

Diabetes Mellitus

Definition

Is a Group of Metabolic Diseases Characterized by Hyperglycemia Due to Autoimmune Cell Destruction, Insulin Deficiency, Insulin Resistance.

Symptoms

(Polyuria, Polydipsia, Weight Loss, Polyphagia, Blurred Vision, Infection).

FBS 100-125 mg/dL, Random Blood Sugar > 200mg/dL.

Types of DM (Aetiology)

Type I (Immune Mediated) 5-10% of Patients (Mainly Infants and Children) Liable to Keto – Acidosis than Type II . Minority Have no Mediated Bases.

Type II (Range from Insulin Deficient Secretion to Insulin Resistance 90-95% of Cases).

Risk Factors

(Obesity, Dyslipidemia, Hypertension, Gestational DM).

Maturity Onset Diabetes (MODY)

Impaired Insulin Secretion with Minimal or No Defect in Insulin Action. Autosomal Dominant, SI Genetic Loci – Most Common Mutation Chromosome 12 in Hepatic Transcription Factor (HNF) -1a.

Genetic Defect in Insulin Action

Mutation of Insulin Receptor Ranging from Hyperinsulinemia to Modest Hyperglycemia to Sever Diabetes.

Diseases of The Exocrine Pancreas (Injury to Pancreas)

(Pancreatitis, Trauma, Infection, Pancreatectomy Adenocarcinoma).

Endocrinopathy

(Growth Hormone, Cortisol, Glucagon, Epinephrine).

Drugs or Chemical-Induced Diabetes

Impaired Insulin Secretion and or Insulin Resistance,
Rat Poison, I.W Pentamidine.

Infection (Due to Viruses e.g. Congenital Rubella).

Gestational Diabetes: Is a Condition in Which a Woman Without Diabetes Develops High Blood Sugar Levels During Pregnancy, Seen in 3-9% of Pregnancies.

Complications to Mother

Pre-Eclampsia, Depression, Caesarian Section, Cure often Developed in 90% of Cases.

Complications to Baby

Large Baby (Macrosomia), Low Blood Sugar, Jaundice, Overweight, Develop Type 2 DM.

Goals & Treatment of Diabetes Mellitus

- 1) Balance Food Meals with Exercise
 - 2) Taking Medication (Insulin and or Oral Medication)
(Insulin in Type I DM)
 - 3) Control The Lipids
 - 4) Control Blood Pressure
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Mechanism & Drugs in The Treatment of DM

- 1) Stimulates Pancreas to Release Insulin
 - 2) Improve the Response of Cells to Insulin
 - 3) Prevent Glucose Production From the Liver
 - 4) Slow the Absorption of Glucose After Meals
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Complications of Diabetes Mellitus

- 1) Cardiovascular Disease (Angina, Stroke, MI).
- 2) Nerve Damage → Via Damage of Small Capillaries That Nourish the Nerve (Hearing Damage).
- 3) Sympathetic Nervous System Dysfunction
(Nausea, Vomiting, Diarrhea, Constipation).
- 4) Kidney Damage (Nephropathy).
- 5) Eye Damage (Retinopathy). Blindness, Cataract
Glaucoma.
- 6) Foot Damage (Nerve and Blood Vessel Infection,
Gangrene, Amputation).
- 7) Alzheimer's Disease.
- 8) Depression.

Diabetic Patient and Surgery

- 1) Ask the Patient about Type of Medications and Their Duration of Action.
 - 2) Patient Taking Metformin May be Stopped 24-48 Hours Before Surgery Due to Lactic Acidosis.
 - 3) SGLT2 Inhibitor (Gliflozins) May Increase the Risk of Blood Sugar during Surgery.
 - 4) Reassess the Dose of Insulin Before Surgery.
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How Do We See DM Patient After Surgery

- 1) May Have Trouble Eating.
 - 2) Vomiting.
 - 3) Psychological Status.
 - 4) Less Active than Usual.
 - 5) Have Pain or Discomfort.
 - 6) Arrange Their Medication.
 - 7) Watching Any Signs of Infection.
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Peptic Ulcer

Location: Stomach, Duodenum, Jejunum

Aetiology

- 1) Helicobacter Pylori (H. Pylori).
 - 2) Long Term Use of NSAIDS (Brufen).
 - 3) Imbalance Between Acid and Mucus in the Gastrointestinal System.
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Symptoms

- 1) Burning Stomach Pain
 - 2) Feeling of Fullness
 - 3) Intolerance to Fatty Food
 - 4) Heartburn
 - 5) Nausea
 - 6) Dark Blood in Stool
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Risk Factors: Smoking, Alcohol, Spicy Food, Stress, Blood Thinning Agents like Aspirin, Clopidogrel, Warfarin. Enhancing Bleeding from Gastric Ulcer.

