

THE DYNAMICS OF SOME LIPID METABOLISM'S INDICATORS AT PATIENTS WITH ARTERIAL HYPERTENSION MONITORED IN TOMESTI DISPENSARY DURING 2011 - 2013

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Abstract: The present study aims to follow up in dynamics the evolution of some lipid metabolism's parameters at patients suffering of arterial hypertension, monitored, during 2011 - 2013, in Tomesti Dispensary - Iasi County. The obtained results show the fact that, after the administered treatment, wasn't remarked a stalwart regression of biochemical index values at all analyzed subjects, the obviously situations in this sense being found in the case of the persons came from the rural environment, in strong connection, probably, with the defectuous and discontinuous administration of medication, the unhealthy food habit, eventually consumption of alcohol and the presence of some other affections associated to hypertension.

INTRODUCTION

The arterial hypertension is one of the most frequent diseases of modern civilization being a major and independent agent of risk for cardiovascular mortality, ischemic cardiac disease, cerebral vascular accident, congestive cardiac insufficiency and sudden death.

With all the epidemiologic dimension of arterial hypertension problem and of involvements for the population's health, the psychopathological mechanisms that are the base for increased arterial pressure development and of the apparition of intricacies still remain in shadow (*Lusis, 2000*).

The undertaken studies in the last years showed that smoking, obesity, stress, over drank coffee, hearty meals to the detriment of continuous alimentation, rational, constitute agents that lead to cardiovascular affections (*Mosca and Shaw, 2004*) as well as to the increasing of fat acids concentration in blood and, finally, to the increasing of lipoprotein secretion with very low density by the liver that implies the increasing of triacylglycerol concentration and cholesterol in circulation. The lipid metabolism's imbalances are closely related to another determinant agent, the obesity, endocrine syndrome that generates hypertriglyceridemia, hypercholesterolemia, the LDL increasing and the HDL decreasing (*Cicccone et al., 2001*), diabetes mellitus type 2, hyperuricemia, cardiovascular, digestive, renal, articular and respiratory disturbances (*Glodeanu, 2011*).

Given the extremely harmful effect of arterial hypertension on human organism, is extremely important the identification and the application of some efficient therapeutic strategy through finding some predictive markers that contribute substantially to reduce the number of hypertensive patients fresh diagnosed which are, presently, on an ascendand scale. Hence, the aim of this study was to monitor the variation of some lipid metabolism's index, within three years, at patients diagnosed with arterial hypertension, booked on the lists of family doctor from Tomesti Dispensary.

MATERIAL AND METHODS

The present study was realized, during 2011 - 2013, on a swatch of 100 subjects, diagnosed with arterial hypertension, from the total of 239, that were in the evidence of Tomesti Dispensary in this period and have done periodically the medical analyses, thereby, representing a favorable criterion to take in consideration for the statistic analyze proposed. These ones were divided on six age categories, but also in function of sex and of their background, following up, in dynamics, the cholesterolemia and trigliceridemia evolution under the influence of antihypertensive treatment, antihyperlipemiant and diuretic applied.

Given the fact that, the arterial hypertension is associated with disturbances of lipid metabolism, were taken into analyze a series of this one's index namely the total cholesterol, the LDL- and HDL- cholesterol as well as triglycerides, these ones dosage being done with the Hitachi 912 ISE automatic analyzer.

RESULTS AND DISCUSSION

It is known the fact that the biochemical index vary in function of different agents as the age, the sexes, the origin environment, the presence of some diseases associated to arterial

hypertension (HTA) and the eventually medicinal treatment administered, the latter having a stalwart and directly influence on the analyzed markers (*Popa, 2014*), reason for what it was applied to their monitorisation within three years.

Given the fact that for all majority of investigated patients is prescribed, largely, the same type of treatment (antihypertensive for arterial tension adjustment, antilipemiantes for decreasing the lipid's values from blood and diuretics like an adjuvant of antihypertensive treatment), our study was realized in function of age, sexes and origin environment.

