

Diabetes Care 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 facilitate a traditional camping experience in a medically 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 responsible for their condition. 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 recommendations for diabetes management of children at a diabetes camp are not significantly different from what has been outlined by the American Diabetes Association (ADA) as the standards of care for people with type 1 diabetes (2,3) or for children with diabetes in the school or day care setting (4). In general, the diabetes camping experience is short term and is most often associated with increased physical activity relative to that experienced at home. Thus, goals of glycemic control are more related to the avoidance of extremes of blood glucose than to the optimization of overall glycemic control (5,6) while away at camp. 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, especially with respect to the prevention and management of hypoglycemia (7). Each camper should have a standardized comprehensive health history form completed by his/her family and a health evaluation form (7) completed by the physician managing the diabetes that details the camper's past med-

ical history, immunization record, and diabetes regimen. The home insulin dosage should be recorded for each camper, including number and timing of injections or basal and bolus dosages given by continuous subcutaneous insulin infusion (CSII) and type(s) of insulin used. Records for insulin dosages and blood glucose values for the week immediately before camp should be provided. Additional medical information, such as prior diabetes-related illnesses and hospitalizations, history of severe hypoglycemia, previous A1C levels, other medications, significant medical conditions, and psychological issues should also be available to camp personnel and reviewed with diligence by those responsible for the health and well-being of the individual camper.

During camp, a record of the camper's diabetes care progress should be documented daily. All blood glucose levels and insulin dosages should be recorded in a format that allows for review and analysis to determine whether alterations in the diabetes regimen are required. A record of the 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 at camp so that they can make appropriate insulin dosage adjustments.

To ensure safety and optimal diabetes management, multiple blood glucose determinations should be made and recorded throughout each 24-h period: before meals, at bedtime, after or during prolonged and strenuous activity, in the middle of the night when indicated for prior hypoglycemia, and after extra doses of insulin. Consideration may also be given to parental or camper requests. Because exercise may still impact blood glucose 12–18 h after completion, campers who have repeated lows during exercise may also need nocturnal testing. Any camper with a bedtime blood glucose level <100 mg/dl and campers on an insulin pump with a blood glucose >240 mg/dl should have their blood glucose re-

checked overnight. The intervention for campers with an overnight blood glucose level <100 mg/dl should be determined based on their insulin regimen and risk for nocturnal hypoglycemia. Campers on insulin pumps with a bedtime or overnight blood glucose >240 mg/dl should follow an established pump protocol for ketone testing and change of catheter site. Children should be encouraged to check blood glucose levels at times other than the routine times if they have symptoms of hypo-/hyperglycemia or if they have other physical complaints. These recommendations imply that there is adequate staffing and that they have received training in blood glucose monitoring procedures as well as the indications and treatment excursions of blood glucose.

Every attempt should be made to follow the home insulin regimen of each camper as closely as possible. If a child's blood glucose record prior to camp indicates tight glucose control and a low activity level, it may be advisable to decrease the insulin dosage in anticipation of the increased activity. Hypoglycemia may occur at the beginning of camp because of increased physical activity and failure to have free access to food. Other alterations in insulin dosage may 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 insulin adjustments using continuous insulin infusion therapy. The medical staff should ensure that adequate backup 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(s) or changing an insulin type, it is important to discuss this with the camper and the family in addition to the child's local diabetes physician before the change is made. 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.

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A record of the blood glucose values, insulin doses, and other medical care provided at camp, with an additional copy for the family to share with their primary diabetes team (if they choose), should be available to the family at the end of camp. Campers should be advised to return to their precamp regimen once they are home, unless the alterations appear to significantly improve glycemic control. In this circumstance, the family should seek the guidance of their primary diabetes team.

Three meals and two to three snacks should be given at set times each day accommodating special dietary needs when needed. 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 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. In addition to the need for nutrition support for optimal diabetes management at camp, there is likely to be a need for special nutrition expertise in the area of food allergies, in general, and celiac disease, in particular, with increasing numbers of youth being diagnosed with both diabetes and celiac disease.

A formal relationship with a nearby medical facility should be secured for each camp so that camp medical staff has 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 including Occupational Safety & Health Association (OSHA), Clinical Laboratory Improvement Amendments (CLIA), and state regulations 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. Retractable single-use lancets and glucose meters in which blood does not touch the machine itself are preferable for group testing. Retractable needles may be considered to further reduce the risk of

untoward blood contamination among campers and staff.

MEDICAL STAFF COMPOSITION AND STAFF TRAINING

— It is imperative that each camp have a medical director who is a physician with expertise in managing type 1 and type 2 diabetes. The medical director or their on-site licensed designee is ultimately responsible for the daily reviewing of blood glucose results, insulin logs, and other prescribed medications of all campers and staff with diabetes to make appropriate adjustments. The medical director or the on-site licensed designee is also responsible for providing guidance in all medical emergencies and should ensure that the medical program is integrated into the overall camping experience. One licensed physician must be on-site at all times for resident camp programs and available on call at all times for a day camp program.

Nursing staff should include diabetes educators and advanced practice diabetes nurses. Licensed physicians and medical residents should also be encouraged to participate in the medical staff. 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 some medical, nursing, pharmacy, physician assistant, and dietetic students as volunteer counselors or junior medical staff to learn not only about diabetes but also the needs of children with a chronic disease.

