HEMOLYTIC-UREMIC SYNDROME

HUS is a common cause of community-acquired ARF in young children. It is characterized by the triad of:

- ✓ *microangiopathic hemolytic anemia*
- ✓ *thrombocytopenia,*
- ✓ *and renal insufficiency*.

❖ Etiology:

HUS can be classified according to etiology as follows:-

- ***Infection-induced*** is the most common cause of HUS; it include: Verotoxin-producing E coli (most common, especially 057:H7 type), Shiga toxin-producing Shigella dysentereriae 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.
- Other **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 exotoxin-producing 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.

- Ecoli is usually transmitted by undercooked meat, unpasteurized milk, contaminated apple cider or bathing in contaminated swimming pool.

❖ Investigation:

1. CBP shows Hb in the range of 5-9gm/dl.
2. Thrombocytopenia is an invariable finding in the acute phase.
3. Leukocytosis is present.
4. Blood film :microangiopathic hemolytic anemia with schistocytes, burr cells , helmet cells and fragmented RBCs.
5. Coombs test is negative.
6. PT & PTT are usually normal.
7. RFT: Renal insufficiency can vary from mild elevations in BUN to ARF.

❖ D.Dx.

- ✓ Thrombotic Thrombocytopenic Purpura (TTP)
- ✓ SLE
- ✓ Malignant hypertension
- ✓ Bilateral renal vein thrombosis.

Treatment:

I. 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.
II. Red cell transfusions are usually required because hemolysis can be brisk and recurrent until the active phase of the disease has resolved.
III. 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.
IV. Antibiotic therapy is not recommended as it results 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.