Complications

- 1) Internal Bleeding
- 2) Perforation
- 3) Obstruction
- 4) Gastric Cancer
- 5) Peritonitis (Antimicrobial Therapy, Intensive Care Support)
- 6) Sepsis and Shock

Anesthesia and Peptic Ulcer is Challenging Because:

- 1) Delayed Presentation
- 2) Old Age
- 3) Hemodynamic Instability
- 4) Presence of Sepsis
- 5) Organ Dysfunction

Investigations: Endoscopy, Biopsy, C14 Breath Test.

Treatment

- 1) Antibiotic to Destroy H. Pylori.
- 2) Proton Pump Inhibitor.
- 3) H2 Receptor Antagonist.
- 4) Reducing Acid by Tablet as Anti Acid.
- 5) Quitting Smoking, Alcohol.

Management of Upper Gastrointestinal Bleeding

All Patients with (UGIH) Must be Managed at Hospitals.

Mallory-Weiss Tear: Persistent Vomiting Followed by Hematemesis at the Junction between Esophagus & Stomach

Gastroesophageal Varices Bleeding Sever Mostly Due to Chronic Liver Disease.

Investigations

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|----------------------|------------------------|
| 1) Full Blood Count | 3) Liver Function Test |
| 2) Urea & Creatinine | 4) Clotting |
| 5) Cross Match | |

Risk Assessment (Rockall Scoring System & Glasgow by Blatchford. e.t.)

Rockall Score (Age, Shock, Comorbidity, Diagnosis Major SRH)

Treatment of Upper GI Bleeding

- 1) 100% Oxygen
- 2) Intravenous Access (Fluid, Blood)
- 3) Central Venous Line
- 4) Catheter in Urinary Bladder
- 5) Therapeutic Endoscopy
- 6) Eradicating H. Pylori
- 7) Injection of Adrenaline
- 8) Heater Probe

Cause of Upper GI Bleeding

- 1) Peptic Ulcer 35-50%
- 2) Gastroduodenal Erosion 8-15%
- 3) Esophagitis 5-15%
- 4) Varices 5-10%
- 5) Mallory-Weiss 15%
- 6) Upper GI Malignancy 1-2%
- 7) Vascular Malformation 5%
- 8) Miscellaneous 5%

Blatchford Score Depends On

- | | |
|--------------------|--------------------|
| 1) Blood Urea | 2) HB |
| 3) SBP | 4) Pulse |
| 5) Melena | 6) Hepatic Disease |
| 7) Cardiac Disease | |

Heart Failure

Heart Failure Means that The Heart is Unable to Pump Blood Around the Body Properly.

HFpEF→ Heart Failure with Preserved EF.

HFmrEF→ Heart Failure with Mildly Reduced Ejection Fraction.

HFrEF→ Heart Failure with Reduced Ejection Fraction.

HFimpEF→ Heart Failure with Impaired EF.

Symptoms of Heart Failure

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|--------------------------------|--------------------------|
| 1) Shortness of Breath | 2) Fatigue and Weakness |
| 3) Leg Oedema | 4) Rapid Irregular Pulse |
| 5) Reduced Ability to Exercise | 6) Dry Cough |
| 7) Chest Pain or Tight Chest | |
| 8) Difficulty of Concentrating | |

Causes of Heart Failure

- 1) Coronary Heart Disease.
- 2) Heart Attack.
- 3) High Blood Pressure.
- 4) Heart Valve.
- 5) Inflammation of Heart Muscle.
- 6) Congenital Heart Disease.
- 7) Arrhythmias.
- 8) Others like DM, HIV, Hypox Hyperthyroidism, Build up Na⁺ and Protein.

