Coastal Carolina University
Athletic Training Department
Policy and Procedure Manual
Diabetes Management
Revised/Reviewed 7/2011

DIABETES CARE PLAN:

Each athlete with diabetes should have a diabetes care plan for practices and games. The plan should include the following:

1. Blood glucose monitoring guidelines. Address frequency of monitoring and pre-exercise exclusion values.
2. Insulin therapy guidelines. Should include the type of insulin used, dosages and adjustment strategies for planned activities types, as well as insulin correction dosages for high blood glucose levels
3. List of other medications. Include those used to assist with glycemic control and/or to treat other diabetes-related conditions.
4. Guidelines for hypoglycemia recognition and treatment. Include prevention, signs, symptoms, and treatment of hypoglycemia, including instructions on the use of glucagon.
5. Guidelines for hyperglycemia recognition and treatment. Include prevention, signs, symptoms, and treatment of hyperglycemia and ketosis.
6. Emergency contact information. Include parents' and/or other family member's telephone numbers, physician's telephone number, and consent for medical treatment (minors)
7. Athletes with diabetes should have a medic alert tap with them at all times.

Supplies for Athletic Training Kits
Supplies to treat diabetes-related emergencies should be available at all practices and games. The athlete (or athlete's parents/guardians, in the case of minors) provides the following items:

1. A copy of the diabetes care plan
2. Blood glucose monitoring equipment and supplies. The athletic trainer should check the expiration dates of supplies, such as blood glucose testing strips and insulin, on a regular basis. Blood glucose testing strips have a code number located on the outside of the test strip vial. The code number on the blood glucose meter and test strip vial must match.
3. Supplies to treat hypoglycemia, including sugary foods (e.g. glucose tablets, sugar packets) or sugary fluids (e.g. orange juice, non-diet soda) and a glucagons injection kit.
4. Supplies for urine or blood ketone testing
5. A "sharps" container to ensure proper disposal of syringes and lancets
6. Spare batteries (for blood glucose meter and/or insulin pump) and, if applicable, spare infusion sets and reservoirs for insulin pumps.

Preparticipation Physical Examination
Athletes with Diabetes should have a glycosylated hemoglobin (HbA1c) assay every 3 to 4 months to assess overall long-term glycemic control. However, HbA1c value is not used to make day-to-day decisions concerning participation. It can help team physicians with management and evaluate the student-athlete's treatment compliance.

An annual examination for retinopathy, nephropathy, and neuropathy is recommended along with an annual foot examination to check sensory function and ankle reflexes. Screening for cardiovascular disease should occur at intervals recommended by the athlete's endocrinologist or cardiologist. Exercise limitations or restrictions for athletes with diabetes-related complications should be determined by the athlete's physician.

Recognition, Treatment, and Prevention of Hypoglycemia
Strategies to recognize, treat, and prevent hypoglycemia typically include blood glucose monitoring, carbohydrate supplementation, and/or insulin adjustments. Athletes with diabetes should discuss with their physicians specific carbohydrate qualities and quantities as well as the use of an insulin reduction plan for activity.

Athletic trainers should know the signs, symptoms, and treatment guidelines for mild and severe hypoglycemia. Hypoglycemia is defines as mild if the athlete is conscious and able to swallow and follow directions or severe if the athlete is unable to swallow, follow directions, or eat as directed or is unconscious. Treatment of severe hypoglycemia requires a glucagons injection, and athletic trainers should be trained in mixing and administering glucagon. The athlete, athlete's family or physician can provide appropriate training.

Mild Hypoglycemia (athlete is conscious and able to follow directions and swallow)

1. Administer 10-15g of fast acting carbohydrates (4-8 glucose tablets)
2. Measure blood glucose level
3. Wait 15min and re-check blood glucose
4. If blood glucose level remains low, administer another 10-15g of fast acting carbohydrates
5. Re-check blood glucose level in 15min
6. If blood glucose level does not return to the normal range after second dosage of carbohydrates, activate EMS
7. Once blood glucose level is in the normal range, athlete may wish to consume a snack

Severe Hypoglycemia (athlete is unconscious or unable to follow direction or swallow)

1. Activate EMS
2. Prepare glucagons for injection following directions in glucagons kit. The glucagons kit has wither (1) a fluid-filled syringe and a vial of glucagons powder or (2) a syringe, 1 vial of glucagons powder, and 1 vial of fluid.
    a.) Inject the fluid into the vial of glucagons. Note: if the vial of fluid is separate, draw the fluid into the syringe and inject it into the vial of glucagons powder
    b.) Gently shake the vial until the glucagons powder dissolves and the solution is clear.
    c.) Draw fluid back into the syringe and then inject glucagons into the arm, thigh, or buttock
    d.) Glucagon administration may cause nausea and/or vomiting when the athlete awakens. Place the athlete on his or her side to prevent aspiration

e.) The athlete should become conscious within 15min of administration
f.) Once the athlete is conscious and able to swallow, provide food.

