

BEWARE OF CASUAL USE OF MEDICATION IN CHILDREN

Lip service cause free, but with a lot of risk and potential danger!

Because of its vital role as an excretory organ the kidneys are responsible for the eliminate and metabolism of many foreign organic compound, including pharmacologic agents. Unfortunately there agents reach the kidneys and bladder before excretion into service.

Unfortunately, while performing its role as an excretory and metabolic organ, the kidney tissues undergo anatomic and functional damage as a result of dry induced toxicity.

Factors that contribute to the district susceptibility of the kidneys to injury, include :-

- ◆ exposure to potentially harmful compounds
- ◆ new borns and preterms with immature kidney issue and function
- ◆ extended and sustained exposure to toxics
- ◆ underlying medical/metabolic disorders.

Both the tubules and glomereelar dysfunction can occur. Vasoconstriction of renal vessels, endothelial cell damage, Redox recycling with damage to antioxidant defence mechanisms of Renal cells (dysfunction of cell proteins of P-450, GSH etc.).

Nephrotoxicity from antibiotics

High concentration of antibiotics in kidneys predispose them to chronic damage.

Drugs- Aminoglycosides (Geutaauyan, Amikacin)

Pemicilims

Sulfas

Macrolidess

Vancomycin

Tetracyclin

TPN

Antifungal – Amphotericin – B

NSAIDS - Ibuprofen, Indomethcin,

Antiviral – Acyclovir, Ganciclovir

Cyclosporine

Radio Contrast Agents

Anti Cancer Drugs

- Types of Reveal Damage
- Acute Tubular Necrosis, (ATN)
 - Acute Nephritis (AIN)
 - Direct Tubular Damage
 - Acidosis
 - Tubular Obstruction
 - Glomerular Damage
 - Induction of Myolysis or Hemolytic Anaemias.
 - Dysfunction of Cellular Protective Mechanisms.
 - Natural Nephrotoxins

Chinese herb nephropathy – These medicines can cause Acute Renal Failure, Chronic Renal Failure, Cancers etc.

- Environmental Toxics – organic solvents – ethylene glycol, pollution and toxins due to industrial and vehicle pollution.
- Heavy Metals – Lead, mercury, gold, copper, arsenic are contained in many herbal and alternative line of medications. These cause chronic organ damage of kidneys, liver, brain etc.
- OCT (over the counter therapy) – this practice should be disallowed to minimize the misuse of any drug. Drugs have been labeled alphabetically to give the potential risks of these drugs but the pharmacies prescribe many medications on their own. A pharmacist or a lay man in a drug store can not and should not prescribe medicines to any patient, even a child. It is also noticed that old outdated prescriptions are reused by patient and pharmacies. All medical conditions of the same system may not have the same line of treatment.
- Self Treatment – Self Treatment is potentially dangerous, and misuse of wrong and top of the line drugs can harm a child. Combination of antibiotics and antipyretics can cause lethal harm.
- Tele Vision – projecting wrong advertisements – “Grandma Nuskas” can give a wrong message to viewers.
- Telephonic Consultation can also be dangerous since the doctor may not get a correct picture without seeing a child. Over use and misuse of irrational drugs precipitate drug resistance and many drugs become ineffective.

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Renal Calculi Disease

Case Study a two month old small infant presented with failure to thrive, vomiting and recurrent infections, and weight loss. After comprehensive tests and diagnosis, the child was diagnosed to have a Renal tubular defect (d-RTA), and had bilateral nephrocalcinosis (Renal stones in both kidneys). With proper treatment, the baby's metabolic condition was controlled and long term permanent damage to kidneys prevented.

Renal stones occurs in all parts of Genio-Urinary Tract, 97% occurs in the upper tracts (Parenchyma, Pelvis, Ureters), 3% are localized in the bladder and urethra. The major constituents are calcium oxalate 65% uric acid, 15% Struvite, 7% carbonate and Ohapatite 5%, others - cystine, Ammonia, urate, xanthine, 2,8diHydroxyadanine, protein etc.

