

<b>Osmotic Diuretics</b>	
Urea Mannitol	
Indications	<ul style="list-style-type: none"> <li>• Decrease ICP</li> <li>• ARF (maintain urine flow which in turn preserves long-term kidney fxn thus saving pts from dialysis)</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>• Increases osmolality in proximal tubule pulling water into lumen (b/c not pulling/keeping Na in lumen then not good for Na retention states)</li> </ul>
SEs	<ul style="list-style-type: none"> <li>• Pulmonary edema</li> <li>• Dehydration</li> <li>• Avoid in pts in Na retaining states</li> <li>• Avoid in pts w/ anuria</li> </ul>

<b>Carbonic Anhydrase Inhibitors Diuretics</b>	
Acetazolamide (Diamox)	
Indications	<ul style="list-style-type: none"> <li>• Altitude Sickness (decreases cerebral/pulmonary edema therefore decreased weakness, breathlessness, dizziness)</li> <li>• Chronic Open Angle Glaucoma (b/c decreases production of aqueous humor)</li> <li>• Urinary Alkalinization for toxins or Metabolic Alkalosis</li> <li>• Rhabdomyolysis</li> <li>• Tumor Lysis Syndrome</li> <li>• Epilepsy</li> </ul>
Mechanism	<ul style="list-style-type: none"> <li>• inhibits carbonic anhydrase at proximal tubule and eye → prevent bicarb reabsorption → (1) alkalizes urine (2) holds Na<sup>+</sup> and thus water in lumen → diuresis is self-limited</li> </ul>
<u>Side Effects &amp; Contraindications</u>	
CNS	<ul style="list-style-type: none"> <li>• neuropathy</li> <li>• paresthesia</li> <li>• drowsy</li> </ul>
Renal	<ul style="list-style-type: none"> <li>• hyperchloremic metabolic acidosis</li> <li>• NH<sub>3</sub> toxicity</li> <li>• Hypokalemia</li> <li>• Hypocalcemia, renal stones</li> </ul>
Allergies	<ul style="list-style-type: none"> <li>• Sulfa allergy (b/c acetazolamide is a sulfonamide but it doesn't have antibacterial activity)</li> </ul>

<b>Loop Diuretics</b>	
40mg Furosemide (Lasix) = 20mg Torsemide (Demadex) = 1mg Bumetanide (Bumex)	
<ul style="list-style-type: none"> <li>They have the same potency just different dosages therefore it really doesn't matter which one you use</li> </ul>	
<b>Indications</b>	
<ul style="list-style-type: none"> <li>Edema 2/2 CHF, Cirrhosis, Nephrotic Syndrome, etc</li> <li>Hypertension</li> <li>Hypercalcemia</li> <li>A/CRF</li> </ul>	
<b>Mechanism</b>	
<ul style="list-style-type: none"> <li>inhibits Na/K/2Cl transporter at TAL of LOH → decreased Na and thus water reabsorption → (1) decreased + lumen potential b/c of decreased K secretion back into lumen and thus decreased Ca++ and Mg++ reabsorption and thus hypoCa/Mg (2) increased distal Na delivery and thus hypoK and met alk (3) diuresis and thus decreased preload</li> </ul>	
<b>Side Effects &amp; Contraindications</b>	
CNS	<ul style="list-style-type: none"> <li>ototoxicity</li> </ul>
Renal	<ul style="list-style-type: none"> <li>acute interstitial nephritis</li> <li>hypovolemia</li> <li>hypoNa, K, Ca, Mg</li> <li>metabolic alkalosis</li> </ul>
Endo	<ul style="list-style-type: none"> <li>hyperuricemia (use cautiously in pts w/ gout, loop/thiazide diuretics enter nephron lumen not by filtration but by secretion via PCT organic acid secretor which secretes primarily amino acids but also antibiotics, diuretics, uric acid, et al and b/c these secretors are saturable in the presence of diuretics uric acid can increase)</li> </ul>
Allergies	<ul style="list-style-type: none"> <li>sulfa allergy</li> </ul>
<b>Notes</b>	
<ul style="list-style-type: none"> <li>onset 1hr duration 6hrs (SIX=laSIX) hence try to give Q6hrs b/c if you don't and especially if you don't salt restrict then its effect goes entirely away b/c then the body holds on to sodium</li> <li>there is synergism when combined w/ thiazide diuretics</li> <li>40mg PO = 20mg IV</li> <li>IV is better b/c interstitial edema decreases PO absorption</li> <li>don't administer after mid-afternoon b/c of nocturia</li> <li>ethacrynic acid (Edecrin) (phenoxyacetic acid derivative not a sulfonamide therefore exact same mechanism and indications as loop diuretics except no sulfa allergy and exacerbation of gout BUT there is increase in the other SEs and the dose response curve is steep therefore not often used)</li> </ul>	

