

POSTPRANDIAL HYPERGLYCEMIA IN THE PREVENTION OF VASCULAR COMPLICATIONS IN CHILDREN WITH TYPE 1 DIABETES MELLITUS

The main sign of diabetes mellitus is a chronic hyperglycemia and lipid metabolism abnormality. Diabetes mellitus is a risk factor for of cardiovascular complications caused by diabetes mellitus as well. The information concerning these disorders in type 1 diabetes mellitus, particularly in children, is inconsiderable in number and is contradictory.

The purpose of the research is to study the state of fat exchange and the possibility of its correction in children with type 1 diabetes mellitus.

The author observed 61 children and adolescents of the age of 3 to 17 with the same type 1 diabetes mellitus, but with different duration of the disease. The duration of observation lasted for 12 weeks. All the patients and their parents were trained to plan a diet. Special attention was paid to food containing a large amount of dietary fibers. Monitoring the adequacy of the ongoing insulin therapy was carried out by assessing the status and well-being of patients, as well as the determination of glycemia at seven time points. The content of VLDL, LDL, HDL, VLDC, LDC, HDC, Chol, SHC, and NEFA in serum was determined in the dynamics. The results of the study showed that prescription of ultra-short insulin preparations to children with type 1 diabetes mellitus contributed to a significant improvement of metabolism, which demonstrated not only a reduction in glycemia level, but also favourable changes in a blood lipid profile.

Keywords: diabetes mellitus, hyperglycemia, lipid metabolism, short-acting insulin preparations, dietary fibers, carbohydrate metabolism, coefficient of atherogenics, blood lipid profile.

Background. As is known, the main sign of diabetes mellitus (DM) is a chronic hyperglycemia. Diabetes mellitus is a risk factor for of cardiovascular complications caused by diabetes mellitus as well [1]. For the formation of the latter, in addition to hyperglycemia, lipid metabolism abnormality is of central importance. [1,2]. In the references there is a lot of data on changes in lipid metabolism in type 2 DM [1,3]. The information concerning these disorders in type 1 diabetes mellitus, particularly in children, is inconsiderable in number and is contradictory [4].

Purpose of the study. The purpose of the research is to study the state of fat exchange and the possibility of its correction in children with type 1 diabetes mellitus.

Material and methods. We have observed 61 children and adolescents of the age of 3 to 17 with the same type 1 diabetes mellitus, but with different duration of the disease. All the children received an intensified insulin therapy (IIT) prior to the study. The average daily dose of insulin was 0.75 ± 0.25 unit/kg. All the patients and their parents were trained to plan a diet. Special attention was paid to food containing a

large amount of dietary fibers, as sources of carbohydrates; however, refined carbohydrates were excluded from the diet.

Monitoring the adequacy of the ongoing insulin therapy was carried out by assessing the status and well-being of patients, as well as the determination of glycemia at seven time points: before all meals, after 2 hours after the meals, and at 3 o'clock in the morning.

In addition, the content of VLDL, LDL, HDL, VLDC, LDC, HDC, Chol, SHC, and NEFA in serum was determined in the dynamics (at the beginning and at the end of the study). The duration of observation lasted for 12 weeks. The coefficient of atherogenics (CA) was calculated according to the formula: $CA = (Chol-HDC)/LDC$. For evaluation of the effectiveness of the conducted therapy some criteria of compensation for diabetes mellitus in children, recommended by the St Vincent Declaration, [5] were used. According to the Declaration a terminal therapy objective for children with type 1 diabetes is to achieve glycemia on the empty stomach of at least 7.0 mmol/l, and less than 10 mmol/l after 2 hours after a meal.

Table 1 - Dynamics of glycemia levels in children with type 1 diabetes mellitus, treated with ultra-short acting insulin

	before breakfast	after 2 hours after a meal	before dinner	after 2 hours after a meal	before supper	after 2 hours after a meal	at 3a.m
Before the prescription of ultra-short acting insulin	11.08±2.1	11.02±2.04	9.60±1.25	13.19±1.80	11.41±0.91	10.68±0.75	10.92±1.12
After a month	7.30±0.08	8.61±1.13	6.50±1.59	6.40±0.90	8.20±1.00	8.15±0.84	5.47±0.51
P₁	>0.05	>0.05	>0.05	<0.05	>0.05	>0.05	<0.05
After 2 months	7.91±1.06	6.70±0.83	5.72±0.54	6.80±0.35	4.70±0.34	5.40±0.35	
P₂	>0.05	>0.05	<0.05	<0.05	<0.05	<0.05	
After 3 months	7.10±1.09	8.30±1.02	3.51±0.28	4.70±0.31	4.72±0.38	4.72±0.40	5.41±0.32
P₃	>0.05	>0.05	<0.01	<0.05	<0.05	<0.05	<0.05

