Acute Poststreptococcal Glomerulonephritis

Definition:

This disease is the classical example of acute nephritic syndrome.

It is characterized by:

- **Sudden onset of gross haematuria.**
- **Edema.**
- **Hypertension.**
- **Renal insufficiency.**

Etiology:

APSGN usually follows group A streptococcal infection of URT or the skin.

Glomerulonephritis following pharyngeal streptococcal infections more common in cold climate & children at school age.

While those glomerulonephrits following skin infection is more common in hot climate &preschool age children.

Clinical Features:

This disease is rare before age of 3 years, most common in children ages 5-12 yr and usually developed 1-2wks after streptococcal pharyngitis or 3-6 wk after a streptococcal skin infection.

The onset is abrupt & the patient develops:

- **Dark color urine**
- **Mild periorbital edema**
- **Decrease urine out put**

- **Flank or abdominal pain**
- **Low grade fever**
- **Hypertension**

Acute hypertension may cause headache , vomiting , disturbed consciousness level→ hypertensive encephalopathy.

Or dyspnea, tachypnea, tender hepatomegaly due to heart failure.

The acute phase last 6-8 wks.

Labratory Finding:

- **GUE: demonstrate RBC, RBC casts**

Mild - moderate proteinuria < 2gm/24hr.

Leucocytes are common.

- **Renal function test: B.U, S.Creatinine are elevated.**
- **CXR.:may show pulmonary congestion.**
- **Throat swab for C/S**
- **Serum C3 level usually *reduced.***

►Test to confirm the recent streptococcal infection which includes:

- **Elevated ASO titer, but this titer rarely elevated after skin streptococcal infection.**

● The best single antibody titer to document cutaneous streptococcal infection is the antideoxyribonuclease B level.
● Streptozyme test which is slide agglutination test that detect Abs to streptolysin O, Dnase B ,hyaluronidase.

Treatment:

There is no specific therapy for acute PSGN .the management is that of acute renal failure, 10 days of systemic antibiotic therapy with penicillin is recommended to limit the spread of micro-organism.

Antihypertensive therapy (diuretics, calcium chanal blocker, ACEI) for treatment of hypertension like:
calcium channel blockers (amlodipine, 0.1-0.6 mg/kg/24 hr divided bid) or β-blockers (propranolol , 0.5-8 mg/kg/24 hr divided bid) .
labetalol (4-40 mg/kg/24 hr divided bid or tid) may be helpful in maintaining control of blood pressure.

Prognosis:

Complete recovery occurs in more than 95%of cases.

Recurrences are extremely rare.

Infrequently, the acute phase is severe and leads to glomerulosclerosis and chronic renal disease in <2% of affected children.

Complications:

1. **Acute renal failure: rarely occurs in less than 5% of cases.**
2. **Volume over load**
3. **Heart failure: due to HT&volume over load**
4. **Hypertensive encephalopathy:**

Presented with headache, vomiting, disturbed consciousness level and even convulsions.

It is medical emergency & should be treated urgently.
a continuous infusion of Sodium nitroprusside (0.5-1 ug/kg/min),

Labetalol (0.25-3.0 mg/kg/hr),

Or esmolol (150-300 ug/kg/min).

Urinary Tract Infection:

Objectives:
● Discuss classification, etiology, and pathogenesis of urinary tract infection.
● Identify the risk factors for urinary tract infection.
● Know clinical presentation of urinary tract infection.
● Discuss laboratory evaluation and treatment of a child with urinary tract infection.
● Discuss the follow up evaluation of a child with urinary tract infection.

UTI is the most common genito urinary disease of childhood with prevelance of 3-4% in girls & 1% in boys.

Etiology:

UTI are caused by colonic bacteria, in female 75-90% are caused by *E.coli* followed by *Klebsiella, proteus* & *staphylococcus saprophyticus.*
Viral infection (adeno virus) may cause cystitis.

