



ACFASP Scientific Review

Glucose Administration

Questions to be addressed:

Should lay rescuers be taught how and when to assist patients with administering glucose (sugar) during a diabetic emergency?

Introduction/Overview:

Original Advisory Statement on Glucose Administration was done in 1999 and asked to be reviewed as either revise, retire or re-affirmed in May of 2006.

Review Process and Literature Search Performed

A National Library of Medicine Medline database search was conducted for the period 1966 to April, 2006 using mesh heading combinations of "hypoglycemia" or "insulin reaction" and "rescuer" or "lay rescuer" or "layperson." No citations were found. Therefore, the American Red Cross Advisory Council on First Aid and Safety used a consensus referencing standard medical textbooks. In addition National Guideline Clearing House was searched.

Scientific Foundation:

Summary of documents provides no data or conclusions about the relationships of first aider and patient in diabetic emergencies. The prominent information describes the disease process and health care workers and patients manage the disease on a regular basis. Self-Insulin regulation and blood glucose monitoring have given more autonomy to diabetics but haven't been studied to the effect of first aid during diabetic emergencies. Data on first aider capabilities and impact on encountering these pumps in dealing with acute hypoglycemic episodes is not yet available. Thus the most prudent recommendation at this time would be to contact the prescribing physician or clinic, or consultation with a knowledgeable family member after requesting EMS and prior to EMS arrival to determine appropriate actions if questions arise.

Diabetic patients are often able to recognize the early signs and symptoms of a hypoglycemic episode but sometimes require assistance in obtaining a source of sugar to correct the problem before it progresses to unconsciousness or seizures. The assistance of a bystander or lay rescuer might prevent such progression. Families, relatives and friends of diabetic patients often learn how to recognize these signs and symptoms and provide appropriate intervention.

The lay rescuer might see the following signs or symptoms in the diabetic patient who needs sugar:

1. asking for some sugar or complaining of being hypoglycemic
2. complaining of feeling weak
3. appearing shaky
4. sweating

Lay Rescuers may also encounter a patient

1. wearing tags, bracelets, jewelry or wallet cards that indicate that the victim is a diabetic
2. insulin pump

If the degree of hypoglycemia progresses, the patient might:

1. demonstrate bizarre or violent behavior
2. become unconscious
3. have seizures

*If the patient shows bizarre behavior, becomes or is found unconscious, or starts to have seizures, the EMS (Emergency Response System) should be immediately activated. Place the unconscious patient in the recovery position and call local emergency number. There should be **NO** attempt to give the patient anything by mouth. Continue to monitor Signs of Life and treat life threatening conditions till EMS arrives.*

The lay rescuer may give sugar or a substance known to be rich in available glucose or simple carbohydrates, e.g. Orange juice, Gatorade, etc. to a patient when:

1. the patient is identified as a diabetic, and
2. the patient says he or she needs some sugar or is having a hypoglycemic reaction, and
3. the patient is awake and able to swallow liquids (the patient might need assistance holding the glass if the patient is very shaky from the low blood sugar).

Information and access to Diabetic Emergency Plans & resources for the victim may be obtained from bystanders (teachers, coaches, family, etc.)

If the patient is awake, states he or she is diabetic and needs some sugar, looks shaky or is sweaty, the lay rescuer can help the patient drink a sweetened drink such as non-diet soda or juice. Two to three teaspoons or packets of common table sugar can be added to the drink and stirred in. While this is being

done, the lay rescuer should direct someone to activate the EMS. If no one is available to do so, the lay rescuer can assist the patient first then activate the EMS. If the rescuer can not easily find a sweetened drink, the EMS should be activated before spending any time looking for a drink or sugar to give the patient.

Glucose products (e.g. instaGlucose, Glucose Gel, GlucoBurst- gel, instant Glucose- gel – to be rubbed on the inside of a patients cheek; “Quick fix keychain”- containing 4 glucose tabs, Dex-4 glucose tabs, BD Glucose tabs) or food stuffs known to be rich in sugars (e.g. Orange juice, Regular Coke, hard candy, Cake frosting tubes, SweeTarts, Lifesavers Candy, Spree, etc.) may also be requested and or provided by a patient in a hypoglycemic state, which a lay rescuer may assist patient in consuming. (Safety factor is that giving sugar to someone who does not need it really does no immediate real harm.) The patient must be awake and able to swallow in order for the lay rescuer to provide assistance. If the patient is not awake and able to swallow, do not put anything, liquid or sugar, into the patients' mouth. Instead immediately activate the EMS.

