



SNS COLLEGE OF ALLIED HEALTH SCIENCES
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DEPARTMENT : PHYSICIAN ASSISTANT

COURSE NAME : NEPHROLOGY

UNIT : CLINICAL EXAMINATION OF KIDNEY

TOPIC : DRUGS AND KIDNEY



NSAIDs (Non-Steroidal Anti-Inflammatory Drugs)



Mechanisms:

- Inhibition of cyclooxygenase (COX) enzymes reduces prostaglandin synthesis, leading to decreased renal blood flow and glomerular filtration.

Renal Effects:

- Acute kidney injury, chronic kidney disease, acute interstitial nephritis, papillary necrosis.



Risk Factors:

- Pre-existing kidney disease, heart failure, volume depletion, concurrent use of other nephrotoxic drugs.

Management:

- Avoidance in high-risk patients, using the lowest effective dose for the shortest duration, ensuring adequate hydration.



ACE Inhibitors and ARBs



Mechanisms:

- Block the renin-angiotensin-aldosterone system (RAAS), causing efferent arteriole vasodilation and reduced glomerular filtration pressure.

Renal Effects:

- Initial reduction in GFR, hyperkalemia, potential for acute kidney injury.



Risk Factors:

- Bilateral renal artery stenosis, severe heart failure, volume depletion, concomitant use with NSAIDs or diuretics.

Management:

- Monitoring renal function and potassium levels, adjusting doses, educating patients on symptoms of hyperkalemia.



Aminoglycosides



Mechanisms:

- Accumulation in proximal tubular cells leading to oxidative stress, mitochondrial dysfunction, and cell death.

Renal Effects:

- Acute tubular necrosis (ATN), non-oliguric renal failure, electrolyte imbalances.



Risk Factors:

- High cumulative doses, prolonged therapy, pre-existing renal impairment, concomitant use of other nephrotoxic drugs.

Management:

- Therapeutic drug monitoring, once-daily dosing, ensuring adequate hydration, avoiding concomitant nephrotoxins.



Amyloidosis



Mechanisms:

- Induces renal vasoconstriction and direct tubular toxicity, leading to contrast-induced nephropathy (CIN).

Renal Effects:

- AKI, typically occurring within 48-72 hours post-exposure.



Risk Factors:

- Pre-existing kidney disease, diabetes, heart failure, high doses of contrast, dehydration.

Management:

- Pre-procedure hydration, using low-osmolar or iso-osmolar contrast agents, minimizing contrast volume, avoiding nephrotoxic drugs around the time of contrast administration.



Calcineurin Inhibitors (Cyclosporine, Tacrolimus)



Mechanisms:

- Vasoconstriction of afferent arterioles, chronic interstitial fibrosis, and tubular atrophy.

Renal Effects:

- Acute nephrotoxicity (reversible), chronic nephrotoxicity (irreversible), hypertension.



Risk Factors:

- High drug levels, prolonged therapy, concurrent use of other nephrotoxic drugs.

Management:

- Monitoring blood drug levels, dose adjustment, managing hypertension and electrolyte imbalances.



Chemotherapeutic Agents (Cisplatin, Methotrexate)



Mechanisms:

- Direct tubular toxicity (cisplatin), crystal nephropathy (methotrexate).

Renal Effects:

- AKI, chronic kidney disease, electrolyte disturbances.



Risk Factors:

- High doses, cumulative exposure, inadequate hydration, concurrent nephrotoxic drugs.

Management:

- Hydration, urine alkalinization (for methotrexate), dose adjustments, monitoring renal function.



Lithium



Mechanisms:

- Interferes with renal tubular function and concentrating ability.

Renal Effects:

- Nephrogenic diabetes insipidus, chronic interstitial nephritis, potential progression to chronic kidney disease.



Risk Factors:

- Long-term therapy, high serum lithium levels, concurrent nephrotoxic drugs.

Management:

- Regular monitoring of renal function and lithium levels, dose adjustments, discontinuation if significant renal impairment develops.



Proton Pump Inhibitors (PPIs)



Mechanisms:

- Induce acute interstitial nephritis (AIN) through an immune-mediated mechanism.

Renal Effects:

- AIN, which can progress to chronic kidney disease if not promptly recognized and managed.



Risk Factors:

- Prolonged use, older age, concurrent nephrotoxic drugs.

Management:

- Discontinuation of the PPI, corticosteroids in severe cases, close monitoring of renal function.



ASSESSMENT



- What all are the Renal Effects of NSIAD ?
- What all are the Risk factors of PPI ?