Carbonic Anhydrase Inhibitor

PCT

Acetazolamide
Dichlorophenamide
Methazolamide

↓ HCO_3^- reab ....
Alkaline diuresis
↓ aqueous humor [ciliary body]
↓ CSF
Mtabolic Acidosis

Glucoma
Metabolic Alkalosis
rarly Diuertics

↑ Cl^- Metabolic Acidosis
calcium phosphate stones
↓ K^+
hepersensitive rxn
↑ NH_4
mountain sickness

Loop diuretics

Thick ascending [loop of henle]

sulfonamide (most)

Furosemide
Bumetanide
Torsemide

high ceiling [↑dose ↑effect]
most efficacious
No Tolerance

phenoxyacetic acid (least) Ethacrynic Acid

↓ $Na^{+2}/K^+/2Cl^-$ cotrasporter
Lumen (+) potential
↑ loss of Na^{+2}, Cl^-, K^+, Mg^{+2}, Ca^{+2}
PTH ⇝ ↑ Ca^{+2} reabs.... [hypocalcemia rare]
↑ PTGs2 ⇝ vasodiation ⇝ RBF ⇝ diuresis

↓ K^+ Mtabolic Alkalosis
↓ Mg^{+2} ↓ Na^{+2} ↓ $Ca^{+2}_{(?)}$
ototoxicity [reversible] [dose related]
Alergic rxns
sever dehydration
heperuricemia ⇝ hypovolemia { uric acid reab...
heperglycemia ⇝ ↓ K^+ ⇝ ↓insulin

Rapid abso.. [orally]
Drug - Drug intrs [plasma protin]
↳ ↑free ↑toxicity + elemination
eleminated → Tubular secretion
→ glomerular filtration

furosemid + ethacrynic [partially meta...]
↳ ↓ Pulmonary congestion
↳ ↑ systimic venous
furosemide + bumtanide
↳ ↓ left ventricular filling
↳ ↓ CA
Toresmide active meta
$T_{\frac{1}{2}}$ longer

* Acute Pulmonary edema
Congestiv Hf ⇝ venous capacitatione
* heperkalemia * R failure

Thiazide — Distal Tuble

They diff in meta... other renally orally

Thiazide: Hydrochorothiazide
Chlorothiazide — Injected / parenterally [water soluble] [lipid soluble]
Chlorthalidone — slow abs... long duration

Thiazide-like: Indapamide — excereted Biliary system
Metolazone

↓K^+ metabolic Alkalosis — ↑Na^{+2} to duct → ↑K^+ sec..
↓ Na^{+2}

↓ Na^{+2}/Cl^- co-transporter
↑ Na^{+2}/Ca^{+2} exchange
↑ Ca^{+2} reab....
↓ PG_E synsthis
↓CA

Nephrolithiasis ⇝ ↑Ca^{+2}
Impotence, weakness, fatigue, paresthesia
photosensitivity

heperuricemia
heperglycemia
heperlipidemia ↑LDL — give lipid drug with it

hepersensitivity — animia, thrombo..., ...itis, Bown↓

first line ⇝ Hepertension [HTN]
Edema
Nephrolithiasis ⇝ ↑Ca^{+2}
Nephrogenic dibetes insipidus unresponsive to ADH
↳ Na^{+2} restriction → ↑therapeutic effect

Potassium-sparing Diuretics → mainly to hypokalemia

Aldosterone Antagonists spironolactone ↓libido → Anti-androgenic oral enterohepatic cycling ↓Dose in hepatic failure active meta: canrenone drug-drug intx
↳↓Bioavailability
Eplerenone drug intx ketoconazole, itraconazole → ↓CYP3A4 → ↑Eplerenone in Blood

ENaC Inhibitors Amiloride unchanged in urine, no spécifice dose in hepatic diseas.
Triaterene meta in liver renally exr... shorter $t_{\frac{1}{2}}$ Crystalluria

↑K^+
Both [Mtabolic acidosis

* Block Aldosterone receptors
  - ↓Na^+, water reab...
  - ↓K^+ exc....
  - H^+ intercalated cells → depend in PGs production
* Block Na^+ entry through selective channels
  - spare K^+ + H^+ ⇝ ↓ Na^+
  - depende in renal PGs production

spironolactone [Gynecomastia *
BPH
impotence, GI upset
Triamterene leg cramps, azotemia
nephrolithiasis, interstital nephritis
Acute Renal failure
glucose intolerance
photosensitivity

ENaC Inhibitors nausea, vomiting
headache

Mineralocorticoid excess
main ⇝ Combined with other diuretics to prevent potassium loss, treat hypokalemia
1° + 2° hyperaldosteronism Ectopic Aldosterone production

Osmotic Diuretics

PCT + Descending

* Mannitol → not orally, not meta..., osmatic diarrhea
  excreted by glomerular filtration
- urea
- Glycerin
- Isosorbide

act in water not Na^+

water ⇝ lumen
ADH ⇝ oppose in collecting tuble → urin volume

↑water exc ... ⇝ ↑Na^{+2}, dehydration

↑ECV
dilutional hyponatremia
pulmonary edema
headache, nausea
congestive HF
↑K^+

Acute renal failure → PGs ⇝ vasodilation ⇝ ↑RBF ⇝ prevent ARF pigment load
hemolysis by hemoglobin rhabdomyolysis by Myoglobin

↓intracranial ↓intraocular pressure

ADH Antagonists

collecting duct

selective Conivaptan (aka) nonpeptide IV, oral possible $t_{\frac{1}{2}}$ = 5-10 hrs

non-selective Demeclocycline [tetracycline]
Lithium not use as ADHR antagonist

Block V_2 receptors
↓
↓ cAMP
↓
↓ water reab ....
↓
so ↓ ADH by vasopressin Block

severe hepernatremia ↑↑Na^+
nephrogenic diabetes insipidus
dry mouth
hypotension

* syndrome of Inappropriate ADH secretion
[SIADH]

سُبْحَانَ اللَّه

الْحَمْدُ للَّه

لَا إله إلَّا اللَّه

اللهُ اكبر

يَا أَيُّهَا الَّذِينَ آمَنُوا اذْكُرُوا اللَّهَ ذِكْرًا كَثِيرًا

«اللَّهُمَّ إِنِّي أَسْأَلُكَ الثَّبَاتَ فِي الأَمْرِ، وَالْعَزِيمَةَ عَلَى الرُّشْدِ، وَأَسْأَلُكَ مُوجِبَاتِ رَحْمَتِكَ، وَعَزَائِمَ مَغْفِرَتِكَ، وَأَسْأَلُكَ شُكْرَ نِعْمَتِكَ، وَحُسْنَ عِبَادَتِكَ، وَأَسْأَلُكَ قَلْبًا سَلِيمًا، وَلِسَانًا صَادِقًا، وَأَسْأَلُكَ مِنْ خَيْرِ مَا تَعْلَمُ، وَأَعُوذُ بِكَ مِنْ شَرِّ مَا تَعْلَمُ، وَأَسْتَغْفِرُكَ لِمَا تَعْلَمُ، إِنَّكَ أَنْتَ عَلَّامُ الْغُيُوبِ»[1].