**What Is Diabetes Mellitus?**

**Diabetes Mellitus (DM)** is a chronic metabolic disorder characterized by **high blood glucose levels (hyperglycemia)** due to either:

1. **Insufficient insulin production** (Type 1 DM).
2. **Insulin resistance** (Type 2 DM).
3. **Other causes**, such as gestational diabetes or genetic defects.

**Types of Diabetes**

**1. Type 1 Diabetes (T1DM)**

* **Cause**: Autoimmune destruction of insulin-producing **beta cells** in the pancreas.
* **Onset**: Often in childhood or adolescence.
* **Key Feature**: Requires lifelong **insulin therapy**.
* **Symptoms**: Polyuria, polydipsia, polyphagia, weight loss, fatigue.

**2. Type 2 Diabetes (T2DM)**

* **Cause**: Insulin resistance and beta cell dysfunction.
* **Onset**: Typically in adults, but increasing in children due to obesity.
* **Key Features**: May be managed with lifestyle changes, oral medications, or insulin.
* **Risk Factors**: Obesity, sedentary lifestyle, family history, hypertension, dyslipidemia.

**3. Gestational Diabetes Mellitus (GDM)**

* **Cause**: Hormonal changes during pregnancy causing insulin resistance.
* **Onset**: During pregnancy; resolves postpartum in most cases.
* **Complications**: Increases risk of Type 2 DM later in life.

**4. Other Types**

* **Secondary Diabetes**: Caused by medications (e.g., steroids) or medical conditions (e.g., pancreatitis).

**Pathophysiology of Diabetes**

1. **Normal Glucose Regulation**:
   * Insulin is produced by the beta cells of the pancreas.
   * It facilitates glucose uptake into cells for energy.
2. **In Diabetes**:
   * Insufficient insulin or insulin resistance leads to **high blood glucose** levels.
   * Prolonged hyperglycemia damages blood vessels and organs.

A diagram of insulin and insulin

Description automatically generated

**Signs and Symptoms**

**"3 Ps" of Diabetes**

1. **Polyuria**: Excessive urination due to glucose spilling into urine.
2. **Polydipsia**: Excessive thirst due to dehydration.
3. **Polyphagia**: Excessive hunger due to lack of glucose uptake by cells.

**Other Symptoms:**

* Fatigue, blurred vision, slow-healing wounds, recurrent infections, weight loss (T1DM).

**Complications of Diabetes**

**1. Acute Complications**

* **Hypoglycemia**:
  + Low blood sugar (<70 mg/dL).
  + Symptoms: Sweating, shaking, confusion, palpitations.
* **Diabetic Ketoacidosis (DKA)**:
  + Common in T1DM.
  + Symptoms: Fruity breath, rapid breathing, nausea, abdominal pain, altered mental status.
* **Hyperosmolar Hyperglycemic State (HHS)**:
  + Common in T2DM.
  + Symptoms: Severe dehydration, confusion, weakness.

**2. Chronic Complications**

* **Microvascular Complications**:
  + **Retinopathy**: Damage to the retina → blindness.
  + **Nephropathy**: Kidney damage → renal failure.
  + **Neuropathy**: Nerve damage → numbness, pain, foot ulcers.
* **Macrovascular Complications**:
  + **Cardiovascular Disease**: Heart attack, stroke.
  + **Peripheral Artery Disease**: Poor circulation → amputations.

**Diagnosis of Diabetes**

**1. Blood Tests**

* **Fasting Blood Glucose (FBG)**: ≥126 mg/dL (after fasting for 8 hours).
* **Random Blood Glucose**: ≥200 mg/dL with symptoms.
* **Hemoglobin A1C**: ≥6.5% (average blood sugar over 2–3 months).
* **Oral Glucose Tolerance Test (OGTT)**: ≥200 mg/dL after 2 hours.

**Management of Diabetes**

**1. Lifestyle Changes**

* **Diet**:
  + Focus on a balanced diet with **low glycemic index foods**, controlled portions, and adequate fiber.
  + Avoid sugary drinks and high-fat foods.
* **Exercise**:
  + At least 150 minutes of moderate-intensity exercise per week.
  + Improves insulin sensitivity and helps control weight.

**2. Medications**

* **Type 1 DM**:
  + Requires **insulin therapy** (rapid, short, intermediate, or long-acting insulin).
* **Type 2 DM**:
  + **Oral Medications**: Metformin, sulfonylureas, DPP-4 inhibitors, GLP-1 agonists.
  + **Insulin**: If oral medications are insufficient.

