HEMOLYTIC-UREMIC SYNDROME

- ETIOLOGY.
- PATHOGENESIS.
- CLINICAL MANIFESTATION.
- INVESTIGATION.
- D.DX.
- TREATMENT.
- PROGNOSIS.
HUS is a common cause of community-acquired ARF in young children.

It is characterized by the triad of:

- **MICROANGIOPATHIC HEMOLYTIC ANEMIA**
- **THROMBOCYTOPENIA**,
- **RENAL INSUFFICIENCY**.
HUS can be classified according to etiology as follows:

- **Infection-induced** (most common); it includes:
  - Verotoxin-producing *E. coli* (most common 057:H7),
  - Shiga toxin-producing *Shigella dysenteriae* type 1 (common),
  - *Streptococcus pneumoniae* (rare), and HIV (rare).

- **Genetic (Atypical)** HUS include: Familial AR & AD of undefined etiology, recurrent, undefined etiology without diarrhea prodrome.
• **Diseases associated** with microvascular injury include: SLE, Following BM transplantation, Malignant hypertension.

• **Medication-induced** include: some immunosuppressant & cytotoxic medications.
Pathogenesis:

- **Microvascular injury with endothelial cell damage** is characteristic of all forms of HUS, capillary and arteriolar endothelial injury in the kidney particularly in glomeruli, leads to localized thrombosis causing a direct decrease in GFR.

- Progressive platelet aggregation in the areas of microvascular injury results in consumptive thrombocytopenia.

- Microangiopathic hemolytic anemia results from mechanical damage to red blood cells as they pass through the damaged and thrombotic microvasculature.
Clinical manifestation:

HUS is most common in preschool and school-aged children.

- In HUS caused by E. coli, onset of HUS occurs a few days (as few as 3 days up to 3 wk.) after onset of gastroenteritis with fever, vomiting, abdominal pain, and diarrhea which is often bloody, but not necessarily, especially early in the illness.

Following the prodromal illness, a sudden onset of pallor, irritability, weakness, lethargy and Oliguria.
• Patients can develop petechiae, but significant or severe bleeding is rare despite very low platelet counts.

• Patients with pneumococcus-associated HUS usually are ill with pneumonia and empyema when they develop HUS.

• E coli is usually transmitted by undercooked meat, unpasteurized milk, contaminated apple cider or bathing in contaminated swimming pool.
Investigation:

I. CBP shows :
   - **Hb** is in the range of **5-9gm/dl**.
   - **Thrombocytopenia** is an invariable finding in the acute phase
   - Leukocytosis is present

i. **Blood film**: microangiopathic hemolytic anemia with schistocytes, burr cells, helmet cells and fragmented RBCs.

ii. **Coombs test** is **negative**.

iii. **PT & PTT** are usually **normal**.

iv. **RFT**: Renal insufficiency can vary from mild elevations in BUN to **ARF**.
schistocytes
D.Dx.

- THROMBOTIC THROMBOCYTOPENIC PURPURA (TTP)
- SLE.
- MALIGNANT HYPERTENSION.
- BILATERAL RENAL VEIN THROMBOSIS.
Treatment:

- Careful management of fluid and electrolytes e.g. correction of volume deficit, control of hypertension, and early institution of dialysis if the patient becomes anuric.

- Plasmapheresis or FFP has been recommended.

- Red cell transfusions are usually required because hemolysis can be brisk and recurrent until the active phase of the disease has resolved.
Platelets **should not be administered**, regardless of platelet count because they are almost immediately consumed by the active coagulation and can theoretically worsen the clinical course.

Antibiotic therapy **is not recommended** as it result in increased toxin release, potentially exacerbating the disease.
PROGNOSIS:

- The mortality rate for diarrhea-associated HUS after careful supportive care has declined to <5%. Most recover renal function completely, but of surviving patients, 5% remain dependent on dialysis.

- The prognosis for HUS that not associated with diarrhea is more severe, with mortality reported ≈20%. The familial forms of HUS have a poor prognosis.
Thank you