Note:

P₁ – reliability of differences in glycemia figures in a month by contrast with the input data;

P₂ – reliability of differences in glycemia figures in 2 months by contrast with the input data;

P₃ – reliability of differences in glycemia figures in 3 months by contrast with the input data;

Table 2 - Dynamics of lipid exchange in children with type 1 diabetes mellitus, treated with ultra-short acting insulin

Indicators	Input values	After 3 months of treatment	P	Changes in indicators, %
VLDL, mg/dl	600.58±84.20	290.20±93.64	<0.01	54.1

LDL, mg/dl	691.74±69.29	512.41±42.10	<0.05	35.2
HDL, mg/dl	138.70±12.76	154.38±23.65	<0.05	12.5
VLDL, mmol/l	0.23±0.08	0.13±0.05	<0.05	77.1
LDC, mmol/l	2.11±0.29	1.95±0.14	<0.05	6.7
HDC, mmol/l	0.87±0.12	1.20±0.10	<0.05	30.1
Chol, mmol/l	3.19±0.22	3.26±0.15	<0.05	0.8
SHC, mmol/l	0.86±0.31	0.53±0.12	<0.05	61.7
NEFA, mmol/l	1.08±0.20	0.65±0.09	<0.01	68.9
CA	3.90±0.71	2.92±0.57	<0.05	33.1

Results and Discussion. As it is shown in Table 1, in advance of taking the ultra-short preparations of insulin the glycemia levels before meals matched with decompensation of diabetes mellitus. Levels of glycemia after 2 hours after breakfast and supper were quite acceptable, and only after 2 hours after dinner the content of glucose in the blood exceeded a tolerance level up to 3.20 mmol/l. 3 months of transfer to ultra-insulin preparations resulted in a decrease in glycemia level after breakfast to 8.0 mmol/l and to its normal level after 2 hours after dinner and supper. Due to simultaneous measurement of an insulin dose the prolonged normoglycemia at night and a quite reasonable average number of glucose blood levels on an empty stomach were achieved.

The improvement of carbohydrate metabolism was accompanied

by a significant decrease in blood atherogenic lipid fractions (Table 2). Thus, the level of VLDL was decreased by 2.3, LDL by 1.3, LDC by 1.9, NEFA by 1.8 times. The Level of HDC ($P < 0.05$) was significantly increased. There was a trend to decrease in CA.

Conclusions.

1. Improvement of metabolic processes in the prescription of ultra-short insulin preparations demonstrates not only a reduction in glycemia level, but also favourable changes in a blood lipid profile.

2. Prescription of ultra-short insulin preparations to children with type 1 diabetes mellitus contributes to a significant improvement of metabolism.

REFERENCE

1. S.G. Kozlov, A.A. Lyakishev, Treatment of ischemic heart disease in patients with type 2 diabetes. RMJ (11). 2003. - №9. - P.53-56.
2. Y.A. Chernyshev, L.A. Krivtsov, Dyslipidemia in the genesis of diabetic heart disease in children. Second Russian Congress of Diabetes: "Diabetes mellitus and cardiovascular complications" Abstracts. M.: 2002. – P. 282-283.
3. V.A. Aliyev, Features of lipid metabolism in patients with diabetes mellitus. Second Russian Congress of Diabetes: "Diabetes and cardiovascular complications." Abstracts. M.: 2002. - 90 p.
4. L.L. Vakhrusheva, Y. Knyazev, T. Turkin, Dyslipidemia in diabetes mellitus in children and their correction. Second Russian Congress of Diabetes: "Diabetes and cardiovascular complications." Abstracts. M.: - 2002. – 264 p.
5. S. Franc, D.K. Van, B.L. Joost St Vincent Declaration and its importance in general practice. Diabetography. 1998. - P. 7-10.

Н.Н. БЕКЕНОВ, П.Е. КАЛМЕНОВА, А. Ж. ДУЙСЕНБАЕВА.

