaxis by a complex targeted approach of risk factors. And, as dyslipidemia is seen as a major cardiovascular risk, we paid attention to it related to research and optimization of diagnosis and therapeutical management.

Most studies on dyslipidemia approached the role of hypolipemia medication in controlling the cardiovascular risk, by keeping plasmatic lipoproteins at low levels of target values settled by the present guides of cardiovascular prevention (NCEP-ATP III, European Society of Atherosclerosis, European Society of Cardiology). Statinotherapy, preferred as a major therapeutical intervention in selected cases with high cardiovascular risk, controls the dynamic LDL cholesterol but we cannot state the same regarding the balancing of HDL cholesterol. Patients with hypoHDL-emia, under treatment, keep having an increased risk for cardiovascular disorders. This finding draws the attention on the following aspects: 1. hypoHDL-emia is a major and independent risk factor thus justifying its recognition as a therapeutical objective by NCEP ATP III; 2. the modulation of HDL-cholesterol level implies the association of many pharmacological and non-pharmacological therapeutical means. Among non-pharmacological means, the physical exercise seems to achieve this goal, a fact proved by a great number of studies.

The aerobic effort practiced at average or high intensity has an efficient impact on lipidic profile. Recommendations for patients are not so varied related to the type of exercises. Frequently, physicians recommend walking or jogging, unsubstantial proposals by their approach without a plan or a concrete methodology of achievement.

Unfortunately, patients do not particularly enjoy this type of movement or at least there has not been yet found an ideal formula for their motivation. Other types of exercises have been researched lately to which patients could be more receptive, could show a great interest in training programs; these exercises could have a similar efficiency to aerobic exercise in improving dyslipidemia. Thus, the effect of yoga-type exercises or different „body-mind” movement techniques on lipids have been studied,

including Tai-Chi exercises implemented during a training session aiming at hypolipemia in the present study.

An other recent research deals with finding a balance between enjoying the physical exercises program and the certainty of a significant improvement in seric lipids. From this perspective, the assumption of interdisciplinary approach of dyslipidemic patients seemed interesting to me, without neglecting their psychic, cognitive, emotional, behavioral or social dimension. The information collected at these less evaluated levels could provide important data for planning a physical exercises program addressing to specific needs of patients. Hence, there was the idea of individualizing the prescription of physical exercises according to patients' needs, to their psychologic and behavioral profile, their physical potential and mainly with their cardiovascular fitness level. This is a fine tuning that has to be permanently watched aiming at optimizing the applied physical exercises program.

CURRENT STATE OF KNOWLEDGE

1. Dyslipidemia – dual pathogen condition: disease and cardiovascular risk factor. Definitions and concepts.

The first chapter of the work deals with notions of nosology and taxonomy related to dyslipidemia. Lipid fractions, plasmatic lipoproteins and their role in different body functions are presented. There are also the most used classifications of dyslipidemia according to different criteria.

2. Etiology and dyslipidemia epidemiology.

The way of life, materialized into the nutritional pattern specific to different geographical areas and into the physical activity diet educationally implemented to the individual, gives a large variability to lipid and sanguine lipoproteins concentration among population. This chapter tackles the distribution of different forms of dyslipidemia all over the country and abroad, as well as the main emergence causes of lipid metabolic imbalance.

3. Dyslipidemia physiopathology

From the physiopathological point of view, dyslipidemia appears as a consequence of a disorder at the level of lipid metabolism, materialized in the increase of lipoproteins synthesis and/or the decrease of their catabolism.

This chapter details the altered metabolic ways that generate the main physiopathological mechanisms implied in the emergence of dyslipidemia, within the context of intervention of some genetic or acquired risk factors.

4. Dyslipidemia screening, prophylaxia and treatment

Chapter 4 presents the screening recommendations in general population in order to find out the increased values of lipid parameters but, at the same time, approaches the ways of primary and secondary prophylaxia for dyslipidemia. It also largely deals with treatment, focusing on the non-pharmacological one.

5. Cardiovascular risk in dyslipidemia

Chapter 5 presents the contribution of each lipid parameter to cardiovascular risk. It describes new lipid fractions related to cardiovascular risk and means of

evaluating and stratifying it. It also presents the therapeutical objectives in dyslipidemia compared to cardiovascular risk.

6. Means of metabolic modulation via striated muscle fibre

Chapter 6 deals with data on energy-producing system of muscle contraction, the muscle metabolism or the features of muscle contractility during effort. It also approaches the influence of kinetic prophylaxia on lipid profile, the cellular levels of interaction physical exercise – lipid metabolism and the main hypolipaemia kinetic means.

PERSONAL CONTRIBUTIONS

7. Study premises and research objectives

The special section of the thesis presents a prospective longitudinal clinical study on 153 patients diagnosed with dyslipidemia of different levels of severity, randomized into 3 lots: two lots benefited from kinetic prophylaxia and one sample-lot, without kinetic program.

The main objectives of the study was represented by identifying and quantifying the differences related to the clinical, biological and functional impact of some physical exercises during two types of training, different as design, principle and action mechanism on lipid metabolism: one aerobic exercise, during long time intervals, with calisthenics exercises and one with Tai-Chi Chuan-type exercise. We aimed at defining the optimal parameters of therapeutical efficiency (intensity, duration, rhythmicity) that characterize the type of physical training for patients with dyslipidemia.

We also focused on the different approach of patients, according to the dominant way of individual sensory perception, considering somehow neglected the relationship therapist-patient.

