“Primary Adrenal Insufficiency”

ADDISON DISEASE
Adrenocortical insufficiency comprises of primary and secondary adrenal insufficiency.

Primary adrenal insufficiency can be congenital or acquired.

Acquired primary adrenal insufficiency is termed as Addison disease.
Addison Disease is the result of an under active adrenal gland. An under active adrenal gland produces insufficient amounts of cortisol (hormones that help control the body's use of fats, proteins and carbohydrates, suppress inflammatory reactions in the body, and affect immune system function) and Aldosterone (that maintains body salts and water).
Cortisol
Very Low

Non functioning Adrenal gland

Aldosterone
very Low

Shock

Liver function

low sugar

Digestive enzyme

vomiting, diarrhea

Kidney, Na & water loss

Low fluid volume

Heart, irregular
Decrease output

Low BP

Brain, Coma

Pathophysiology
ETIOLOGY

- Autoimmune adrenalitis
  - Isolated autoimmune adrenalitis
  - Autoimmune adrenalitis as a part of APS
    - APS type 1
    - APS type 2
    - APS type 4

- Infectious Adrenalitis
  - Tuberculous adrenalitis
  - Fungal adrenalitis
  - HIV associated

- Bilateral Adrenal Haemorrhage
- Bilateral Adrenalectomy
Genetic Disorders

- Adrenoleukodystrophy
- Congenital adrenal hyperplasia
- Congenital lipoid adrenal hypoplasia
- ACTH insensitivity syndrome
- Smith-Lemli-Opitz syndrome
- Triple A syndrome

Adrenal infiltration

Drug induced adrenal insufficiency
Autoimmune Addison Disease

- Autoimmune destruction of the adrenal glands is the most common cause of Addison Disease.

- Component of autoimmune polyendocrinopathy syndromes:
  - APS type 1:
    - Chronic mucocutaneous candidiasis
    - Hypoparathyroidism
    - Addison Disease
  - APS type 2:
    - Addison disease with
    - Autoimmune thyroid disease (Schmidt syndrome) or
    - Type 1 Diabetes Mellitus (Carpenter Syndrome)
Infections

- Most frequent infectious etiology is Meningococcemia.
- Tuberculosis is Second common cause of adrenal destruction.
- HIV infection.
Drugs

- Ketoconazole
- Rifampicin
- Phenobarbitone
- Phenytoin
- Mitotane
Haemorrhage into Adrenal Gland

- Breech presentation
- Anticoagulant therapy
- Child Abuse
HOW THEY PRESENT
- Hypoglycemia
  - (sweating and irritability)
- Hypotension
- Hypovolemic
- Hyponatremia
- Hyperkalemia
Hyperpigmentation

Marked at exposed areas, buccal and gingival mucosa, at scars and genitalia.
Non specific signs:

- Muscle weakness
- Malaise
- Anorexia
- Weight loss
- Orthostatic hypotension
HOW TO INVESTIGATE
Serum electrolytes:
- Hypoglycemia
- Hyponatremia
- Hyperkalemia

ABG

Renal function

Plasma renin activity

Urinary Sodium, and potassium levels

CT scan and MRI
Specific:

Serum cortisol levels (low)

- Before stimulation
- After stimulation
- i.e. 30 – 60 min after administration of 0.25mg cosyntropin
MANAGEMENT
IMMEDIATE MANAGEMENT

- Intravenous administration of 5% dextrose.
- 0.9% saline solution
- Hydrocortisone
  - Hydrocortisone sodium succinate
  - Intravenously, 6 hourly for 24 hours
  - 10mg in infants, 25mg in toddlers, 50 mg in children, and 100 mg in adolescent.
- Treat hyperkalemia
LONG TERM MANAGEMENT

- **Cortisole replacement**
  - Hydrocortisone
  - **Daily dose:**
    - 10 mg/m²/24 hours
    - 3 divided doses
  - **High doses:**
    - 2 – 3 folds increased dose
    - Infection
    - Stress
    - Minor surgery
    - Major surgery (intravenous steroids)

- **Aldosterone replacement**
  - Fludrocortisone
  - 0.05 – 0.3 mg per day orally
Follow up

- Adherence to treatment
  - ACTH levels are mainstay to monitor the adequacy of replacement therapy
- Adverse effects of treatment
- Frequency of crisis