

Hypoglycemia Risk Management at the Georgian Diabetic Camp

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Abstract

We have studied record sheets of campers (293) during 10 days sessions in the years 1996-2000 of the Georgian diabetic camp. Totally 24 000 blood glucose determination were done. There were 635 episodes of hypoglycemia, during observation period (blood glucose < 70 mg/dl) In 522 cases (82%), campers detected hypoglycemia by themselves. In 67 cases (10,7%) campers had a feeling of high blood glucose and in 18 cases (7,5%) hypoglycemia was recognized by other campers or staff members. Probability of hypoglycemia occurrence is high and nearly equal in time from breakfast till lunch, from dinner till bedtime and during sleeping up to 4.00. Camp educational program is focused on making campers responsible for recognition of hypoglycemia symptoms and avoid or treat such a conditions.

Keywords: *diabetes type 1, hypoglycemia, insulin therapy*

Introduction

One of the major goals for the Summer Diabetic Camps is diabetes education of children and adolescent with Diabetes Type 1. Practical skills in Diabetes emergencies, like hypoglycemia or ketoacidosis are of great importance for proper Diabetes day to day management. That is why Georgian Diabetic Camp educational program is focused on making campers responsible for recognition of hypoglycemia symptoms and ways to avoid or treat such a conditions. Hypoglycemia is most common complication during the camp session. Hypoglycemia risk management at camp requires certain medical management. During camp, a daily record of the camper's progress should be made. All blood glucose levels and insulin dosages should be recorded in a format that allows for review and analysis to determine if alterations in the diabetes regimen are required. Recording degree of activity and food intake may also be helpful in determining subsequent alterations in the diabetes regimen. To ensure safety and optimal diabetes management, multiple blood glucose determinations should be made throughout

each 24-h period: before meals, at bedtime, after or during prolonged and strenuous activity and in the middle of the night when indicated for prior hypoglycemia (bedtime blood glucose <100 mg/dl). Children should be encouraged to check blood glucose levels at other than routine times if they have symptoms of hypo/hyperglycemia or if they have other physical complaints [1].

Aims

An aim of our study was to evaluate Hypoglycemia risk management effectiveness at the Georgian Diabetic Camp

Materials and Methods:

We've studied record sheets of 293 campers, recorded during 10 day sessions in the years 1996 - 2000. Blood Glucose determinations were made routinely before breakfast, before lunch, before dinner, at bedtime and in the middle of the night in every suspected case of

hypoglycemia. Campers were encouraged to do extra BG determinations during various activities, as well as at any case of unusual feelings. Totally 24 000 BG determinations were done. We count as a hypoglycemia any case, when blood glucose was < 70 mg/dl.

Results:

During these years we had no case of hypoglycemic coma at Georgian Diabetic Camp. Totally 637 episodes

of hypoglycemia were detected during observation period. In 522 cases (82%) campers had common symptoms of hypoglycemia, detected at daytime by themselves or by medical staff during the night rounds. In 67 cases (10,5%) campers had a feeling of high blood glucose, in other 48 cases (7.5%) hypoglycemia was recognized by other campers or staff members due to character changes.

Day-Night distribution of hypoglycemia episodes are shown in *Tab.1* and *Fig.1*.

TimeYear	8.00-14.00	14.00-19.00	19.00-23.00	23.00-4.00	4.00-8.00	Total
1996	27	6	19	15	1	68
1997	19	3	20	14	-	56
1998	94	32	78	59	1	264
1999	42	8	55	49	1	155
2000	15	5	19	49	6	94
Total	197	54	191	186	9	637
%	31%	8%	30%	29%	2%	100%

Tab.1 Daily occurrence of hypoglycemic episodes during the georgian diabetic camp sessions in the years 1996-2000.

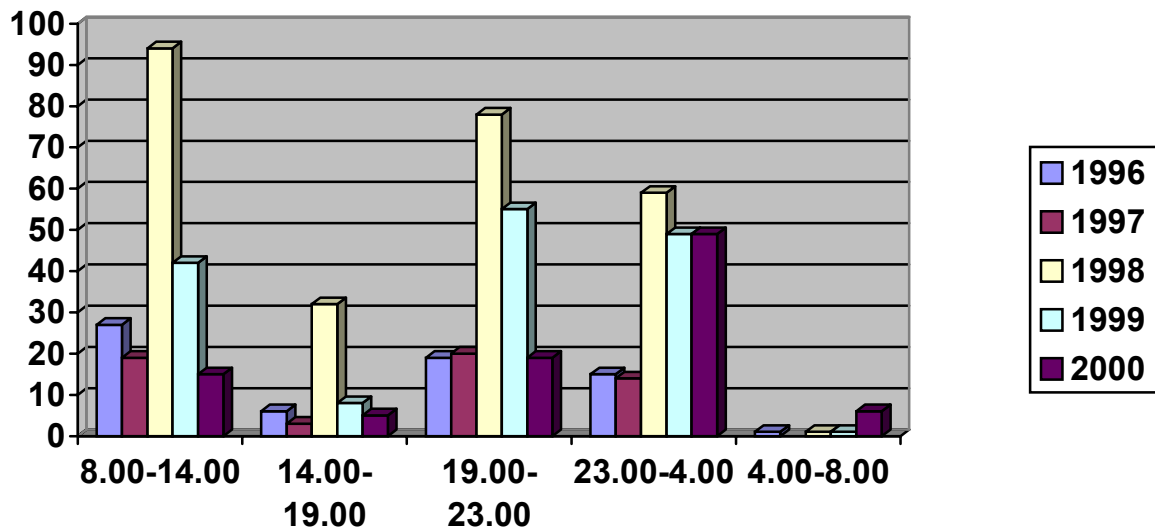


Fig.1 Daily occurrence of hypoglycaemic episodes during the Georgian diabetic camp sessions in the years 1996-2000.