To remember that the effect of treatments on arterial tension values installs oneself absolutely in a few weeks, the treatment having to be, generally, one individualized and on long term, this ones cutoff being usually followed by a come-back of arterial tension values at previous levels' administration, or even to a suddenly major overflow of initial registered value.

From the total of investigated patients with arterial hypertension and periodically investigated in within the lab, 56% represent the female sexes and 44% the male one.

As we can see from the graphic representation (Fig. 1a), if at the women came from the urban environment, framed in 41-50 years old category, the medium value of cholesterol is situated, both in 2011 (180 mg/dL) and in 2012 (195 mg/dL), towards the maximum ordinary level, at 51-60 and 61-70 years old category cholesterolemia is high, the medium maximum value registering in 2011 (257 mg/dL at 61-70 years old category). In return, at the male patients came from urban environment, the medium value of this index of lipid metabolism registered values between 155 mg/dL at 61-70 years old category and 245 mg/dL at 81-90 years old category, both situations being remarked within the periodical medical analyses made during 2013 (Fig. 1c).

At the women came from the rural environment, the cholesterolemia is situated, generally, besides the ordinary- physiologic interval, the medium values oscillating between 203 mg/dL at 41-50 years old category, in 2011 and 231 mg/dL at 81-90 years old category in 2012 (Fig. 1a-b). In the case of male patients, it is seen a different evolution of cholesterolemia based on age, on the one hand, but also the period when were realized the medical researches. Thus, if at 41-50, 61-70 and 71-80 years old category it is remarked a diminution of cholesterol's concentration in blood, towards the end of the monitoring period, at 31-40 years old and 51-60 years old categories takes place a development of its level (from 201 to 266 mg/dL, respectively, from 221 to 234 mg/dL), probably due to the fact that, the patients came from the country don't really respect the prescribed medication, and so much the less, an adequate alimentation, for the evaluation of global risk of the hypertensive patient having to consider the level of arterial tension, the degree of target organ affectation and the agents of associated cardiovascular risk, the global risk influencing the precocity of treatment's institution and its aggressivity.

It has to be mentioned the fact that the number of patients monitored constantly during the three years taken into study and that came from the rural environment is largely significant than that of those subjects from urban environment, due to, probably, the their predisposition higher at the apparition of HTA, strongly connected with their system of life (*Denke and Grundy, 1999*).

Furthermore, data from the specialty literature (*Liu et al., 2010*) concerning the dyslipidemia syndrome associated with arterial hypertension and its implications on the Beijing town population, underlines that the prevalence of dyslipidemia is high and increases more and more, especially among the youngsters (*Caprnda et al., 2008*). Thus, was ascertained the fact that the patients that presented dislipidemias recently installed were from the category of those relatively young generation, that were taken part of, eventually, from a professional group, that

weren't using at all or were using irregularly the breakfast, that were doing lower physical activities and were having the habit to smoke.

