Management of Diabetes at Diabetes Camps

American Diabetes Association

Since Leonard F.C. Wendt, MD opened the doors of the first diabetes camp in Michigan in 1925, the concept of specialized residential and day camps for children with diabetes has become widespread throughout the U.S. and many other parts of the world. It is estimated that worldwide camps serve 15,000–20,000 campers with diabetes each summer (1).

The mission of camps specialized for children and youth with diabetes is to allow for a camping experience in a safe environment. An equally important goal is to enable children with diabetes to meet and share their experiences with one another while they learn to be more personally responsible for their disease. For this to occur, a skilled medical and camping staff must be available to ensure optimal safety and an integrated camping/educational experience.

DIABETES MANAGEMENT AT CAMP — The general recommendations for diabetes management at a diabetes camp are not significantly different than what has been outlined by the American Diabetes Association as the standards of care for people with type 1 diabetes (2). The management protocol aims to balance insulin dosage with activity level and food intake so that blood glucose levels stay within a safe target range (3). Each camper should have a standardized medical form completed by his/her family and the physician managing the diabetes that details the camper’s past medical history, immunization record, and diabetes regimen. The home insulin dosage should be recorded for each camper, including number and timing of injections and type of insulin used. Records for insulin doses and blood glucose values for the week immediately prior to camp should be provided. Additional medical information, such as prior diabetes-related illnesses and hospitalizations, previous glycated hemoglobin levels, other medications, significant medical conditions, and psychological issues should also be available to camp personnel and be reviewed with diligence by those responsible for the health and well-being of the individual camper.

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. It is imperative that the medical staff have knowledge about the exercise schedule and the meal plan so that they can make appropriate insulin dosage adjustments.

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 levels <100 mg/dl [5.6 mmol/l]), after extra doses of insulin, and if the parent/camper so requests. 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.

Attempts should be made to follow the home insulin regimen of each camper as closely as possible. However, most camps have found it advisable to decrease the home insulin dosage by 10–20% (or more) on arrival at camp, especially in those children under good control who were not active before the camp session. Hypoglycemia is common at the beginning of camp because of increased physical activity and failure to have free access to food. Other major alterations in insulin dosage need to be made for extreme physical activity, such as prolonged hikes or active water sports.

Increasingly, children manage their diabetes with an insulin infusion pump. The camp medical director and other appropriate medical staff should be familiar with the programming of insulin pumps, replacement of insulin infusion catheters, and adjustment of insulin dosing using continuous insulin infusion therapy. The medical staff should ensure that adequate pump supplies, including extra batteries, are available for the duration of camp.

If major alterations of a camper’s regimen appear to be indicated, such as adding an additional insulin injection or changing an insulin type, it is important to discuss this with the camper and the family. The record of what transpired during camp should be discussed with the family when the camper is picked up. However, this may not be possible for campers who go home by bus or car pool; in these instances, the record should be sent with the camper or by mail to his/her family. A copy should also be sent to the home health care team. Campers should be advised to return to their pre-camp regimen once they are home, unless the alterations appear to significantly improve glycemic control and the camper’s pre-camp glycated hemoglobin levels were high, indicating poor home metabolic control.


The initial draft of this paper was prepared by Francine Kaufman, MD, Desmond Schatz, MD, and Jane Silverstein, MD. The paper was peer-reviewed, modified, and approved by the Professional Practice Committee and the Executive Committee, November 1998. Most recent review/revision, 1999.
Three meals and three snacks should be given at set times each day. These meals and snacks should be balanced, and their composition should be made known to campers and staff. The carbohydrate component of food, exchange value, and/or calorie count should be taught to campers, according to their developmental level, to enable them to learn how to balance food and activity. Supervision of the food intake of younger children by counselors ensures that the campers are consuming adequate nutrition. Signs of eating disorders should be reported to medical staff for assessment and intervention if necessary.

A formal relationship with a nearby medical facility should be secured for each camp so that camp medical staff have the ability to refer to this facility for prompt treatment of medical emergencies. (The American Camping Association requires the notification of all emergency medical support systems local to the camp.) If the camp is located in a remote area, an arrangement should be made with a medical helicopter or fixed-wing aircraft to provide rapid transport if necessary.

Universal precautions must be followed by all, with gloves worn for all procedures that involve blood draws and appropriate containers placed throughout the camp to dispose of sharps without hazard. Disposable lancets and meters in which blood does not touch the machine itself are preferable for group testing.

**MEDICAL STAFF COMPOSITION AND STAFF TRAINING** — It is imperative that the medical staff be led by someone with expertise in managing type 1 diabetes. This person(s) is ultimately responsible for daily reviewing the blood glucose and insulin logs of all campers and staff with diabetes to make appropriate management adjustments. This person is also responsible for overseeing all medical emergencies, and should ensure that the medical program is integrated into the overall camping experience.

Nursing staff should include diabetes educators and diabetes clinical nurse specialists. Registered dietitians with expertise in diabetes should also have input into the design of the menu and the education program. It is beneficial to include medical, nursing, and dietetic students as volunteer counselors or junior medical staff to learn not only about diabetes, but also about the needs of children with a chronic disease.