As we find out, probability of hypoglycemia occurrence is high and nearly equal in time intervals from breakfast till lunch (8.00- 14.00), from dinner till bedtime (19.00-23.00) and during sleeping up to 4.00. such a probability is much lower from lunch till dinner and after 4.00 till morning. Different numbers of hypoglycemia episodes from year to year is reflection of difference in number of campers. In average every camper might have at least 2 episodes of hypoglycemia during the camp session.

Discussion

Even today, in many places diabetes education is not an obligatory part of treatment, but is regarded as an optional service to the patient which is frequently fragmentary and haphazard. Several misconceptions about diabetes education keep counteracting the spread and hence the availability of effective treatment and teaching programs for all Type 1 diabetic patients. One such misconception is that diabetes education could compensate for deficiencies of inappropriate insulin treatment regimens. A further reason for a lack of success of diabetes education is an unstructured approach which is frequently mistaken for individualized care. The deleterious effects of putting patients on intensified insulin therapy without offering them sufficient and systematic training have manifested themselves at various places by an excessive increase in the risk of severe hypoglycemia, and of ketoacidosis during therapy. [2]. Patient education plays a key role in diabetes care, and summer camps have been shown to be of value in teaching diabetic children. Camp attendance also significantly improved the children's self-management at home. Camps whose teaching staff is well trained in educational methods are of value in enhancing both the diabetes knowledge and self-management of children as young as 6 years of age, and/or of children whose diabetes is of recent onset, and may therefore be helpful in improving their coping processes [3]. The positive effect of physical exercise on the metabolism for those with diabetes has been well known for a long time. It pertains also for children with diabetes. In spite of this, children and adolescents with diabetes still have problem taking part in sport-activities. The reasons are poor information and education of physicians, teachers, parents and those with diabetes. Holiday-camps will be an useful help for children to learn how to adapt the metabolism by self-control of blood and urine-sugar. Then it will be easier to accommodate physical exercise during the day. The improvement of fitness is one of the positive effects of

sport, but it is of no consequence for metabolic control. However, sport-activities are a helpful addition for therapeutic management [4].

The triad of insulin, diet and exercise has been the basis for treatment of diabetes for several decades. However, the choice of sporting activities for young diabetics requires an understanding of: a) the energy metabolism and the adaptation to physical activity in the healthy; b) the metabolic adaptation during physical activity in the diabetic child; and c) the practical recommendations concerning diet and insulin that have to be learned by the children themselves. In diabetic children, an adequate insulin therapy is required to allow the full benefit of muscular activity on glucose assimilation and to reach the same level of physical performance as the non-diabetic. In the case of insufficient metabolic control, exercise can provoke severe hypoglycemic episodes, even after muscle activity has ceased, or increase glucose levels and lead to ketoacidosis [5,7]. Severe hypoglycemic episodes in diabetic children are a serious complication of present medical therapy. With the recent trend towards intensified insulin therapy, the incidence of severe hypoglycemia will probably increase. The pathophysiological mechanisms in the development of severe hypoglycemia are lack of modulation of plasma insulin levels, diminished or abolished glucagon release, delayed epinephrine release, and diminished glucose threshold for awareness of hypoglycemic symptoms, especially in well stabilized diabetics. A highly increased risk factor is a low HbA_{1c}, and a complete lack of endogenous insulin secretion. Home blood glucose monitoring for determining the correct insulin dose and food supply is of great prophylactic importance. In the presence of coma in a diabetic child due to hypoglycemia, i.m. glucagon or i.v. glucose should be administered immediately in the correct dose. Regular education of the patient on risk factors, prevention and therapy of hypoglycemia is of great importance [6,8].

Conclusions

In average each camper might have at least two cases of hypoglycemia during the camp session. Highest probability of hypoglycemia occurrence at camp is from breakfast till lunch and from dinner till late midnight. Intensive blood glucose monitoring and hypoglycemia awareness in staff and campers can avoid hypoglycemic coma development. Exercise and other physical and emotional activities can be safe for campers in case of proper management and control.

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Управление риском гипогликемии в диабетическом лагере Грузии

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РЕЗЮМЕ

За период летних сессий Диабетического лагеря Грузии с 1996 по 2000 год нами установлено 637 случаев гипогликемии (уровень глюкозы в крови <70 мг%) Наибольшая и приблизительно равная вероятность развития эпизодов гипогликемии отмечается в период от завтрака до обеда, от ужина до сна и во время сна до 4 часов утра. В среднем на каждого участника приходится, как минимум, два эпизода гипогликемии за период сессии. По нашему заключению, вероятность развития гипогликемических состояний в течение сессии достаточно высока. Эффективное управление риском гипогликемии путем интенсивного контроля гликемии и высокой бдительности, все же позволяет успешно реализовать программу лагеря, избегая при этом развития гипогликемической прекомы и комы.

Ключевые слова: диабет тип 1, гипогликемия, интенсивная инсулинотерапия