Diuretic	Na	K	Ca	Volume	
CAI	5	25	10	10	
Loop	25	10	25	25	High volume isoosmotic diuresis acute onset (min), brief duration (hrs) pee a lot no change on SVR hence not used to Tx HTN
Thiazide	10	10	-10	10	Moderate volume hyperosmolar diuresis long onset (wks), long duration (days) don't pee a lot decrease SVR hence used to Tx HTN
K Sparing	2	-5	2	5	

<b>Thiazide Diuretics</b> hydrochlorothiazide (HCTZ) there are tons of combinations metolazone (Zaroxolyn) mainly used for edema NOT HTN, better in pts w/ RF, not actually a thiazide but works the same way indapamide (Lozol), chlorthalidone (Thalitone), chlorothiazide (Diuril) not used anymore b/c not potent	
<b>Indications</b> <ul style="list-style-type: none"> <li>Hypertension</li> <li>Edema 2/2 CHF, Cirrhosis, Nephrotic Syndrome, etc</li> <li>Hypocalcemia</li> <li>Nephrogenic Diabetes Insipidus</li> </ul>	
<b>Mechanism</b> <ul style="list-style-type: none"> <li>inhibits Na/Cl transporter at DPT → decreased Na and thus water reabsorption → (1) decreased + lumen potential b/c of decreased K secretion back into lumen BUT FOR SOME REASON INcreased Ca++ and Mg++ reabsorption and thus hyperCa/Mg (2) increased distal Na delivery and thus decreased K+ and H+ reabsorption and thus hypoK and met alk (3) diuresis</li> </ul>	
<b>Side Effects &amp; Contraindications (sames except hyperCa/Mg, DL, hyperglycemia)</b> Renal <ul style="list-style-type: none"> <li>acute interstitial nephritis</li> <li>hypoNa (very common), K</li> <li>hyperCa, Mg</li> <li>metabolic alkalosis</li> </ul> Endo <ul style="list-style-type: none"> <li>hyperlipidemia (refer)</li> <li>hyperglycemia</li> <li>hyperuricemia (use cautiously in pts w/ gout)</li> </ul> Allergies <ul style="list-style-type: none"> <li>sulfa allergy</li> </ul> GI <ul style="list-style-type: none"> <li>pancreatitis</li> </ul>	
<b>Potassium Sparing Diuretics</b> <ul style="list-style-type: none"> <li><b>Aldosterone Receptor Blocker</b> <ul style="list-style-type: none"> <li>Spironolactone (Aldactone) +HCTZ (Aldactazide)</li> <li>Eplerenone (Inspra)</li> </ul> </li> <li><b>Collecting Tubule Na Channel Inhibitor</b> <ul style="list-style-type: none"> <li>Amiloride (Midamor)</li> <li>Triamterene (Dyrenium) +HCTZ (Maxzide, Dyazide)</li> </ul> </li> </ul>	
<b>Indications</b> <ul style="list-style-type: none"> <li>Hyperaldosteronism</li> <li>Hypokalemia</li> <li>Hypertension (only effective when coadministered with other diuretics which is only done if hypokalemia is a problem)</li> <li>CHF (the benefit of aldo in CHF is independent on its effect on renal tubular fxn)</li> </ul>	
<b>Mechanism</b> <ul style="list-style-type: none"> <li>prevents aldosterone from binding receptor → (same but only effective when aldo levels are high)</li> <li>inhibits Na/K transporter at CT → decreased Na and thus water reabsorption → (1) decreased distal Na and thus increased K+ and H+ reabsorption and thus hyperK and met acid (2) diuresis</li> </ul>	
<b>Side Effects &amp; Contraindications</b> Renal <ul style="list-style-type: none"> <li><b>hypoNa</b></li> <li><b>hyperK</b></li> <li><b>metabolic acidosis</b></li> </ul> Endo <ul style="list-style-type: none"> <li><b>gynecomastia (aldosterone receptor blockers only, b/c they resemble sex steroids)</b></li> <li><b>hyperuricemia (use cautiously in pts w/ gout)</b></li> </ul>	
<b>Notes</b> <ul style="list-style-type: none"> <li>titration is based on plasma K+, monitor at @1wk, 1mo, 2mo, 3mo, Q3mo for 1yr, Q6mo from then on</li> </ul>	