# **Bullet Point Nursing**

#### Nephrology pharmacology

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#### Pathophysiology review

- Blood enters the nephron and continues until it is either reabsorbed back into the body or goes out to the bladder as urine
- Nephron pathway is as follows
  - Glomerulus → Bowman's capsule → PCT → Loop of Henle → DCT → collecting duct →
- Aldosterone is a hormone that increases sodium and water reabsorption back into the body
- Antidiuretic hormone pulls water out of filtrate into the body
- Labs to assess kidneys include BUN, creatinine, GFR
  - Diuretics lower BP, always assess BP prior and following administration
- Kidneys release renin, erythropoietin, calcitriol (active vitamin D)

## Drug class: Loop diuretics

- Drugs:
  - o Bumetanide (Bumex)
  - Furosemide (Lasix)
  - Torsemide
- MOA: Blocks reabsorption of sodium and chloride in the Loop of Henle (Nephron loop)
- Indications: Edema related to heart failure, liver failure, kidney failure, alternative for hypertension
- SE/AE: Ototoxicity, hypokalemia
- Black Box warning: can cause fluid and electrolyte imbalances
- Most potent class of diuretics
- Patient education: Do not increase your sodium intake
- Reassess based on the route of administration

## **Drug class: Thiazide Diuretics**

- Drugs:
  - o Chlorothiazide
  - Hydrochlorothiazide (HCTZ)
  - Chlorthalidone
- MOA: Blocks reabsorption of sodium and chloride in the early distal convoluted tubule
- Indications: HTN and edema
- Most prescribed class of diuretics
- SE/AE: Hypokalemia, hyperglycemia, dehydration, orthostatic hypotension
- Patient education: Do not increase your sodium intake

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#### Drug class: Potassium sparing diuretics (Aldosterone antagonist)

- Drug:
  - o Spironolactone
- MOA: Blocks aldosterone (aldosterone increases sodium and water reabsorption)
- Indications: Hypertension, edema and heart failure
- Black box warning: Found to cause tumors in animals
- SE/AE: Hyperkalemia (especially when taking ACEI/ARB)
  - Reproductive / endocrine (i.e. gynecomastia, ED, decreased libido, irregular bleeding)

#### Drug class: Osmotic diuretic

- Drug:
  - o Mannitol
- MOA: Active in the PCT and Loop to pull water into the nephron using osmotic pressure, acts as hypertonic solution
- Indications: Reduction of ICP and IOP, increase diuresis related to renal failure
- Monitor for neuro, cardiac, electrolyte, or volume adverse effects

#### Drug name: Antidiuretic hormone (ADH)

- MOA: Decreases urine output and vasoconstriction
- Indication: Shock and cardiac arrest
- Off label use: Diabetes insipidus
  - Discussed further in endocrine

## Drug class: Carbonic anhydrase inhibitor

- Drug:
  - Acetazolamide
- MOA: Increased renal excretion of sodium, potassium, bicarbonate, and water
- Indications: Glaucoma, edema, and acute mountain sickness

#### Final notes:

- Educate patients to expect side effect of increased urine output with all diuretics
- Cranberry juice can be used for to prevent UTIs (not for treatment)
- Avoid taking later in the day, if possible, to avoid nocturia
- Normal urine output is roughly 0.5-1.0 ml/kg per hour
- Monitor output in all patients with kidney issues, hemodynamic issues or taking diuretics
- Frequency is excess times of urinating
  - I.e. UTI, BPH, OAB, pregnancy
- Polyuria is excess volume of urinating
  - o DM, DI
- \*\*Many medication dosages need to be adjusted in the presence of kidney disease\*\*

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