Medical staff should receive training concerning routine diabetes management and the treatment of diabetes-related emergencies (hypoglycemia, ketosis) before camp begins. Camp policies and job descriptions for the medical staff should be understood and available in print before camp. All camp staff should be familiar with the signs and symptoms of hypo/hyperglycemia, indications for blood glucose testing, and treatment of hyperglycemia (4,5).

Supplies for routine first aid and for the treatment of intercurrent illnesses, such as allergies, asthma, sore throats, diarrhea/vomiting, and minor trauma, should be available. Diabetes supplies should be monitored and given out by responsible medical staff.

**TREATMENT OF DIABETES-RELATED EMERGENCIES**

**Hypoglycemia**

Glucagon or intravenous glucose solutions must be available for administration by medical personnel for treatment of severe hypoglycemia. All possible measures should be taken to avert severe hypoglycemia. These may include nighttime blood glucose testing, decreasing insulin dosages for extreme activity, altering insulin regimens for campers with prior severe hypoglycemia and giving extra snacks for blood glucose levels <100 mg/dl (5.6 mmol/l), or administering slowly released carbohydrate as part of the evening snack (such as uncooked cornstarch) (6).

A set protocol for the treatment of mild-to-moderate hypoglycemia with oral glucose should be followed so that hypoglycemia is consistently managed. Repeat blood glucose testing should be performed within 30 min to ensure resolution of hypoglycemia.

**Ketoacidosis**

It is possible to treat mild-to-moderate diabetic ketoacidosis at camp if this can be done safely. Urine or blood should be measured for the presence of ketones if a camper has persistent hyperglycemia (blood glucose level >240 mg/dl [13.3 mmol/l]) or if a camper has an intercurrent illness, regardless of blood glucose level. Oral or intravenous hydration (if vomiting) should be administered, and adequate insulin should be given to reverse ketosis, with a flow sheet produced to document the progress of the treatment regimen. Referral to an appropriate medical facility is required if vomiting and ketosis do not resolve promptly.

**WRITTEN CAMP MANAGEMENT PLAN** — A written plan that includes camp policies and medical management procedures must be available at camp. It should be written or reviewed by the camp medical director in collaboration with others, such as the camp program director, members of the camp oversight and/or policy committee, local pediatric endocrinologists and diabetes educators, etc. It must adhere to the American Diabetes Association’s standards of medical care and the American Camping Association’s accreditation standards. All medical staff should review this management plan before camp.

The written medical management plan should include information about:

- General diabetes management;
- Insulin injections/pump therapy and blood glucose monitoring;
- Nutrition, timing, and content of meals and snacks;
- Routine and special activities;
- Hypoglycemia and treatment;
- Hyperglycemia/ketosis and treatment;
- Medical forms;
- Assessment and treatment of intercurrent illness;
- Pharmacy compendium;
- Universal precautions and policies for needle sticks;
- Psychological issues at camp;
- Monitoring of medical equipment;
- Incident/accident reporting;
- Handling of infectious wastes;
- When to notify parents/guardians; and
- Policies for camp closure and returning home.

In addition, camp policies should cover emergency procedures (e.g., medical and natural disasters), out-of-camp excursions, and the prevention of physical, sexual, and psychological abuse. A risk management plan should also be developed and understood by all camp staff. The American Diabetes Association’s Camp Implementation Guide (7) includes a variety of resources including sample pol-
DIABETES EDUCATION AND PSYCHOLOGICAL ISSUES AT CAMP — The camp setting is an ideal place for teaching diabetes self-management skills. Education programs should be developmentally appropriate. Examples of educational topics suitable for the camp setting include:

- Insulin injection techniques;
- Blood glucose monitoring;
- Recognition and management of hypo/hyperglycemia and ketosis;
- Insulin dosage adjustment based on nutrition and activity schedules;
- Sexual activity and preconception issues;
- Carbohydrate counting;
- Diabetes complications;
- The importance of diabetes control;
- New therapies; and
- Problem-solving skills for caring for diabetes at home versus camp.

Medical personnel, with the aid of on-site psychologists/social workers if they are available, should aim at improving the psychological well-being of campers. These staff members should be willing to address specific and general psychosocial issues and be able to offer suggestions for subsequent follow-up if indicated.

RESEARCH AT CAMP — Clinical research is often performed at diabetes camps. However, if such projects are to be done, they must not interfere with the integrity of the camping program. In addition, all studies should be approved by an institutional review board in good standing and the camp medical and program director before the camping session. Parents and campers should have a copy of the research protocol and the ability to contact the principal investigator before consenting to enter the research study. Informed consent must be obtained, preferably before arrival at camp.

CONCLUSION — Camping experiences for children and youth with diabetes are invaluable. Most camps have a high return rate for campers, many of whom become counselors and staff as young adults. Thus, it is reasonable to assume that they have benefited not only from the camp experience, but also from the friendships that have developed from being in an environment where the norm is to have diabetes. Providing high-standard diabetes care is imperative to maximize the experience offered by camps specialized for children with diabetes. Using the active camping environment as a teaching opportunity is an invaluable way for children with diabetes to gain skills in managing their disease within the supportive camp community.

References