Management of Clients with Diabetes Mellitus

Chapters 47, (pp 1243-1288)

Baptist Health School of Nursing
NSG 4037: Adult Nursing III
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Famous People with Diabetes Mellitus:
Mary Tyler Moore, Halle Berry, Elizabeth Taylor, Elvis Presley
Diabetes Mellitus

- Types
  - Type 1 and type 2
  - Gestational
  - Other causes

- Etiology and risk factors
  - Type 1 and type 2
Diabetes Mellitus

- Pathophysiology: type 1 and type 2
  - Decreased glucose utilization
    - Hyperglycemia
    - Glucosuria
  - Increased fat mobilization
    - Ketone levels increased
    - Metabolic Acidosis
    - Dehydration
  - Increased protein utilization
    - Catabolism
    - Protein wasting
Diabetes Mellitus: Clinical Manifestations

- **Type 1 Diabetes**
  - Stage 1: Genetic predisposition
  - Stage 2: Environmental trigger
  - Stage 3: Active autoimmunity
  - Stage 4: Progressive beta cell destruction
  - Stage 5: Overt Diabetes Mellitus

- **Type 2 Diabetes**
  - Beta Cells become less efficient
  - Insulin resistance
Diabetes Mellitus: Assessment

- Fatigue, weakness
- Weight loss
- Mild dehydration
- Paresthesias
- Polyuria
- Polydipsia
- Polyphagia
Diabetes Mellitus: Assessment

Type 1 crisis

- Profound dehydration, hyperglycemia, Kussmaul’s respirations, acetone breath, weak and rapid pulse

Type 2 crisis

- Severe dehydration, hypovolemic shock, severe hyperglycemia, shallow respirations, altered mental state
Diabetes Mellitus: Diagnosis

- Fasting blood glucose
- Casual blood glucose
- Postload blood glucose
- Glycosylated hemoglobin
- Glycosylated albumin
- Connecting peptide
- Ketonuria
- Proteinuria
Diabetes Mellitus: Diagnosis

- Oral glucose tolerance test
- Ketonuria
- Proteinuria
- Self-monitoring of blood glucose
Diabetes Mellitus: Medical Management

- Regulate blood glucose
  - Nutrition and physical activity
- Pharmacologic agents
  - Oral antidiabetes agents
  - Insulin therapy
  - Intensive diabetes therapy
  - Combination therapy
Sulfonylureas

- Sulfa based Pills (like some anti-biotics)
- Stimulate the pancreas to release more insulin
- Include:
  - glyburide (*DiaBeta®, Micronase® or Glynase®*),
  - glipizide (*Glucotrol®*),
  - glipizide extended release (*Glucotrol XL™*)
  - and glimepiride (*Amaryl®*).
Biguanides

- Slows down the release of glycogen from the liver
- Makes the body more sensitive to insulin
- Includes:
  - metformin (Glucophage®) and
  - metformin extended release (Glucophage® XR).
Other Oral Medications

- **Meglitinides** cause the pancreas to release insulin over a shorter period of time (after meals). Meglitinides include repaglinide (*Prandin®*).

- **Phenylalanine Derivatives** cause the pancreas to release insulin over a shorter period of time (after meals). Phenylalanine Derivatives include nateglinide (*Starlix®*).

- **Alpha Glucosidase Inhibitors** slow the body’s absorption of carbohydrate. Alpha Glucosidase Inhibitors include acarbose (*Precose®*) and miglitol (*Glyset®*).

- **Combination pills** are two or more medications with complementary actions combined in one pill. One combination pill is currently available: glyburide/metformin (*Glucovance®*).
Diabetes Mellitus: Insulin Therapy

- Insulin sources
- Duration of action
- Insulin dosage
  - Scheduled and sliding dose
- Insulin pump therapy
# Diabetes Mellitus: Insulin Therapy