Complications of Heart Failure

- | | |
|-------------------|--------------------------|
| 1) Kidney Damage. | 2) Damaged Heart Valve. |
| 3) Liver Damage. | 4) Sudden Cardiac Death. |

Investigations of Heart Failure

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|----------------------------|---------------------------------------|
| 1) Blood Test | 2) CXR |
| 3) Electro Cardiogram | 4) Echo Cardiogram |
| 5) Exercise Test or Stress | 6) CT scan of the Heart |
| 7) MRI Scan | 8) Coronary Angiogram |
| 9) Myocardial Biopsy | 10) BNP (B-Type Natriuretic Peptides) |

New York Heart Association (NYHA) Classification:

Class 1 HF → No Heart Failure Symptom.

Class 2 HF → Daily Activity Done with Exertion.

Class 3 HF → Difficulty in Completing Daily Activity.

Class 4 HF → Shortness of Breath at Rest Even Sever Heart Failure.

American College of Cardiology

Stage A → There are Several Risk Factors for Heart Failure but No Signs & Symptoms.

Stage B → There Is Heart Disease but No Signs or Symptoms of Heart Failure.

Stage C → There is heart disease and Signs & Symptoms of Heart Failure

Stage D → Advanced Heart Failure Requires Specialized Treatment.

Treatment (Pharmacological)

- 1) Angiotensin Converting Enzyme (ACE) Inhibitors.
- 2) Angiotensin Receptor Blockers (ARBs).
- 3) Angiotensin Receptor plus Neprilysin Inhibitor (ARNI).
- 4) P-Blockers.
- 5) Diuretics (Loop Diuretics, Potassium Sparing Diuretics, Sodium-Glucose Cotransporter₂ (SGLT₂).
- 6) Digoxin.
- 7) Hydralazine and Isorbide Dinitrate.
- 8) Vericiguat (Oral Soluble Guanylate Cyclase Stimulator SGC).
- 9) Positive Inotropes (IV).
- 10) Other Medicines (Receive Nitrate, Statins, Blood Thinners).

Surgical Procedure in Cardiac Disease

- 1) Coronary Bypass Surgery.
- 2) Heart Valve Repair or Replacement.
- 3) Implantable Cardiovascular-Defibrillators (ICD).
- 4) Cardiac Resynchronization Therapy (CRT).
- 5) Ventricular Assist Device.
- 6) Heart Transplant.

The Three Major Risk Factors for Heart Failure

- 1) Age
- 2) Hypertension
- 3) Coronary Artery Disease

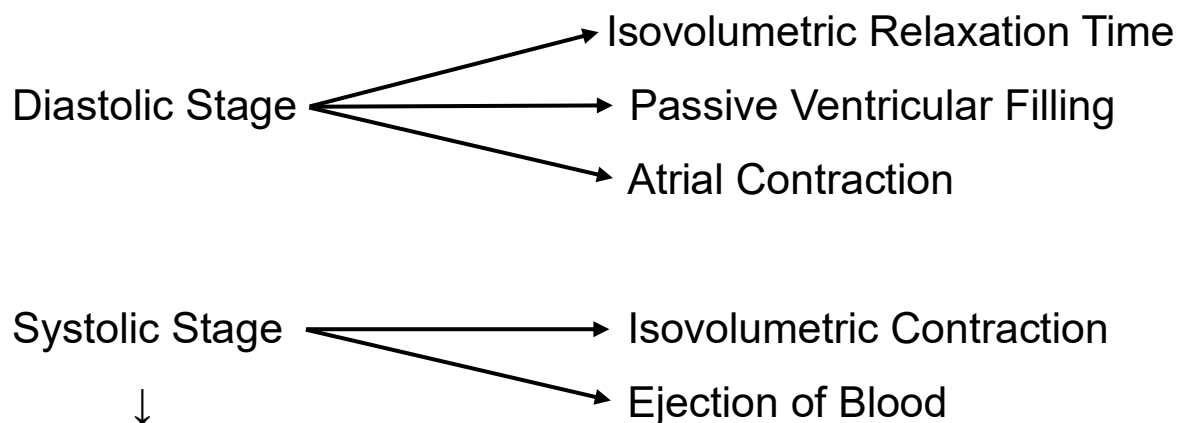
Systemic Vascular Resistance is The Amount of Force Exerted on Circulating Blood by The Vasculature of The Body.

Structural Change in Heart Failure

- 1) Enlargement of The Heart.
- 2) Increased Wall Thickness.
- 3) Stiffness.
- 4) Fibrosis.
- 5) Myocellular Hypertrophy.

Stroke Volume is The Volume of Blood Pumped Out of The Left Ventricle During Each Systolic Cardiac Contraction.