Urinary stones (urolithiasis) is increasingly recognized in patients, with a variety of clinical settings.

Incidence - 1 – 1000-7000 hospital admissions
- 110/1 lakh population/year in 10-19yr. age
- more common in males (M:F = 2:1)

- **Urine Stone Formation** – factors include age, sex, profession, mentality, nutrition, constitution, climate, race, inheritance leading to ----- abnormal renal morphology + disturbed urine flow + UTI + Metabolic abnormality + genetic factor leading to ----- Increased excretion of stone constituents + decreased excretion of stone forming inhibitors of crystallization leading to ----- Physicochemical change in state of super saturation leading to ----- abnormal (crystalluria + aggregation + growth) leading to ----- renal stone.

Associated Diseases : Disturbances of (a) calcium metabolism – pHPT, dRTA, Batters, NF, Wilson's, medullary sponge kidney, osteoporoses, immobilization, sarcoidosis, osteolytic metastasis, plasmocytoma (b) Oxalate metabolism – primary hyperoxaluria (1&2), Crohn's ulcerative colitis (c) uric acid metabolism – anemia, neoplasia, intoxication, MI, irradiation, chemotherapy, gout, Lesh-Nyhan synd, Acute and Chronic Renal Failure, metabolic acidosis (d) infections – UTI, (e) Medication – Uricosurics, iuretics, analgesics, high dose vitamin A, D & C.

Symptoms & Signs – varied, hidden, subtle

Renal colic (Pain, sweating, abnormal BP, abdominal distension, Vomiting, oligo-anuria, dysuria, urgency, fever, sepsis, haematuria, etc.)

Obstructive pyelonephritis

Diagnosis : Urine – Routine and Culture, Spot (Ca, Urea, Creatinine, Albumin, Uric acid, P, Na, K, oxalate, citrate, Mg, NH₃, cystine) with require 24 hours excretions, Radiology – Plain x-ray, USG, IVP, RGP, renal nuclear scans, MCU, Blood – Haemogram, Clotting profile, U/E/C, Ca, P, Alk. Phos, LFT, Uric acid, ABG, PTH. There are specific normograms for blood and specially urine for urinary excretion values, which are age dependent.

Infection induced renal calculi.

Rare in paediatrics, even rarer in infancy, staghorn calculi in early infancy vary rare. M > F, caused by urea splitting bacteria in recurrent Urinary Infections with abnormal super saturation and crystalluria, which causes alkaline urine these stones can contain calcium, Mg, NH₃, P and matrix.

Treatment of Infection induced renal calculi.

1. Acute UTI
2. Diagnosis of cause of UTI
3. Prophylaxis, urine PH modification, diet advise, watch for medication, which is nephrotoxic or stone causing, metabolic abnormality treatment eg. Vitamin B₆, Allopurinol, indomethacin, K – supplementation, hydrochlorothiazide, etc.
4. Urine stone analysis (X-ray diffraction, spectrometry)
5. Watch for sepsis
6. Surgical treatment – Open surgery, Endoscopic, PCNL, URS, Lithotripsy etc.

Dietary Modification helps in controlling kidney stone disease – diets high in cereals, low in animal protein and ketogenic diets often cause stones.

Suggested therapy for use lithiasis:-

- For Hypercalciuria - reduction in dietary sodium, Reduction in Thiazide use, add potassium citrate /phosphates
- For Hyperoxaluria - low oxalates, add phosphates, magnesium and pyridoxine
- For Hyperuricosuria - Alkalinization of urine, with allopurinol.
- For cystinuria - Alkalinization of urine, reduction of dietary sodium, add D-penicillamine, captopril.

Summary – early diagnosis and treatment of paediatric kidney stone disease prevents chronic kidney failure and end organ damage. Specific centres with correct therapy are available in Delhi for treating even the smallest of infants with this disease.