"Is It Hypoglycemia?"

Recognition of low blood sugar levels before, during and after fluorescein angiography in individuals with diabetes

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Hypoglycemia is a well-known complication of diabetes mellitus. Also termed low blood sugar or an insulin reaction, hypoglycemia is a rapid drop in the blood's sugar level. The most common causes of hypoglycemia are from overtreatment with insulin or oral agents, insufficient food intake, or physical exercise that is exceptional for the individual. If recognition of hypoglycemia is delayed, or in the case of a severe reaction, other symptoms such as headache, confusion, drowsiness or unconsciousness may occur. Symptoms of nausea, shakiness, fainting, rapid pulse, sweating — to name a few — can be manifestations of either hypoglycemia or a mild reaction to the use of sodium fluorescein during angiography. The ophthalmic photographer should be aware of the symptoms of hypoglycemia as well as the common symptoms of a fluorescein reaction in order to better recognize that a hypoglycemia emergency may be developing. If hypoglycemia occurs before, during, or after fluorescein angiography, recovery may depend upon quick action by the ophthalmic photographer.

Photography for the purposes of documentation, diagnosis and treatment of diabetic retinopathy is one of the most common requests presented to the ophthalmic photography laboratory. For this reason, ophthalmic photographers should have an in-depth knowledge and understanding of diabetes, and should be well-informed and prepared to assess the specific nature and possible complications of a hypoglycemic state. If a physician or nurse is not present prior to, during or following ophthalmic photography, the decision to initiate emergency medical care may frequently be made by the photographer. In this role, the photographer has the responsibilities of both recognizing the symptoms of hypoglycemia and being able to respond appropriately in the event of such an emergency.

When to Suspect Hypoglycemia

In a hypoglycemic state, the patient may be sweaty, nervous or trembling. The patient may not recognize the problem or be too confused to express what is wrong. The pulse may be rapid and the skin may appear clammy to the touch. The patient may be "spacey" and faltering or appear inebriated. The patient may become confused, incoherent, belligerent or unconscious for no apparent reason. These symptoms could be confused with those of respiratory or cardiac distress. If any of these symptoms occur, hypoglycemia should be considered, particularly if the patient has not yet had an injection of sodium fluorescein. If the angiography has been scheduled for late afternoon or during the noon hour, the patient may be overdue for their regularly scheduled meal and may be on the fringe of hypoglycemia.

Assessment Prior to Angiography

A brief review of the patient’s chart and a few simple questions asked prior to the procedure can significantly lower the risk of serious complications and the inconvenience of aborted testing. Determine if the patient has diabetes, a previous history of adverse reaction to sodium fluorescein or other medical problems. If the patient has diabetes, identify when the patient has last eaten. The following questions might be asked if hypoglycemia is suspected:

1) "Have you eaten your meal or snack on time?" If not, the patient's blood sugar may drop too low during angiography. If the procedure will extend beyond the patient's scheduled meal time, the patient should eat prior to commencing the photography.

2) "What types of food do you normally eat?" Oftentimes the patient will be prepared and have a snack on hand. Ask to see it and keep it handy in case it's needed.

3) "Has your blood sugar level been tested today?" "Do you have a means of testing your own blood sugar now?" If the patient normally tests his/her own blood sugar levels and has the materials presently available to do so, have the patient test the level prior to angiography.
4) "Are you prone to hypoglycemia?" If the answer is yes, ask the patient to describe how he/she feels when his/her blood sugar is low. Diabetic individuals tend to develop the same set of symptoms with subsequent hypoglycemic episodes.

5) "Have you engaged in more vigorous than usual physical activity prior to today’s appointment?" If yes, the patient’s blood sugar may become too low. Exercise often lowers the blood sugar levels and the patient may need extra food to compensate for the extra physical activity. If possible, have the patient measure his/her blood sugar level before the procedure. Consult with the physician if you suspect that a drop in blood sugar may be pending as a result of extra physical exertion.

How to Handle a Hypoglycemia Emergency

Be alert for the early warning signs which can include shakiness, nervousness, sweating, confusion, drowsiness, difficulty in speaking or belligerence. These are all common warning signs of impending hypoglycemia. If any of these signs are present, you should alert the physician immediately for assistance. Be prepared to administer the following emergency treatment with the supervision of the physician:

1) If the patient is conscious and can swallow, administer some form of sugar by mouth. Never force anything into the mouth of an unconscious person as this can induce aspiration.

