Diabetes Mellitus Type 1 - Learning Objectives

Describe the pathophysiology and clinical manifestations of diabetes mellitus.
Describe diagnostic tests utilized in diabetes.
Describe the differences between hyperglycemia and hypoglycemia.
Identify the role of exercise and nutrition in the management of diabetes and identify associated patient education.
Discuss foot care for the patient with diabetes.

What is Diabetes Mellitus, Type 1?

Diabetes mellitus type 1 is an autoimmune disorder that is characterized by pancreatic beta cell destruction.
The destruction of the beta cells in the pancreas causes a decrease in insulin, the hormone produced in the pancreas.
Insulin helps the body convert glucose (sugar), starches, and other foods into energy needed for daily life.
Without the insulin in the body, the blood glucose levels become elevated (hyperglycemia).
Type 1 diabetes requires regular blood glucose monitoring and treatment with insulin.

What happens when you eat?

Some of the food in the stomach breaks down into sugars—one of these sugars is glucose, the body’s main fuel.
Sugar enters the bloodstream, and the level of sugar in your blood begins to rise.
When your body senses an increase in sugar, it sends a signal to your pancreas.

Pathophysiology

The pancreas makes insulin and sends it into the bloodstream.
Insulin lowers the level of blood sugar by acting as a key to unlock the body’s cells and allows sugar to pass from the bloodstream into the cells.
The level of sugar in the bloodstream falls as the sugar passes into the cells.
The body’s cells use the sugar for fuel.

Diabetes Mellitus...

Type 1 diabetes is usually diagnosed in children and young adults, and was previously known as juvenile diabetes.
But can develop at any age.
In the United States, Canada, and Europe, type 1 diabetes accounts for 5 to 10 percent of all cases of diabetes.
It is relatively more common in people who are white compared to people of African or Asian descent.
Factors that contribute to the destruction of the beta cells include genetic, immunologic, and possibly environmental.
**Causes**

The causes of diabetes are not clearly known, but there are many factors which may lead to the development of the disease.
- A possible history of type 1 diabetes in the family.
- Diet - eating too much carbohydrates, fats, and proteins.
- Viral infections - problems with the immune system.
- Age
- Emotional stress
- People who smoke.

**Signs and Symptoms**

<table>
<thead>
<tr>
<th>HYPOGLYCEMIA</th>
<th>HYPERGLYCEMIA</th>
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<tbody>
<tr>
<td>Shaking</td>
<td>Extreme thirst</td>
</tr>
<tr>
<td>Sweating</td>
<td>Frequent urination</td>
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<tr>
<td>Dizziness</td>
<td>Dry skin</td>
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<tr>
<td>Anxious</td>
<td>Hunger</td>
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<tr>
<td>Fast heartbeat</td>
<td>Blurred vision</td>
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<tr>
<td>Hunger</td>
<td>Drowsiness</td>
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<tr>
<td>Impaired vision</td>
<td>Decreased healing</td>
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<tr>
<td>Weakness, fatigue</td>
<td></td>
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<tr>
<td>Headache</td>
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</tbody>
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**Complications...**

- Eye problems
- Dental problems
- Skin problems
- Kidney disease
- Nerve damage
- Sexual problems
- Frequent infections
- Frequent infections
- Heart attack or stroke
- Amputations

**Diagnostic Interventions**

- Fasting blood glucose
- Oral glucose tolerance test
- Glycosylated hemoglobin (HbA1c)
- Pre-meal glucose

**Taking control of your Diabetes**

- Test your blood sugar
- Own a glucometer
- Follow a Special Diet
- Exercise regularly
- Diabetes insulin
### Assessment

- Polyuria, Polydipsia, and Polyphagia
- Weight loss
- Fatigue
- Increased frequency of infections
- Assess blood glucose levels and factors affecting levels
- Intake and Output, weight
- Skin integrity and healing status of any present wounds
- Sensory alterations
- Condition of feet and foot care practices
- Dietary practices
- Exercise patterns
- Client’s self monitoring blood glucose skill proficiency
- Client’s self medication administration proficiency
- Pain levels

### Nursing Diagnosis

- Risk for Injury
- Imbalanced Nutrition... more than body requirements
- Risk for Impaired Skin Integrity
- Deficient Knowledge
- Self-care Deficits

### Nursing Interventions

- Refer the client to a diabetes educator.
- Encourage the client to take measures to reduce risk of injury.
- Refer clients to dieticians.
- Teach the client guidelines to follow when sick
- Teach the client measures to take in response to hypoglycemic/hyperglycemic symptoms.
- Provide information regarding the importance of foot care.

### Interventions Cont...

- Know the onset, peak, and duration of administered insulin, plan for administration of prescribed insulin, and monitor client for signs of hypoglycemia.
- Provide information regarding self-administration of insulin.
- Observe the client perform self-administration of insulin.

### Evaluation

- Patient achieves fluid and electrolyte balance.
- Patient achieves metabolic balance.
- Patient demonstrates/verbalizes diabetes survival skills.
- Patient shows no signs of complications.

### Summary

Diabetes mellitus type 1 is a very common disorder in which at least one in every 20 people gets the disorder. Even though there is no cure for diabetes, it can be controlled and managed by keeping blood sugars close to normal. The more you know about diabetes and act upon that knowledge, the healthier you can be. Type 1 diabetes is serious, but people with diabetes can live long, healthy, happy lives.
The tissue area that provides the fastest absorption rate for regular insulin is believed to be the:
A) abdominal area
B) anterior thigh
C) deltoid area

A) abdominal area

The nurse knows that an intermediate acting insulin should reach its “peak” in:
A) 1 to 2 hrs
B) 3 to 4 hrs
C) 4 to 10 hrs

C) 4 to 10 hrs

When teaching a child newly diagnosed with type 1 diabetes mellitus, a nurse should place the highest priority on information regarding:
A) Weight loss measures.
B) Self-monitoring of blood glucose.
C) Need to reduce physical activity.

B) Self-monitoring of blood glucose.

What instruction related to foot care should the nurse include in the discharge teaching plan of a client who has diabetes?
A) Carefully trim toenails once a week with nail clippers.
B) Soak feet for at least 30 minutes every day.
C) Filed and cut toenails even with rounded contour of toes.

C) Filed and cut toenails even with rounded contour of toes.

Exercise will increase a diabetic’s need for insulin
A) True
B) False

B) False.
It will decrease his or her need for insulin.

References
ATL. (2007). Adult Medical-Surgical Nursing (RN Edition 7.1 ed.). Assessment Technologies Institute, LLC.