Recognition, Treatment, and Prevention of Hyperglycemia
Athletes with Diabetes and athletic trainers are advised to follow the American Diabetes Association (ADA) guidelines for avoiding exercise during periods of hyperglycemia.

Athletes with Diabetes who experience hyperglycemia during short-term, intense, and stressful periods of exercise should consult with their physicians concerning an increased basal rate or the use of small insulin boluses to counteract this phenomenon.
Athletes should drink noncarbohydrate fluids when blood glucose levels exceed the renal glucose threshold (180mg/dL, or 10mmol/L), which may lead to increased urination, fluid loss, and dehydration.

Hyperglycemia (unusual fatigue, sleepiness, inattentiveness, loss of appetite, increased thirst, frequent urination, fruity odor to breath, rapid breathing)

1. Fasting blood glucose level is greater than 250mg/dL. Test urine and/or blood for ketones. If ketones are present, exercise is contraindicated. If ketones are not present, exercise is not contraindicated.
2. Blood glucose value is greater than 300mg/dL and without ketones. Exercise with caution and continue to monitor blood glucose levels.

Carbohydrate Supplementation
Before exercise

1. When blood glucose is less than 100mg/dL carbohydrates should be consumed

During Exercise

1. Additional carbohydrate supplementation may be needed for practices or games lasting more than 60min when the pre-exercise insulin dosage has not been reduce by at least 50%
2. Athletes who are exercising at the peak of insulin activity may require additional carbohydrates.

Post Exercise

1. Athletes should eat a snack and/or meal shortly after exercise.

Insulin Administration
Insulin should be administered into the subcutaneous tissue. The abdomen, upper thigh, and upper arms are common sites for injection. Intramuscular injections of insulin should always be avoided as muscle contractions may accelerate insulin absorption.

Depending on the type of insulin used by the athlete, heat and cold should be avoided for 1 to 3 hours after an injection of rapid-acting insulin and up to 4 hours for fast-acting insulin. Heat may increase insulin absorption rates. Thus, athletes with Diabetes should avoid warm whirlpools, saunas, showers, hot tubs, and baths after injection. Local heat-producing modalities such as moist hot packs, diathermy, and thermal ultrasound should not be applied directly over an infusion or injection site. By contrast, cold may decrease insulin absorption rates. Therefore, athletes with Diabetes should avoid using ice and cold sprays directly over the injection or infusion site after insulin administration. Similarly, cold whirlpools should be avoided after insulin injection.

Insulin pump users should replace insulin infusion sets every 2 to 3 days to reduce skin and infusion site irritation.

Extreme ambient temperature (<36 deg F or > 86 deg F) can reduce insulin action. Athletes with Diabetes are advised to check blood glucose levels frequently and replace the entire insulin-filled cartridge and infusion set if any signs of unusual hyperglycemia occur in extreme environmental conditions.

Travel Recommendations

Athletic trainers should review the advice provided by the Transportation Security Administration (TSA) in conjunction with the AADA for airline passengers with diabetes traveling within the US. In addition, athletes are advised to carry diabetes supplies with them and have prescriptions available in the event that medication or supplied need to be replaced. Due to extreme temperature fluctuations that could affect insulin action, insulin should not be stored in the cargo hold of the airplane.

When traveling, athletes with Type I Diabetes are advised to carry prepackaged meals and snack in case food availability is interrupted. If travel occurs over several time zones, insulin therapy may need to be adjusted to coordinate with changes in eating and activity patterns.

Athletic Injury and Glycemic Control

Trauma, even in persons without diabetes, often causes a hyperglycemic state. Hyperglycemia is known to impair the wound healing process; thus, for athletes with Type I Diabetes, an individualized blood glucose management protocol should be developed for use during injury recovery, including frequency of blood glucose monitoring.