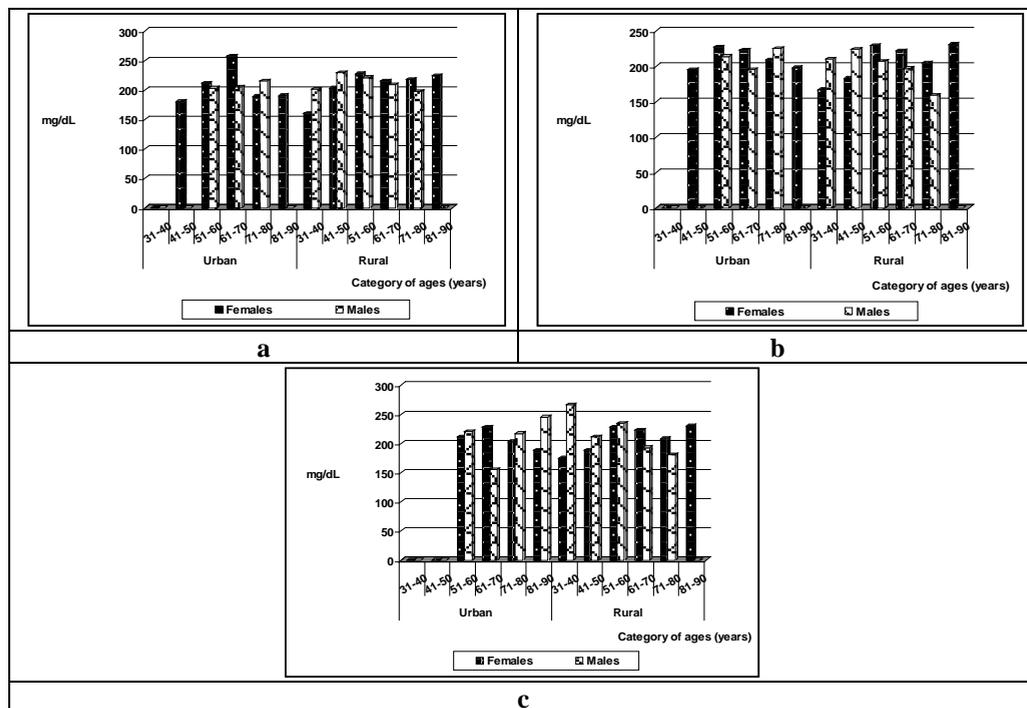


Fig. 1. Annuals mean values of cholesterol in patients with HTA (a - 2011; b - 2012; c - 2013)

In the blood collected in the morning, after a 8-10 hours of alimentary pause, the LDL-cholesterol content represent approximately 70% from the total plasmatic cholesterol (*Dinu, 1998*), being engaged into the cholesterol's transportation towards the tissues, especially in arterial system, fact that explains the increased incidence of arteriosclerosis and of coronary diseases at patients with high seric levels of this lipoprotein, the determination of this parameter being specific to the estimation of cardiovascular risk and the establishment of therapeutic decision (*Mac Mahon, 1989; Fischbach, 2004*).

At the women from urban environment, at 71-80 and, respectively 81-90 years old categories LDL-cholesterol is situated under the maximum value of the reference interval (<100 mg/dL), varying between 71 mg/dL (in 2011) and 90 mg/dL (in 2012 - 2013), respectively 55 mg/dL (in 2011) and 70 mg/dL (in 2013), while, at the younger persons is registered medium values more higher comparatively with the physiologic value. Thus, at 61-70 years old category, LDL-cholesterol oscillates around the 146 mg/dL value, and at the 41-50 years old category the level of this lipid index is more that the double of the maximum allowed value – 205 mg/dL in 2011 (Fig. 2a).

Unlike the female, the male from urban environment, LDL-cholesterol is maintained in physiologic limits, excepting the 61-70 years old category, in the case of analyses made in 2012

(Fig. 2b) and 2013 (Fig.2c), not even in this situation the deviation from the normal being insignificant (106 mg/dL).

Similar to total cholesterol, at patients from rural environment, the medium annual values of LDL-cholesterol are higher, with a special mention for the persons between 51-70 years old, both for women (111 - 130 mg/dL), as well for men (109 -134 mg/dL).