Cardiac Output is The Amount of Blood Pumped / Minute.



Neuroendocrine Response.

Baroreceptors Increase Sympathetic Nervous System.

Three Factors Affect Cardiac Output

(Preload, Afterload, Contractility).

There is No Evidence of Benefit of General Versus Regional Anaesthesia with Cardiac Patient and Heart Failure.

Hypertension

→ 42% of Adults Have Hypertension.

1 in 5 with Hypertension is Under Control.

30% of Males have HTN.

28% of Females have HTN.

Etiology

- | | |
|----------------------|--------------------------|
| a) Age | b) Diet and Salt |
| c) Modern Lifestyle | d) Family History |
| e) Cigarette Smoking | f) Diet Low in Potassium |

Risk Factors

A) Modifiable Risk Factors

- | | |
|---|----------------|
| 1) Diet High in Salt and Saturated Fat. | 3) Alcohol. |
| 2) Physical Inactivity. | 5) Overweight. |
| 4) Tobacco. | |

B) Non-Modifiable

- 1) Old Age.
- 2) Genetics.
- 3) Co-Existing Disease. Such as DM and Kidney Disease.

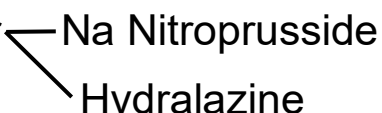
Symptoms

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|----------------------------|--------------------|------------------|
| 1) Severe Headache | 2) Chest Pain | 3) Dizziness |
| 4) Difficulty Breathing | 5) Nausea | 6) Vomiting |
| 7) Blurred Vision | 8) Buzzing in Ears | 9) Nose Bleeding |
| 10) Abnormal Heart Rhythm. | | |

Treatment

- a) Lifestyle Changer.
- b) BP Goal is less than 130 / 80 if have:
 - 1) Cardiovascular Disease.
 - 2) Diabetes.
 - 3) Chronic Kidney Disease.

Drugs

- 1) ACE Inhibitor (Enalapril → Relax Blood Vessel).
- 2) Angiotensin-2 Receptor Blocker (ARBs) → Relax Blood Vessel.
- 3) Calcium Channel Blockers (Amlodipine → Relax Blood Vessel).
- 4) Diuretics. 5) B Blocker. 6) Vasodilator 
 - Na Nitroprusside
 - Hydralazine

Control Blood Pressure → Reduce Heart Attack, Stroke, Kidney Damage, Retinopathy.

Control → Reduce Atherosclerosis, Left Ventricular Hypertrophy, Diastolic Dysfunction, Reduced Coronary Blood Flow (All End Organs Damage).

Summary

- 1) BP 180 / 100 This Patient Can be Munged Safely on the Day of Surgery.
- 2) If BP 180 / 110 With no History of Hypertension, Elective Surgery Should be Postponed.
- 3) If SBP → 200 mm Hg Surgery Cancelled.
- 4) DRP → if 110 Is Risk Factor for Cardiovascular Complication.
- 5) If Surgery is Emergency → Monitoring ↑BP (in PACU) or (ICU).

Resp Disease

Asthma → Oedema, Inflammation, Muscle Spasm and Reversible, Patients on Steroids May Need Supplementation of 1 Extra Dose.

Avoid Aspirin and or NSAIDS. Ketamine and All Volatile Agents Are Bronchodilator Atracurium and Tubocurarine Should be Avoided. also, Morphine, Pethidine is an Alternative.

Postoperative Care

- | | |
|-------------------------------------|--------------------------------|
| 1) Adequate Analgesia. | 2) Humidified O ₂ . |
| 3) Regular Physiotherapy. | 4) Maintain Hydration. |
| 5) Antiasthma Medication (Steroid). | |
| 6) Failure Ventilation May (ICU). | |
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Chronic Obstructive Pulmonary Disease (COPD)

Irreversible, Hypersecretion and Repeated Infection.

Investigation is The Same as Asthma.

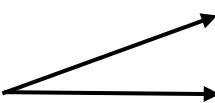
Causes → Intrinsic (Pulmonary Fibrosis, Asbestosis).

→ Extrinsic (Obesity, Kyphoscoliosis).

Cysticfibrosis → Antibiotic.

Bronchiectasis → Antibiotic.

Tuberculosis → if Acute Antituberculosis.

If Emergency → 

After Surgery → Very Well Sterilized.