INPATIENT / NEPHROLOGY

Hypercalcemia

Checklist
-- **Gut Check**: Correct for albumin (corrected Ca = Serum Ca + 0.8 x (4 - albumin)
-- **Admission Criteria:** If severe (Ca >14, symptoms) requires admission for treatment and expedited workup
-- **Chart Check**: history of malignancy, age-appropriate cancer screening, stones, CKD, prior iCal, PTH; thiazide, calcitriol, lithium use
-- **HPI Intake:** symptoms, new malignancy (weight loss, poor PO, lymphadenopathy, night sweats, blood in stool, smoking)
-- **Can't Miss**: new malignancy, severe disease, AKI and renal failure
-- **Admission Orders:** BMP (creatinine), LFTs (albumin, alk phos), iCal, PTH, 1,25(OH) VitD, UA (stones); malignancy - PTHrP, SPEP/UPEP, strict I/O
-- **Initial Treatment to Consider:** aggressive fluids with normal saline, calcitonin for severe disease
-- **Other**: hold thiazides, don't give any calcium products, consult to renal/oncology as needed

Assessment:
-- **History**: *** known malignancy, new malignancy, nephrolithiasis, CKD
-- **Clinical**: *** bone pain, weakness, stones, n/v, anorexia, constipation, fatigue, confusion
-- **Exam:** *** AMS, volume assessment, abdominal tenderness or distention (constipation), pain to palpation over sites of bony disease
-- **Data**: *** iCal, PTH, VitD, Creatinine
-- **Etiology/DDx:** *** Primary hyperPTH, CKD, malignancy (SCC lung and head/neck, breast, RCC, myeloma most common), sarcoid; uncommon - VitD toxicity, meds (thiazine, lithium), immobilization, milk alkali, hyperthyroid, adrenal insufficiency

Plan:
Workup
-- f/u iCal, PTH, VitD, BMP (renal function), LFTs (alk phos)
-- low PTH or high concern for malignancy - PTHrP, SPEP/UPEP/SFLC, consider pan scan
-- surgery consult if primary hyperPTH and symptomatic OR Ca >11.5, osteoporosis/fracture, nephrolithiasis, age <50

Treatment
-- **Fluids:** *** PO vs IV - for severe hyperCa, bolus NS then aggressive 200-300cc/hr for goal UOP 100-150 cc/hr and diurese as needed to avoid overload
-- **Calcitonin** 4-8U/kg BID for 48 hours if Ca >14 or severe symptoms
-- **Bisphosphonates**: zoledronic acid 4mg IV > pamidronate 90mg IV q3-4 weeks; need to take for 2-4 days for effect; replete VitD <20 along with bisphosphonates cautiously (400-800 units daily);I do not give if profound AKI
-- Consider denosumab for patients with CKD or other bisphosphonate contraindication (60mg) or refractory to zoledronic acid 8mg (120mg)
-- Avoid contributory medications including thiazides, lithium, IV phosphate
-- If not surgical candidate with Primary hyperPTH - bisphosphonate, cinacalcet, and tamoxifen are all options