Classification:

There are three basic form of UTI:

1. **Pyelonephritis**
2. **Cystitis**
3. **Asymptomatic bacteriuria**

Pyelonephritis or upper UTI

Is characterised by any or all of the following:

- **Abdomenal or flank pain.**
- **Fever, malaise.**
- **Nausea & vomiting.**
- **non-specific symptom such as poor feeding, irritability, Jaundice especially in newborn or infant.**

Cystitis:

Indicate bladder involvement & presented with:

- **dysuria**
- **urgency & frequancy**
- **suprapubic pain**

Asymptomatic bacteriuria:

This condition refer to children who have a positive urine culture without any manifestation of infection & occur almost in girls.
This condition is benign & dose not cause renal injury.

Pathogenesis:

Nearly all UTI are ascending infection, the bacteria arise from fecal flora, colonize the perinium, entered the bladder via the urethra.

In some cases the bacteria ascend to the kidney to cause pyelonephritis, rarely UTI may occur by hematogenous spread.

Risk factors for UTI:

- **Female sex**
- **Uncircumcised male**
- **Toilet training children**
- **Voiding disorder**
- **Constipation**
- **Obstructive uropathy**
- **Congenital malformations of urinary tract**
- **Pinwarm infestation**
- **Urethral instrumentation**
- **Pregnancy**

Diagnosis:

- **CBP:**

Will show leukocytosis, neutrophilia & elevated ESR& C-reactive protein , those are non specific & usually occur in acute pyelonephritis.

●Urinalysis

-Pyuria (leukocytes in urine) suggestive of UTI.

-Nitites & leukocyte esterase usually positive in UTI.

-Microscopical hematuria is common in UTI.

●Urine Culture:

To make diagnosis of UTI, urine must be cultured there are several ways to obtain urine culture:

1.Mid stream urine sample:

this sample usually obtain in toilet trained children, if culture show >100000colonies of single pathogen it considered UTI or 10000 colonies in a symptomatic child.

2.Adhesive steirle collection urine bag:

usually used for infants but it has problem of contamination negative result will exclude infection.

3.Catheterization .
4.Suprapubic bladder puncture.

Treatment:

Cystitis:

5-7days course of therapy with trimethoprim-sulfamethoxizole is effective.
***or* nitrofurantoin 5-7mg/kg/day**
amoxicillin 50mg/kg/day for the same period of time.

Acute pyelonephritis:

7-14 days course of broad spectrum antibiotics such as ceftriaxone(50-75mg/kg/day) or cefotaxime (100 mg/kg/24 hr) or combination of ampicillin 100mg/kg/day + gentamicin 3-5mg/kg/day.

Prophylactic antibiotic:

Trimethprim-sulfamethoxizole, nitrofurantoin

these drugs given at one third of normal

therapeutic dose once aday.

Indication of prophylactic Antibiotic:

- **neurogenic bladder**
- **Urinary tract stasis & obstruction**
- **vesicouretral reflux**
- **calculi**

Follow-up Evaluation of UTI:

▲Urine Culture

Urine culture should be perform 1wk after the end of treatment , &because UTI has tendency of recurrence, follow up with urine culture first at 1mo. interval &then at 3 mo. interval for 1-2years.

▲Imaging Studies:

The goal of imaging studies in children with UTI, is to identify anatomical abnormalities that predispose to infection. These studies include:

1. Renal U/S:
To rule out:

- **♦ Hydronephrosis**
- **♦ Renal & perirenal abscesses**
- **♦ Pyelonephritis or renal scaring.**

2. Voiding Cystourethrogram(VCUG):
Indications:

- **all children <5years with UTI**
- **any child with febrile UTI.**
- **any male with UTI**
- **school aged girls with 2 or more UTI**

It usually perform 2-6wk &the most common finding is vesicouretral reflux.

3. DMSA scan (2,3dimercaptosuccinic acid):

DMSA scan is most sensitive method in detecting renal scaring that occur after UTI, it also to assess the size, shape & position of the kidney.

4.C.T

<u>Complications of UTI</u>

1. Renal scaring mainly occur with upper UTI.
2. Hypertension.
3. End stage renal disease.
4. Stone formation.

References:

1. Nelson Textbook of Pediatrics 20th_Edition.
2. Illustrated Textbook of Pediatric.