*Международный Казахско-Турецкий университет им. Ходжа Ахмеда Яссави,
Шымкентский медицинский институт, г. Шымкент
Казахский Национальный Медицинский университет им. С.Д. Асфендиярова*

ПОСТПРАНДИАЛЬНАЯ ГИПЕРГЛИКЕМИЯ В ПРОФИЛАКТИКЕ СОСУДИСТЫХ ОСЛОЖНЕНИЙ ПРИ САХАРНОМ ДИАБЕТЕ 1 ТИПА У ДЕТЕЙ

Резюме: Известно, что одним из главных признаков сахарного диабета (СД) является хроническая гипергликемия. Сахарный диабет также является одним из факторов риска развития для диабета специфических сердечно-сосудистых осложнений. В формировании которых, помимо гипергликемии, придается огромное значение нарушениям липидного обмена. Сведения, касающиеся подобных нарушений при сахарном диабете 1 типа, в особенности у детей, противоречивы немногочисленны.

Изучение состояния жирового обмена и его коррекции у детей при сахарном диабете 1 типа.

Под нашим наблюдением было 61 детей и подростков, больных СД 1 типа в возрасте от 3 до 17 лет. Все больные и их родители были обучены планированию питания. При этом особое внимание уделялось тому, чтобы источниками углеводов были продукты, содержащие большое количество пищевых волокон (клетчатки), рафинированные углеводы исключались из рациона. Улучшение состояния углеводного обмена сопровождалось достоверным снижением содержания в крови атерогенных фракций липидов. Так, уровень ЛПОНП, ЛПНП, ХНП, НЭЖК снизились, а уровень ХВП повысился. Отмечена тенденция к снижению КА. Улучшение обменных процессов при назначении ультракоротких препаратов инсулина проявляется не только снижением показателей гликемии, но и благоприятными сдвигами в липидном спектре крови. Назначение детям, больным СД 1 типа, ультракоротких препаратов инсулина способствует значительному улучшению метаболизма.

Ключевые слова: сахарный диабет, гипергликемия, липидный обмен, метаболизм, инсулин.

А.Ж. ДУЙСЕНБАЕВА, Н.Н. БЕКЕНОВ., П.Е. КАЛМЕНОВА

*Қоджа Ахмед Яссауи атындағы Халықаралық Қазақ-Түрік университеті
Шымкент қ., Шымкенттік Медицина институті
С.Ж. Асфендияров атындағы Қазақ Ұлттық Медицина университеті*

БАЛАЛАРДАҒЫ ҚАНТТЫ ДИАБЕТ КЕЗІНДЕГІ, ПОСТПРАНДИАЛЬДІ ГИПЕРГЛИКЕМИЯ ҚАНТАМЫРЛАРДАҒЫ АСҚЫНУЛАРДЫҢ АЛДЫН АЛУ ШАРАЛАРЫ

Түйін: Белгілі, қантты диабеттің негізгі белгілерінің бірі созылмалы гипергликемия болып табылады. Сонымен қатар, қантты диабеттің дамуының факторлары, арнайы жүрек қантамырларының асқынулары болып табылады. Оның түзілуіне гипергликемиядан басқа липидтік

алмасудың бұзылуына арасан зор назар аударылуда. Мәлімет бойынша 1-типті қантты диабет кезінде мұндай бұзылулар әсіресе балаларда көптеген қарама қайшылықтар тудырып отыр. 1-типті қантты диабет кезінде май алмасулар жағдайлары және балалардағы оның коррекциясын оқып зерттеу болып табылады.

61 бала және жасөспірімдер және де 3 жастан 17 жас аралығындағы қантты диабеттің 1-типімен ауыратын науқастар біздердің бақылауымызда болды. Олардың барлығы зерттеу алдында үдетілген инсулин ем домдарын қабылдаған. Сонымен қатар, рафинирленген тағамдар рационынан алынып тасталып, оның орнына көмірсулардың көзі тамақтағы тағамдық талшықтарының мөлшерінің (клетчатканың) көбірек болуына ерекше назар аударылды. Қандағы атерогенді липидтердің фракциясының мөлшерінің төмендеуі, көмірсулар алмасуының жағдайын жақсарту нәтижесінде қол жеткізілді. Соныменен, ТӨТЛП, ТТЛП, ТПХ, ЭБМҚ деңгейлері төмендейді. ЖТХ деңгейі жоғарылады. КА тенденциясының төмендеуі байқалады. Инсулиннің ультра қысқаша дәрілерін белгілеу кезінде зат алмасу үрдістерінің жақсауы ғана емес, гликемия көрсеткіштерінің төмендеді, сонымсен қатар қандағы липидтер алмасуының пайдалы жаққа ығысуына әкелді. 1 типті қантты диабетпен ауыратын науқас балаларға инсулиннің ультра қысқаша дәрілерін белгілеу, метаболизмнің әлдеқайда жақсаруына септігін тигізеді.

Түйінді сөздер: қантты диабет, гипергликемия, липидті алмасу, метаболизм, инсулин.