All camp staff, including medical, nursing, nutrition, and other volunteer or paid staff, should undergo background testing to ensure the appropriateness of their working with children. Medical staff should receive training concerning routine diabetes management, issues related to lifestyle modification for type 2 diabetes, and the treatment of diabetes-related emergencies (hypoglycemia or ketosis) before camp begins. Camp policies and job descriptions for the medical staff should be understood and available in print before the start of camp. All camp staff should be familiar with the signs and symptoms of hypo-/hyperglycemia, indications for blood glucose testing, and treatment of hypoglycemia, including the administration of glucagon to treat severe hypoglycemia (7,9). Diabetes supplies should be monitored and given out by responsible medical staff.

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. All medical treatment should be recorded in both the camper's file and in the yearly camp medical log.

TREATMENT OF DIABETES-RELATED EMERGENCIES

Hypoglycemia

Glucagon or intravenous glucose solutions must be available for administration by trained camp 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, and altering insulin regimens for campers with prior severe hypoglycemia. Extra snacks should be provided to children not on basal-bolus therapy with blood glucose levels <100 mg/dl at bedtime. Additional snacks or modifications of insulin for those on Lantus or pump therapy with blood glucose levels <80 mg/dl should also be considered.

A set protocol for the treatment of mild-to-moderate hypoglycemia with oral glucose at other times should be followed so that hypoglycemia is consistently managed. Repeat blood glucose testing should be performed within 15–20 min to ensure resolution of hypoglycemia.

Ketosis

It may be possible to treat mild-to-moderate diabetic ketosis at camp. 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 committees, local

pediatric endocrinologists and diabetes educators, etc. It must adhere to the ADA'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
- Blood glucose monitoring and ketone testing
- 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 and handling of infectious wastes
- Psychological issues at camp
- Quality control of medical equipment according to OSHA and CLIA standards
- Incident/accident reporting
- When to notify parents/guardians, primary care physician, and diabetes care provider
- 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 ADA's *Camp Implementation Guide Modules* (10) includes a variety of resources including sample policies, job descriptions, and medical forms.

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:

- Blood glucose monitoring
- Recognition and management of hypo-/hyperglycemia and ketosis
- Insulin injection techniques
- Carbohydrate counting
- Insulin dosage adjustment based on nutrition and activity schedules

- Pump issues
- The importance of diabetes control
- Healthy lifestyles issues, including integration of healthy eating, physical activity, and relaxation
- Problem-solving skills for caring for diabetes at home versus camp
- Life skills for independent living
- Stress management and coping skills
- Sexual health and preconception issues
- Diabetes complications
- New therapies including technologies

Medical personnel with the aid of on-site psychologists/social workers, if 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. Individualized attention may be needed for campers with type 2 versus type 1 diabetes.

RESEARCH AT CAMP — Clinical research is often performed and encouraged at diabetes camps. However, if such projects are to be done, they must not interfere with the integrity of the camping program. All research conducted in the camp setting should be minimally invasive to the camping experience. All studies should be approved by an institutional review board in good standing and by the camp medical and program director before the camping session. Parents and campers must have the consent form, a summary/synopsis of the research protocol, and the ability to contact the principal investigator before consenting to enter the research study. Informed consent from parents or guardians and assent from the camper must be obtained, preferably before arrival at camp.

OTHER — At times, industries related to diabetes may wish to have a presence at camp. Camp medical staff and administrative personnel should develop policies for visits from industries while camp is in session. Industries seeking to have a presence at camp should be subject to the same background checks and standards outlined by the ADA. Employees of industries serving in the role of volunteer or paid medical staff at camp are prohibited from soliciting or endorsing their company's products.

CONCLUSION — Camps for children and youth focused on diabetes are invaluable. Most camps have a high return rate for campers, many of whom

have gone on to become counselors, staff, and role models for younger campers. 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

1. American Diabetes Association: *The Journey and the Dream*. Alexandria, VA, American Diabetes Association, 1990
2. American Diabetes Association: Standards of medical care in diabetes (Position Statement). *Diabetes Care* 29 (Suppl. 1): S4–S42, 2006
3. Silverstein J, Klingensmith G, Copeland K, Plotnick L, Kaufman F, Laffel L, Deeb L, Grey M, Anderson B, Holzmeister LA, Clark N: Care of children and adolescents with type 1 diabetes: a statement of the American Diabetes Association. *Diabetes Care* 28:186–212, 2005
4. American Diabetes Association: Diabetes care in the school and day care setting (Position Statement). *Diabetes Care* 28 (Suppl. 1):S43–S49, 2005
5. The Diabetes Control and Complications Trial Research Group: The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 329:977–986, 1993
6. Diabetes Control and Complications Trial Research Group: Effect of intensive diabetes treatment on the development and progression of long-term complications in adolescents with insulin-dependent diabetes mellitus: Diabetes Control and Complications Trial. *J Pediatr* 125:177–188, 1994
7. Cryer PE, Davis SN, Shamoon H: Hypoglycemia in diabetes. *Diabetes Care* 26: 1902–1912, 2003
8. American Academy of Pediatrics Committee on School Health, American Academy of Pediatrics Section on School Health: Health appraisal guidelines for day camps and resident camps. *Pediatrics* 115:1770–1773, 2005
9. Bode BW (Ed.): *Medical Management in Type 1 Diabetes*. 4th ed. Alexandria, VA, American Diabetes Association, 2004
10. American Diabetes Association: *Camp Implementation Guide Modules*. Alexandria, VA, American Diabetes Association, 2005