Choose one of the following forms of sugar:

• Fruit juice (fructose) one glass
• Two tablespoons or two packets of table sugar (sucrose)
• One regular (not diet!) soda
• Two or three glucose tablets or one tube of fast-acting glucose gel. There are several forms of rapid-acting glucose available.* One of these products should be kept on hand at all times on the photography room crash cart.

Treatment with oral glucose should bring relief of symptoms within five to fifteen minutes. After the patient has recovered by consuming glucose, a more complex form of food which equals one carbohydrate and one protein exchange** should be consumed, such as the following examples:

• Half of a sandwich cheese on wheat bread is an excellent choice
• One ounce of cheese and four to six crackers

Remember: Foods are only given after the use of oral glucose. They are ineffective prior to a rise in the blood sugar effected by some form of rapidly-absorbed sugar.

2) If the patient becomes unconscious, an intramuscular or intravenous form of emergency treatment may be necessary. The physician would make the decision to render this treatment or contact emergency medical personnel. The two forms of more intense therapy are:

• 1/2 cc of Glucagon injected intramuscularly. Glucagon is a hormone that induces a sudden release of glucose stored in the liver. Glucagon is considered the fastest and safest form of treatment for severe hypoglycemia.
• Intravenous D-50 (dextrose 50%). The amount is varied depending on the patient’s blood sugar level and body weight. A physician, RN or paramedic would administer the D-50. High concentrations of D-50 can cause vessel necrosis if extravasated.

Following a Hypoglycemic Episode

If a hypoglycemia episode occurs before the angiographic procedure, once the physician has evaluated the patient and considers the patient recovered (that is, the blood sugar has returned to a safe level as determined by either checking the blood sugar or asking the patient how they feel), the decision to continue the photography should be discussed with the patient and the physician. On an individual basis, it may be acceptable to the patient and the physician to continue; however, the ethical and legal ramifications of such a situation may dictate that the photographic session be rescheduled. Frequently, the patient may be left with a severe headache or a feeling of malaise following an insulin reaction and thus will not wish to continue. A severe hypoglycemic reaction, may, in itself, precipitate a retinal hemorrhage which could affect the quality of the photography.

During fluorescein angiography, if a hypoglycemia episode occurs immediately following the injection of sodium fluorescein, the procedure may be rendered ineffective for diagnostic purposes. Despite the patient’s recovery, this procedure may need to be repeated at another time. While the importance of the information elicited by angiography cannot be overstated, neither can the photographer’s and the physician’s responsibility for the well-being of the patient.

Prevention

Hypoglycemia before or during fluorescein angiography can be detected and managed with careful assessment by the ophthalmic photographer. Understanding the symptoms of low blood sugar and implementation of the proper procedures for treatment can prevent a potential life-threatening situation and the interruption of important photographic procedures.
**Hypoglycemia**

<table>
<thead>
<tr>
<th>Due to:</th>
<th>Low blood sugar</th>
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<tbody>
<tr>
<td>Time of Onset:</td>
<td>Fast — within seconds</td>
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<tr>
<td>Causes:</td>
<td>Too little food</td>
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<td></td>
<td>Too much insulin</td>
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<td></td>
<td>Too much exercise without food</td>
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<td>Missing or being late for meals or snacks</td>
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<td></td>
<td>Excitement in young children</td>
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<tr>
<td>Blood Sugar:</td>
<td>Low (below 60mg/dL)</td>
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<td>Urine Tests:</td>
<td>Usually negative sugar and ketones</td>
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<tr>
<td>Symptoms/Treatment:</td>
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<tr>
<td><strong>Mild</strong></td>
<td>Hunger, shaky, sweaty, nervous</td>
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<td><strong>Moderate</strong></td>
<td>Headache, unexpected behavior changes, impaired or double vision confusion, drowsiness, weakness, difficulty talking</td>
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<tr>
<td><strong>Severe</strong></td>
<td>Loss of consciousness, seizures</td>
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<td>Give 1/2cc (1/2mg) Glucagon into muscle (anterior thigh) and call doctor. Test blood sugar. If no response, call paramedics or go to emergency room. May need intravenous sugar.</td>
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**REFERENCES**


**Suggested References**


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