<table>
<thead>
<tr>
<th>Type of insulin</th>
<th>Begins to work</th>
<th>Working hardest</th>
<th>Stops working effectively</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bolus insulin</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid-acting</td>
<td>5-10 minutes</td>
<td>1 hour</td>
<td>2-4 hours</td>
</tr>
<tr>
<td>Lispro (Humalog®)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Novolog®)</td>
<td>5-10 minutes</td>
<td>1 hour</td>
<td>2-4 hours</td>
</tr>
<tr>
<td>Short-acting</td>
<td>30 min to 2 hr</td>
<td>2-4 hours</td>
<td>4-6 hours</td>
</tr>
<tr>
<td>Regular</td>
<td></td>
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</tbody>
</table>
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<tr>
<td><strong>Background insulin</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate-acting</td>
<td>NPH</td>
<td>2-4 hours</td>
<td>4-10 hours</td>
</tr>
<tr>
<td></td>
<td>Lente</td>
<td>2-4 hours</td>
<td>4-10 hours</td>
</tr>
<tr>
<td>Prolonged intermediate-acting</td>
<td>Ultralente</td>
<td>3-5 hours</td>
<td>6-12 hours</td>
</tr>
<tr>
<td>Long-acting</td>
<td>(Glargine) Lantus</td>
<td>1 hour</td>
<td>No peak</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24 hours</td>
</tr>
</tbody>
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## Diabetes Mellitus: Insulin Therapy

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<tr>
<td>Premixed insulin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75/25 (NPL/Lispro)</td>
<td>5-15 minutes</td>
<td>Early peak - late peak: 1-12 hours</td>
<td>about 18 hours</td>
</tr>
<tr>
<td>70/30 or 50/50 (NPH/ Regular)</td>
<td>30-60 minutes</td>
<td>Early peak - late peak: 2-12 hours</td>
<td>about 18 hours</td>
</tr>
<tr>
<td>70/30 (NPA/ Aspart)</td>
<td></td>
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</tbody>
</table>
Diabetes Mellitus: Nursing Management

- **Readiness for Enhanced Therapeutic Regimen Management**
  - Explain the pathophysiology
  - Plan an exercise program
  - Prevent complications from exercise
  - Plan nutrition therapy

- **Risk for Ineffective Therapeutic Regimen Management**
Diabetes Mellitus: Surgical Management

- Pancreas and pancreas-kidney transplantation
  - Indications
  - Contraindications
  - Complications
  - Nursing management of the surgical client
Diabetes Mellitus: Acute Complications

- Hyperglycemia and Diabetic Ketoacidosis
  - Etiology and risk factors
  - Pathophysiology
Diabetes Mellitus: Acute Complications

- Hyperglycemia and Diabetic Ketoacidosis
  - Clinical manifestations
    - Dehydration
    - Electrolyte Imbalance
    - Ketosis
Diabetes Mellitus: Acute Complications

- Hyperglycemia and Diabetic Ketoacidosis
  - Medical management
    - Rehydrate
    - Reverse Shock
    - Restore Potassium Balance
    - Correct pH
    - Administer Insulin
Diabetes Mellitus: Acute Complications

- (HHNS) Hyperglycemic, Hyperosmolar, Nonketotic Syndrome
  - Hyperglycemia (600-2000)
  - HHNS common in older clients
  - Mortality high
Diabetes Mellitus: Acute Complications

- Hypoglycemia
  - Etiology and risk factors
  - Pathophysiology
  - Clinical manifestations
Diabetes Mellitus: Acute Complications

- Hypoglycemia
  - Medical Management
    - Mild = 10-15g carb
    - Moderate = 20-30 g carb
    - Severe = 50% dextrose,
      25 g IV Glucagon,
      1 mg IM or IV
Diabetes Mellitus: Chronic Complications

- Macrovascular complications
  - Coronary artery disease
  - Cerebrovascular disease
  - Hypertension
  - Peripheral vascular disease
  - Infections
Diabetes Mellitus: Chronic Complications

- Microvascular complications
  - Diabetic retinopathy
  - Nephropathy
- Neuropathy
  - Mononeuropathy
  - Polyneuropathy
  - Autonomic neuropathy
Diabetic Complications

- Diabetic retinopathy: a leading cause of blindness and visual disability
- Kidney failure
- Heart disease
- Diabetic neuropathy
- Diabetic foot disease