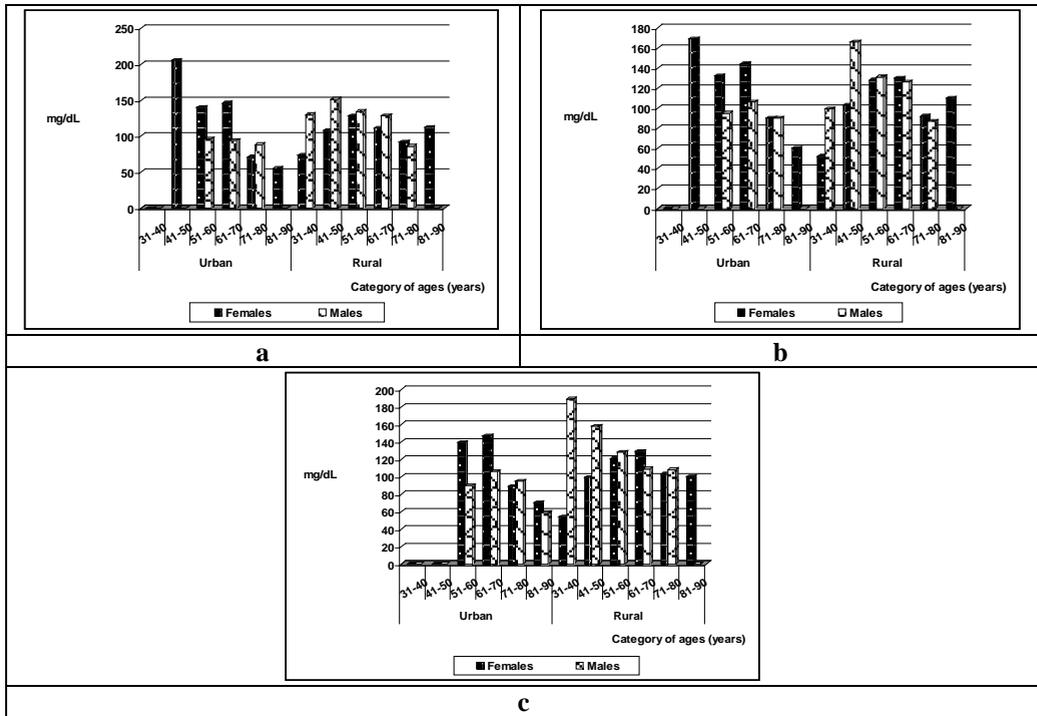


Fig. 2. Annuals mean values of LDL-cholesterol in patients with HTA (a - 2011; b - 2012; c - 2013)

In parallel with LDL-cholesterol dosage, it was applied to the determination of annual medium values of HDL –cholesterol, that represent a risk agent for all the patients, obese or non-obese, being a trustier marker than the fraction with lower density in prediction of cardiovascular complication (*Ajossa et al., 2004*). HDL-cholesterol implies a lower risk in the heart disease’s apparition being present in higher concentration at women (45-65 mg/dL) that at men (35-55 mg/dL).

At the female patients, monitored in Tomesti Dispensary, is ascertained ordinary-physiologic levels of this index (Fig. 3a-c), during all the investigation period, exceptions being the subjects came from the rural environment with ages between 81-90 years old, at who the medium concentration is between 77 mg/dL (2013) and 84 mg/dL (2011). The male patients, no matter their origin place, don’t make their self-conspicuous through annual medium values framed outside the reference interval, excepting the 71-80 years old category (urban environment) with a mean of HDL-cholesterol of 63 mg/dL in the year 2011 (Fig. 3a) in which is

ascertained a considerably diminution after the treatment applied (up to 47 mg/dL in 2013 - Fig.3c).

