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The risk of atherosclerosis in children with encumbered family history

Ryzyko wystąpienia miażdżycy u dzieci z obciążonym wywiadem rodzinnym

INTRODUCTION

Medicine concentrates more and more on, so called, civilisation diseases which are caused, among other things, by reduced physical activity, inappropriate diet, the influence of stressing factors and the environmental pollution. Atherosclerosis, being a civilisation metabolic disease, is a serious social problem. Early prophylactics of atherosclerosis requires an early detection of risk factors. The prognostic factors for cardiac ischaemia development are the following: hypercholesterolemia and lipid metabolism disorders, hypertension, diabetes, obesity, tobacco smoking, insufficient physical activity, sex (males are favoured), genetic factors [1, 3, 5, 6, 10, 11].

Recently a relationship between the risk factors of cardiovascular diseases and the size of atherosclerosis in youth and in adults has been confirmed [1, 12].

The increased level of lipids in the blood serum, hypertension and obesity are correlated positively with the degree of atherosclerosis development [1, 8].

When analysing the atherosclerosis risk factors characteristic for adults, it can be noticed that the group predisposed for early development of atherosclerosis includes obese children. Obesity in children often goes hand in hand with the encumbered family history (cardiac infarction, coronary disease, stroke, obesity, diabetes, and hypertension). The aim of the study was to evaluate the atherosclerosis risk factors occurrence in children with simple obesity and the encumbered family history.

MATERIAL AND METHODS

The study included 32 children (16 girls and 16 boys) aged 8–14 years, with simple obesity. In all of the patients anthropometric measurements were taken and they comprised body weight, height and skin-fold thickness.

For the evaluation of fat metabolism in venous blood serum the triglicerides concentration was assayed with enzymatic method with application of reagents from Behringer–Mannheim Company. Total and HDL cholesterol concentration were determined with application of colorimetric method.

The concentration of LDL and VLDL cholesterol was calculated by means of generally accepted formula given by Rifkind and Friedwald.

The obtained results were statistically analysed and compared with earlier developed standards for individual age groups and with relation to sex [9].

RESULTS

The results are presented in Table 1. When analysing the values of triglicerides concentration, total cholesterol and its fraction in blood serum as compared to the control group and on the basis of the taken family history, 7 risk factors of atherosclerosis in children with simple obesity and encumbered family history were established:

1. Obesity among the family members
2. Circulatory system diseases of the parents and among the closest family members
3. The increased total cholesterol level in blood serum
4. The increased level of LDL cholesterol (atherogenic fraction)
5. The increased level of VLDL cholesterol (atherogenic fraction)
6. The reduced level of HDL cholesterol (protective fraction)
7. The increased level of triglicerides in blood serum

In all of the studied children with simple obesity the body weight to height ratio was evaluated with relation to the number of atherosclerosis risk factors [13].

DISCUSSION

The study confirmed that 1/3 of the studied children with simple obesity and the presence of cardiac ischaemia factor in the family are exposed to 5 and more atherosclerosis risk factors.

Obesity in the close relatives was confirmed in 100% of the studied children; the circulatory system diseases of parents and the closest relatives were noticed in 90.6%. In 75% of the studied children the increased total cholesterol was confirmed and in 62.5% children there was an increased level of LDL cholesterol. In 43.7% — the increased level of VLDL cholesterol (atherogenic fractions). However in 37.5% of the studied subjects a reduced level of HDL cholesterol (protective fraction) was confirmed. In 47% of the children the increased triglicerides level was observed.

