Approach to Hypoglycemia in pediatrics.

* Any patient with acute lethargy or coma should have an immediate measurement of blood glucose to determine if hypoglycemia is a possible cause.
  * other findings,

Clinical presentation:

Symptoms of hypoglycemia can be divided into

A. Neurogenic (autonomic) symptoms. → Sympathetic nervous system response to hypoglycemia.
ex. Sweating, tremors, palpitation, tachycardia & hunger (plasma glucose < 55-60 mg/dl)

B. Neuroglycopenic symptoms → insufficient supply of glucose to the brain leading to brain dysfunction.
ex: lethargy, confusion, irritability, loss of consciousness & seizures (plasma glusc < 50 mg/dl)

Hypoglycemic-Associated Autonomic Failure (HAAF): failure of the autonomic nervous system to respond to hypoglycemia due to repeated exposure to hypoglycemia (adaptation).

Causes of hypoglycemia in children.

Disorder

① Insulin mediated
1. Hyperinsulinism; congenital, perinatal (stress induced), *Syndromic*
2. Insulinoma; associated with MEN1
3. Factitious
4. Congenital disorders, phosphomannomutase 2 deficiency, phosphoglucomutase 1 deficiency, Mannosephosphate isomere deficiency.

② Ketotic hypoglycemia
1. Disorders of glycogen metabolism
Glycogen storage diseases
type 0, III, VI, IX
2. Hormone deficiencies
✓ Growth hormone deficiency
✓ Cortisol deficiency.
3. Ketone utilization defects
4. Idiopathic ketotic hypoglycemia

③ Disorders of gluconeogenesis
1. Glycogen storage disease I
2. Fructose-1,6-biphosphatase deficiency
3. Pyrovate carboxylase deficiency
4. Galactosemia.
5. Heriditiry fructose intolerance.

④ Fatty acid oxidation disorders.
1. Medium chain acyl-Co-A dehydrogenase
2. 20+ other

⑤ Other causes
1. Ingestion
oral hypoglycemic, ethanol, salicylate, β-blockers, pentamidine, ...
2. Liver failure
3. Sepsis

- **Physical Signs**

✓ Hypopituitarism / growth hormone deficiency ⟶ Midline defects (eg; single central incisor, optic nerve hypoplasia, cleft lip/palate, umbilical hernia) & Microphallus / undescended testes in males.

✓ Hepatomegaly ⟶ glycogen storage disease.

✓ Macroglossia, abdominal wall defects or hemihypertrophy may indicate Beckwith-Wiedemann syndrome

✓ Hyperventilation ⟶ metabolic acidosis from an inborn error of metabolism/ingestion

✓ Hyperpigmentation ⟶ primary adrenal insufficiency (growth hormone).

✓ Bick with-wiedman syndrome (BWS) is an overgrowth disorder caused by abnormal genomic imprinting on chromosome 11p15

- Chromosome 11p15 contains genes that regulate growth. two main functions

1. IGF-2 → Promotes growth
2. CDKN1C → suppress cell proliferation

✓ The mutation results in ↓growth suppression, ↑ glucose uptake (IGF-2 acts like insulin), ↑ risk of oncologic tumors (Wilms tumor, Hepatoblastoma)

Sumary of clinical presentation:

Overgrowth + Neonatal hypoglycemia + tumor risk.