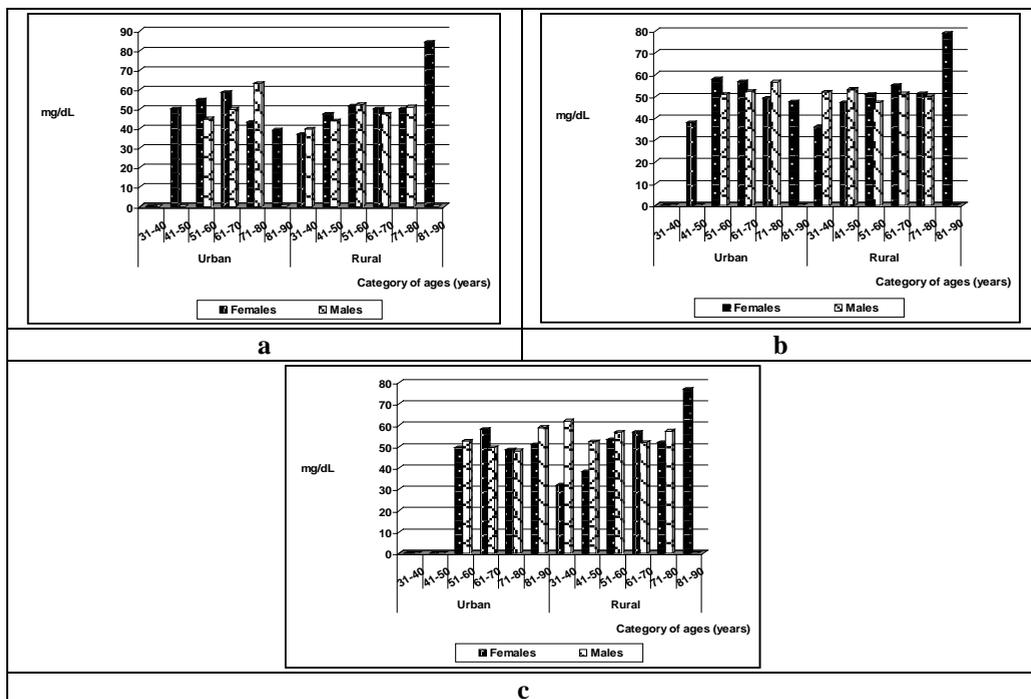


Fig. 3. Annuals mean values of HDL-cholesterol in patients with HTA (a - 2011; b - 2012; c - 2013)

Triglycerides are an important source of energy (*Roșoiu and Șerban, 2005; Roșoiu and Verman, 2008*), requiring the inclusion in lipoprotein to get up to the tissues and organs. At relatively bigger concentrations, along with other types of lipid can represent a risk agent for arteriosclerosis (*Mureșan, 2004*), the estimation of atherogen risk at the present necessitating to know the level of triglycerides, total cholesterol, as well as of HDL/LDL rapport and total cholesterol/HDL-cholesterol (*Johnson et al., 1997; Grover et al., 2003; Ahmadi et al., 2008*). Also, the risk to develop cardiac coronaries diseases is high at the patients with high levels of triglycerides and which present genetic mutations that influence the structure and the HDL-cholesterol's synthesis and the triglycerides' increasing (*Thuren, 2000*).

The same thing is also sustained by *Sharrett et al., 2001* și *Sarwar et al., 2007* who underline that, in addition to LDL-cholesterol, both HDL-cholesterol and the high triglycerides are more and more recognized as independents risk agents for atherosclerosis (*Brown and Goldstein, 1984; Popa, 2014*), diabetes mellitus (*Haffner, 1998; Turner et al., 1998; Serrano and Martinez, 2003*), the coronary disease (Gordon and Kannel, 1982 citat de *Wilson et al., 1998*), the dyslipidemia being one of the main cause of decease and cardiovascular morbidity in the western countries (*Abello et al., 2008*), the arterial hypertension representing an important agent which is associated to all these affections.

Furthermore, there are numerous epidemiological studies in which there is demonstrated the relation HTA-obesity, HTA-thyroidian affections, HTA-atherosclerosis and HTA-diabetes mellitus (*Cappola and Ladenson, 2003; Kawashima and Yokoyama, 2004; Kaplan, 2001*).

For the patients came from the urban environment, the situation concerning the triglyceridemia’s level differs based on age, but mostly, based on sexes. Thus, if at males the concentration of triglycerides presents annual medium values framed in the ordinary interval (<150 mg/dL), at women, exception making the categories of 71-80 and 81-90 years old, at all the other patients, the values jump over the maximum ordinary-physiologic limit (164 mg/dL at the 61-70 years old category, in 2013 - Fig.4c and 217 mg/dL at 41 - 50 years old, in 2011 - Fig.4a).