8. Material and method

This chapter describes the exploration protocols, presenting the criteria for creating the study lots (eligibility criteria, the intended characteristics), the monitored parameters and the methodology for their determination, the

configuration and applying methodology for secondary kinetic prophylaxis programs as well as the concepts used to process statistically the collected data.

The two types of training were characterized according to effort parameters and their different theoretical principles were presented.

9. Results

This chapter presents lots characterization according to demographical, habitual, anthropometrical, biological, functional, moral and life quality parameters.

The share of patients in the three lots was as follows: 58 patients in the aerobic lot, 45 in Tai-Chi lot and 50 in sample lot, with a slight prevalence in women (52,29%) and age, 50-59 years old (33,99%). 77 patients (50,33%) started from an average level of weekly physical activity (according to IPAQ questionnaire) and the four types of sensory perception (visual, auditive, kinesthetic and interior dialogue) were balanced represented in each lot. Patients with average forms of hipercholesterolemia and mixed hiperlipidemia were predominant.

The results of kinetic prophylaxis on lipid profile were quantified by calculating the variations of total cholesterol values, of LDL cholesterol, of HDL cholesterol, of seric triglyceridemia and of some derived parameters, between the two moments of evaluation (initial and after 12 weeks).

10. Discussions

This chapter is dedicated to exhaustive discuss on the evolution of somatometric, biological, functional and life quality parameters, with differences between the three lots and multiple correlations between the anthropometric parameters and the biological and functional ones.

Predictably, some of the somatometric parameters evolved favourably: *body weight*, *BMI* (the evolution was better, like that for the body weight, for the lot with kinetic prophylaxis, the decrease recorded by the patients in the aerobic lot was 4,98%, for Tai-Chi lot was 3,95% and for sample lot was 2,04%), *abdominal circumference* (CA evolution for the 3 lots recorded the following: the best evolution was for the patients in aerobic lot where the

average CA value diminished with 3,88cm (4,36%); in Tai-Chi lot the decrease was of 3,96cm (4,34%), whereas for the sample lot the CA average value was of only 2cm), *body composition* (measuring the p Wilcoxon coefficient for the progressive average of body composition values regarding the percent of fat tissue identified highly significant values for aerobic and Tai-Chi lots ($p < 0,001$), and near the significance limit for sample lot; though the active mass increased differently in aerobic and Tai-Chi lots, recording a decrease of 540g in sample lot).

The results obtained for the parameters of lipid profile by aerobic and Tai-Chi trainings emphasize: a decrease in total seric cholesterol, statistically significant only for the aerobic lot, an increase in the average of HDL cholesterol values with about 8% (7,59% for the aerobic lot and 8,38% for Tai-Chi lot) with statistic significance for both types of effort; the sample lot presented a decrease of 1,05% for HDL-C average, a decrease in the average of LDL cholesterol values with 6,15% for the aerobic lot (a value statistically significant), 6,01% for Tai-Chi lot and 3,60% for sample lot, the diminution in the average of seric triglycerides level with 3,71% for the aerobic lot, 2,60% for Tai-Chi lot and 2,03% for sample lot (none of these values was statistically significant), the decrease, statistically insignificant, in non HDL cholesterol of 4,45% for the aerobic lot, 5,95 % for Tai-Chi lot and 3,59% for sample lot, the decrease in Castelli and Reaven values for the three lots but only in lots with kinetic prophylaxis the values were statistically significant, placing the respective patients into inferior classes of cardiovascular risk.

The results confirm the efficiency of kinetic prophylaxis in patients with dyslipidemia, both under the form of aerob training during long intervals, with callisthenic exercises and by practising Tai-Chi exercises.

11. Conclusions

The results of kinetic intervention in approaching the dyslipidaemic patients, stated in the previous chapters, confirm the efficiency of kinetic prophylaxis, both under the form of aerob training during long intervals, with callisthenic exercises and by practising Tai-Chi exercises.

A constant value of the study was represented by the alteration of anthropometric parameters, in both lots with kinetic prophylaxis, in direct or reverse correlation with the components of lipid profile, with the effort ability and RCV level. The proof of settled correlations could be used in self-monitoring and motivation of patients with dyslipidemia who can benefit from such a feedback of correcting the lipid parameters, maintained by somatic „reshaping”.

The comparative analysis of habitual and somatometric parameters and of sensory type allowed us to outline the profile of dyslipidaemic patient with adherence to aerobic training with callisthenic exercises and of that prone to Tai-Chi exercises. By signalling these associations proved in the present study, we consider that the recommendations for practicing physical exercises could be more concrete, orienting the patients, after the clinical, biological and functional evaluation, towards different types of effort.

If we get to know the predominant type of the dyslipidaemic patient's sensory perception we could get the key for modulating therapy and increased adherence to the programs of kinetic prophylaxis.

The unfavourable evolution of some biological, somatometric or functional parameters in the sample lot emphasizes the need for introducing kinetic prophylaxis in approaching the dyslipidaemic patient, as a major means to increase HDL-C, active mass and effort ability, either through a unique intervention, or through a therapeutical association (with diet, hypolipemia medication).

Both types of training proved their positive impact on the clinical, biological and functional status and on life quality of dyslipidaemic patients, allowing us to propose the following: to create a mixed program of callisthenic and Tai-Chi exercises that could interfere many etiopathogenic links of dyslipidemia; to individualize the programs of physical exercises recommended to the dyslipidaemic patient in accordance with physical fitness and perceptive-sensory profile, to implement the results of the present study in

the therapeutical program of these patients and to create some printed or video newsletters.