Summary:

Recommendations and Strength (using table below):

Standards: (none)

Guidelines: (none)

Options:

Re-Affirm and update 1999 Advisory Statement

The lay rescuer may give glucose or glucose rich substance to a patient when:

1. the patient is identified as a diabetic, and
2. the patient says he or she needs some sugar or states that he or she is having a hypoglycemic reaction, and
3. the patient is awake and able to swallow liquids (the patient might need assistance holding the glass if the patient is very shaky from the low blood sugar).

The EMS should be activated for all patients.

Summary of Key Articles/Literature Found and Level of Evidence

Author(s)	Full Citation	Summary of Article	Level of Evidence (Using table below)
Cydulka R, Siff J	Diabetes Mellitus and Disorders of Glucose Homeostasis, in <u>Emergency Medicine. Concepts and Clinical Practice</u> . Rosen P et al (eds), 5th edition, Mosby-Year Book, Inc, St. Louis, 2002, pp 1744-1762	Description of insulin pumps and challenges for users— “EPs and prehospital care providers are encountering patients with insulin pumps. Many insulin pumps are available, each having a pump mechanism, a reservoir for insulin, tubing, and indwelling subcutaneous needles. They are attached, usually with tapes, to the patient’s body and administer insulin at a regular adjustable rate. Most pumps also allow the patient to administer additional boluses of insulin as necessary. These pumps support tight glycemic control and are acceptable to some patients.” Cydulka R 2002, p. 1760.	6
Slama G. Traynard PY. Desplanque N. Pudar H. Dhunpath I. Letanoux M. Bornet FR. Tchobroutsky G.	Slama G. Traynard PY. Desplanque N. Pudar H. Dhunpath I. Letanoux M. Bornet FR. Tchobroutsky G. The search for an optimized treatment of hypoglycemia. Carbohydrates in tablets, solutin, or gel for the correction of insulin reactions. Archives of Internal Medicine. 150(3):589-	(N=41) type 1 diabetic subjects with induced hypoglycemia who were treated with 15 g carbohydrate from glucose solution or tablets, sucrose solution or tablets, or corn syrup had alleviation of symptoms in 10 min. Treatment with 15 g carbohydrate from glucose gel or orange juice was less effective in alleviating their symptoms. Although pure glucose may be the preferred treatment, any form of carbohydrate that contains glucose will raise blood glucose levels	2a

	93, 1990 Mar.		
Gagliardi M. Neighbors M. Spears C. Byrd S. Snarr J.	Gagliardi M. Neighbors M. Spears C. Byrd S. Snarr J. Emergencies in the school setting: are public school teachers adequately trained to respond. Prehospital & Disaster Medicine. 9(4):222-5, 1994 Oct-Dec.	Public school teachers represent a potentially effective first-response component during disasters and isolated emergencies in the school environment. Overall, most of public school teachers in this study were deficient in both training and knowledge of emergency care and BLS modalities. Lack of effective, formal emergency care training in teacher preparation programs coupled with no continuing education requirement is a possible explanation of these results. Emergency medical services providers should seek opportunities to help with first-responder training and continuing education in their schools.	5
American Diabetes Association	Personal communication 5/26/06	Per ADA- 5/26/06-There are 20.8 million children and adults in the United States, or 7% of the population, who have diabetes. While an estimated 14.6 million have been diagnosed, unfortunately, <i>6.2 million people (or nearly one-third) are unaware that they have the disease.</i>	7

<u>Level of Evidence</u>	Definitions (See manuscript for full details)
Level 1a	Randomized clinical trials or meta-analyses of multiple clinical trials with substantial treatment effects
Level 1b	Randomized clinical trials with smaller or less significant treatment effects
Level 2a	<u>Prospective</u> , controlled, non-randomized, cohort studies
Level 2b	<u>Historic</u> , non-randomized, cohort or case-control studies

Level 2c	<u>Case series</u> : patients compiled in serial fashion, lacking a control group
Level 3	Animal studies or mechanical model studies
Level 4	Extrapolations from existing data collected for other purposes, theoretical analyses with limited correlation to current question
Level 5	Peer-reviewed, state of the art articles, review articles, editorials, or consensus statements
Level 6	Non-peer reviewed published opinions, such as textbook statements, official organizational publications, guidelines and policy statements and consensus statements
Level 7	Rational conjecture (common sense); common practices accepted before evidence-based guidelines
Level 1-6E	Extrapolations from existing data collected for other purposes, theoretical analyses which is on-point with question being asked. Modifier E applied because extrapolated but ranked based on type of study.