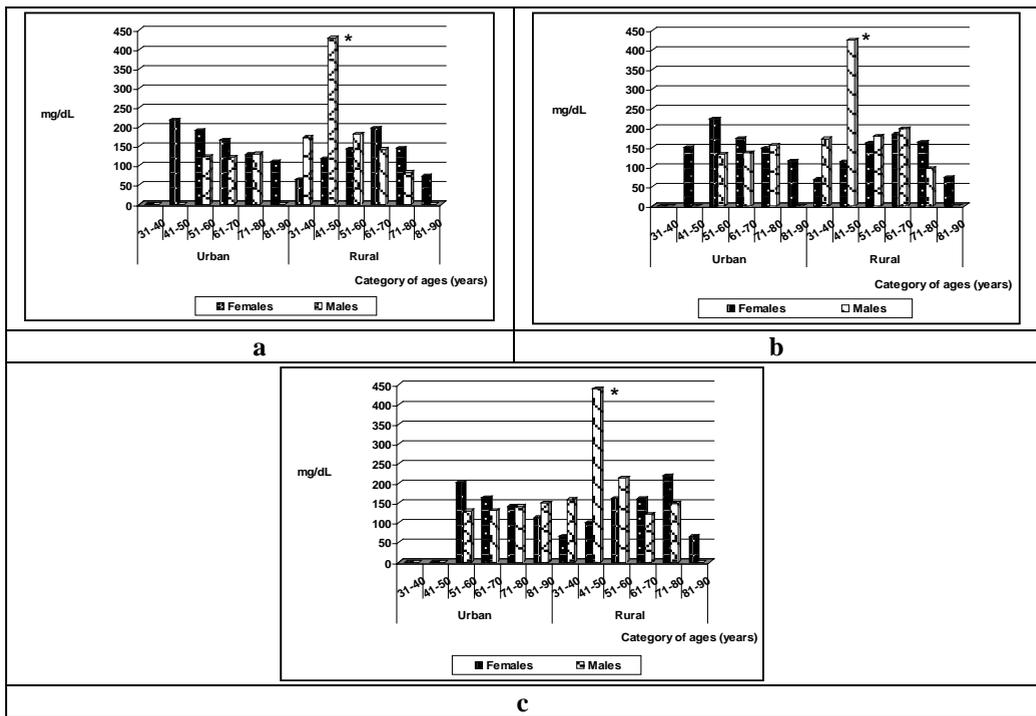


Fig. 4. Annuals mean values of triglycerides in patients with HTA (a - 2011; b - 2012; c - 2013)

At the subjects from the rural environment the situation is more critical, due, probably, to a discontinuous medical treatment, to the presence of some associated diseases more severe and to a deficiatary diet, at women triglyceridemia varying, in 2013, between 161 mg/dL at 61-70 years old category and 219 mg/dL at 71-80 years old category, while, at men, the younger are the most affected (159 - 172 mg/dL at 31-40 years old category, 179 - 214 mg/dL at 51-60 years old category and 425 - 440 mg/dL at 41-50 years old category). The extremely high level of triglyceridemia at 41-50 years old category is due to the fact that one of the patients of this category namely a man of 48 years old, presented, repeatedly, values up to 956.48 mg/dL triglycerides, value that overtake much the maximum level allowed for what means in medical

terminology „the increased risk” (between 200 - 500 mg/dL). Data from the specialty literature underlines the fact that hypertriglyceridemia determines an increase of hepatic lipase’s activity, followed by a denaturation of HDL-cholesterol, each degradation of 1mg HDL-cholesterol having like a consequence an increase with 2% of coronary disease’s risk (*Njajou et al., 2009; Libby, 2002*).

CONCLUSIONS

The analyze in dynamics, of lipid metabolism index values (cholesterol, LDL- and HDL- cholesterol, respectively triglycerides) at patients diagnosed with arterial hypertension whose treatment was monitored in Tomesti Dispensary, during 2011 - 2013, underlines the fact that not at all age categories was remarked a decreasing trend of seric lipid concentrations in close connection with, probably, a system of life disorganized, the unrespectation of prescribed therapeutic scheme, the presence of some associated affections, the level of stress and the physical effort inappropriate.

Thus, it is necessary, a stratification of the patients on risk groups to establish the moment of therapy beginning and of the treatment’s intensity, but also the impose of some unpharmacologically (stop smoking, reducing of body weight, reducing the salt consume, reducing the alcohol consume, a balanced diet, the physical dynamic effort, reducing the stress), compulsory for each hypertensive sick, including for those who need medical treatment.

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