Table I. Concentration of total cholesterol, cholesterol HDL, LDL and VLDL and of triglicerides in obese children (mg%)

	Sex	Group	Number	M (G)	SD	Mean differences	t	P
Total cholesterol	Boys	Control group	341	150.31	29.00	+35.19	4.76	<0.001
		Study group	16	185.58	26.30			
	Girls	Control group	210	160.30	28.23	−1.93	0.29	>0.70
		Study group	16	158.51	23.20			
HDL-cholesterol	Boys	Control group	228	52.51	10.44	+10.83	3.90	<0.001
		Study group	16	64.97	11.99			
	Girls	Control group	210	54.52	9.67	−0.39	0.05	>0.90
		Study group	16	54.33	12.76			
LDL-cholesterol	Boys	Control group	228	77.26	29.39	+24.36	3.21	<0.01
		Study group	16	101.70	31.32			
	Girls	Control group	359	86.95	27.84	+1.93	0.26	>0.70
		Study group	16	87.94	20.88			
VLDL-cholesterol	Boys	Control group	228	18.37	18.56	−1.55	0.52	>0.60
		Study group	16	16.82	25.91			
	Girls	Control group	210	17.56	17.40	−1.55	0.74	>0.40
		Study group	16	16.09	16.24			
Triglicerides	Boys	Control group	228	91.08	41.99	−7.00	0.48	>0.60
		Study group	16	84.00	58.61			
	Girls	Control group	210	87.84	39.37	−7.87	0.84	>0.35
		Study group	16	80.14	36.75			

CONCLUSIONS

The obtained results indicate that atherosclerosis prophylactics should be realised from the very early childhood. Atherosclerotic process may be delayed by adequate diet, change of habits having been developed since the childhood and physical exercises. Periodical medical tests are also recommended as well as the screening tests for cholesterol level and its fractions in blood serum in obese children, particularly in the increased risk groups.

High frequency of occurrence and coexistence of several atherosclerosis risk factors in children with encumbered family history with cardiac ischaemia justify inclusion of these children in the programme of primary prevention.

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STRESZCZENIE

Medycyna coraz więcej uwagi poświęca tzw. chorobom cywilizacyjnym, które spowodowane są m.in. zmniejszoną aktywnością fizyczną, niewłaściwym odżywianiem się, działaniem czynników stresowych i zanieczyszczeniem środowiska. Miażdżyca naczyń zaliczana do metabolicznych chorób cywilizacyjnych stanowi poważny problem społeczny. Wczesna profilaktyka miażdżycy wymaga wczesnego wykrycia czynników ryzyka. Analizując listę czynników ryzyka miażdżycy ustalonych dla osób dorosłych, okazuje się, że grupą predysponowaną do wczesnego rozwoju miażdżycy mogą być dzieci otyłe. Badania epidemiologiczne potwierdzają, że duże znaczenie mają czynniki genetyczne i środowiskowe. Otyłości u dzieci towarzyszy często obciążony wywiad rodzinny (zawał, choroba wieńcowa, wylew krwi do mózgu, otyłość, cukrzyca, nadciśnienie). Celem pracy była ocena występowania czynników ryzyka miażdżycy u dzieci z otyłością prostą oraz obciążonym wywiadem rodzinnym. Badaniami objęto 32 dzieci w wieku od 8–14 lat z otyłością prosta. U wszystkich badanych przeprowadzono pomiary antropometryczne, które obejmowały pomiar masy ciała, wysokości oraz grubości fałdów skórno–tłuszczowych. Celem oceny gospodarki tłuszczowej oznaczono w surowicy krwi cholesterol całkowity i jego frakcje (chol–HDL, LDL i VLDL) oraz trójglicerydy. W wyniku przeprowadzonych badań oraz na podstawie zebranego wywiadu rodzinnego ustalono 7 czynników ryzyka wystąpienia miażdżycy u dzieci z otyłością prostą. Stwierdzono, że 1/3 badanych dzieci posiada 5 lub więcej czynników zachorowania na miażdżycę. Uzyskane wyniki potwierdzają, że profilaktyka miażdżycy powinna być prowadzona od najmłodszych lat życia dziecka. Proces miażdżycy może być opóźniony przez odpowiednie postępowanie dietetyczne, zmianę nawyków, kształtowanych od wczesnego dzieciństwa oraz prowadzenie aktywnych ćwiczeń fizycznych. Wskazane są także okresowe badania lekarskie oraz wprowadzenie na szerszą skalę przesiewowych badań poziomu cholesterolu i jego frakcji w surowicy krwi u dzieci otyłością, a zwłaszcza w grupach zwiększonego ryzyka.