**3. Blood Glucose Monitoring**

* **Self-Monitoring of Blood Glucose (SMBG)**: Check glucose levels multiple times a day.
* **Continuous Glucose Monitors (CGM)**: For real-time glucose tracking.

**4. Preventing Complications**

* Regular eye exams (retinopathy screening).
* Foot care (to prevent ulcers and infections).
* Blood pressure and cholesterol management.

**Nursing Care for Diabetes**

**1. Patient Education**

* Teach about symptoms of hypo- and hyperglycemia.
* Demonstrate proper insulin administration and glucose monitoring.
* Emphasize the importance of adherence to medications and lifestyle changes.

**2. Monitor for Complications**

* Assess for signs of DKA or HHS in acutely ill patients.
* Regularly check for neuropathy, retinopathy, and nephropathy.

**3. Dietary Guidance**

* Work with a dietitian to create individualized meal plans.
* Teach portion control and the importance of carb counting.

**4. Promote Physical Activity**

* Encourage regular exercise tailored to the patient’s abilities.

**5. Psychosocial Support**

* Address the emotional impact of living with a chronic condition.
* Provide resources for support groups or counseling.

**Key Mnemonic for Diabetes Management: "ABCDE"**

* **A**: **A1C Control**: Keep HbA1C <7%.
* **B**: **Blood Pressure**: Maintain BP <140/90 mmHg.
* **C**: **Cholesterol**: Manage LDL cholesterol <100 mg/dL.
* **D**: **Diet and Exercise**: Promote healthy eating and activity.
* **E**: **Eyes, Feet, Kidneys**: Regular screenings to prevent complications.

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| **Feature** | **TIDM** | **TIIDM** |
| **Definition** | Autoimmune destruction of beta cells in the pancreas, | Chronic condition involving insulin resistance and beta cell dysfunction. |
| **Onset** | Usually occurs in childhood or adolescence but can occur at any age. | Typically develops in adults but is increasingly seen in children. |
| **Cause** | Autoimmune: body attacks insulin producing beta cells | Insulin resistance and eventual beta cell exhaustion. |
| **Insulin Production** | Little to no insulin Production | Insulin is produced but in insufficient amounts and/or not effectively utilized. |
| **Risk Factors** | Family history, genetic predisposition, possible viral triggers. | Obesity, sedentary lifestyle, family history, advanced age, metabolic syndrome. |
| **Symptoms** | Polyuria, polydipsia, polyphagia, weight loss, fatigue. | Polyuria, polydipsia, blurred vision, slow wound healing, fatigue. |
| **Management** | Requires lifelong insulin therapy blood glucose monitoring, and lifestyle adjustments. Pancreatic transplant or beta cell transplant may be possible | Lifestyle changes (diet, exercise), oral medications, insulin in advanced cases. |
| **Complications** | DKA (diabetic ketoacidosis), hypoglycemia, retinopathy, nephropathy, neuropathy. | HHS (hyperosmolar hyperglycemic state), cardiovascular disease, neuropathy, nephropathy. |

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| **Feature** | **DKA (Diabetic Ketoacidosis)** | **HHS (Hyperosmolar Hyperglycemic State)** |
| **Definition** | Life-threatening complication of Type 1 Diabetes due to severe insulin deficiency. | Severe hyperglycemia without significant ketosis or acidosis. |
| **Primary Population** | Type 1 Diabetes (but can occur in late-stage Type 2). | Type 2 Diabetes, often in elderly patients. |
| **Onset** | Rapid onset (hours to a day). | Gradual onset (days to weeks). |
| **Blood Glucose Levels** | >250 mg/dL. | >600 mg/dL. |
| **Ketones** | High; present in blood and urine. | Low or absent. |
| **Acid-Base Balance** | Metabolic acidosis (pH < 7.3). | Normal or mild acidosis (pH > 7.3). |
| **Dehydration** | Moderate to severe. | Severe. |
| **Symptoms** | Fruity breath, Kussmaul respirations, nausea, abdominal pain, confusion. | Extreme dehydration, confusion, seizures, coma. |
| **Complications** | Cerebral edema, severe hypokalemia, death. | Thrombosis, severe dehydration, death. |
| **Management** | IV fluids, IV insulin, electrolyte replacement (potassium, bicarbonate if needed to correct acidosis). | Aggressive IV fluids, IV insulin, electrolyte replacement. |

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| **Hot and Dry-Sugar is High** |  | **Needs Insulin** |
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| **Cold and Clammy-Needs Some Candy** |  | **Needs Some Sugar** |