Internal Medicine Considerations in the Oncology Patient

Diagnosis, Management and Clinical Pearls

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Moffitt at International Plaza
Disclosures

- Speaker’s Bureau for Bristol Myers Squibb
- Speaker’s Bureau for Incyte
Objectives

• Cancer is largely an affliction of older adults, many of whom have comorbidities
• To understand how cancer treatment can affect comorbidities
• To understand how cancer treatment can cause sequelae which can be transient or can become new comorbid conditions
• To evaluate changes in laboratory data and clinical presentation in cancer patients while on therapy and to consider management options using published standards of care and/ or refer to appropriate specialists
• To consider dietary and supportive care issues
• Learn to use Moffitt’s resources – “curbside an expert”
Purpose of Discussion

- Cancer is largely an affliction of older adults. The median age of cancer patients is 66 years old*. Many older adults have comorbid conditions – treated or untreated. These comorbid conditions are often exacerbated by cancer treatment. Cancer treatment in itself can also cause internal medicine related sequelae unrelated to existing comorbidities.

- When comorbid conditions are affected by cancer treatment or new sequelae occurs, the APP should be able to refer to published standards to guide management decisions (i.e. treatment versus referral to a specialist).

* National cancer Institute Cancer.gov
Consideration of Comorbidities and Sequelae

- Patients who have existing comorbid conditions
- Patients who have existing comorbid conditions that are affected by treatment
- Patients who are found to have new comorbid conditions at diagnosis
- New conditions/ sequelae to therapy
- Chronic conditions secondary to therapy
Patients who have existing comorbid conditions

• Review history and med list each visit and compare/ contrast this to physical exam and diagnostic findings (labs, imaging, etc)
• In EHR/ EMR the histories are in a database and get pulled into the notes. It is easy to ignore this during a patient encounter. **Update the histories with new events/ procedures**
• Ask patients if they understand why they are on a particular medication
• Ask patients if they are followed by a PMD and/or a specialist. Put contact info for these MDs in the EHR- “sticky note” feature in Cerner

• **Clinical Pearl:** If a Pt is on a Beta Blocker ask the pt if they are on b/c of arrythmia, HTN, anxiety or other
A study analyzing data from 1975-2010 showed 31.8% of Medicare beneficiaries had at least one comorbid condition. 52.9% Lung cancer patients, 40.7% of colorectal patients, 32.2% of breast cancer patients, and 30.5% prostate cancer patients had at least one comorbidity. The most common conditions were diabetes (16.0%), COPD (15.5%), congestive heart failure (9.7%), and cerebrovascular disease (6.0%) *

Clinical Pearl: familiarize yourself with the common medications for the most common comorbid conditions and understand the pharmacology between those medications and common cancer therapies. i.e. diuretics with patients who become dehydrated from chemotherapy. Statins and LFTs/ muscle cramps

Charlson Comorbidity Score

- Identifies 16 common comorbidities that affect overall cancer survival:

- Acute/ previous myocardial infarction, acquired immunodeficiency syndrome (AIDS), cerebrovascular disease, chronic renal failure, cirrhosis/chronic hepatitis, congestive heart failure, chronic obstructive pulmonary disease (COPD), dementia, diabetes, diabetes with sequelae, liver disease, paralysis, rheumatologic disease, ulcer disease and vascular disease.

- Hypertension?
Common Internal Medicine Issues Seen in Clinic

• Hypertension/Hypotension
• Diabetes Mellitus
• Hypercalcemia
• Incidental PE/ DVT
• UTI
• Cellulitis
• Nausea
• Protein Calorie Malnutrition
• Supportive Care Issues
• Arrhythmia
• Hyper/ Hypothyroid
Existing Conditions

- Does the patient have a medical provider who is currently managing their diagnosis?
- Is the current issue well managed? For example, A Pt with HTN records a BP diary and brings it to clinic to review
- Is current issue resolved with treatment? For example, HTN resolving after weight loss from chemo
- Is current issue made worse with treatment?
- Does medication for an existing co-morbid condition expose Pt to drug interactions or sequelae from treatment? For example, diuretics with nephrotoxic agents. Statins with hepatotoxic agents. Beta blockers with anemia
Issue Identified. Now what?!

- Does the patient have a primary provider who will manage this?
- Treat and manage yourself?
- If sequelae/ diagnosis is not managed with your effort, then ???
- AIM Clinic (DM management, Anticoagulation, D/C clinic)
- Outside specialist
- Urgent Care
Hypertension – Pharmacologic Treatment

• In the general nonblack population, including those with diabetes, initial antihypertensive treatment should include a thiazide diuretic, calcium channel blocker, angiotensin-converting enzyme (ACE) inhibitor, or angiotensin receptor blocker (ARB). In the general black population, including those with diabetes, initial treatment should include a thiazide diuretic or calcium channel blocker. If the target blood pressure is not reached within one month after initiating therapy, the dosage of the initial medication should be increased or a second medication should be added (thiazide diuretic, calcium channel blocker, ACE inhibitor, or ARB; do not combine an ACE inhibitor with an ARB). Blood pressure should be monitored and the treatment regimen adjusted until the target blood pressure is reached. A third drug should be added if necessary; however, if the target blood pressure cannot be achieved using only the drug classes listed above, antihypertensive drugs from other classes can be used (e.g., beta blockers, aldosterone antagonists). Referral to a physician with expertise in treating hypertension may be necessary for patients who do not reach the target blood pressure using these strategies.

• Blood pressure diary

• Source: JNC 8 Guidelines for the Management of Hypertension in Adults Am Fam Physician. 2014;90(7):503-504
Causes of Hypotension in the Outpatient Setting

- Sepsis and infusion reactions will not be discussed during this lecture
- Medication Related
- Sequelae to Treatment (i.e. weight loss)
- Anemia
- Dehydration/ Lack of Intake
- Adrenal insufficiency
- Orthostasis and Autonomic Neuropathy
- GI Bleed/ bleeding
- Cardiac Status – murmur? EF?
- Combinations of any of the above.
Approach to the Clinic Patient with Hypotension

- It is possible to have very low BP and be asymptomatic.
- Is the patient stable?
- Consider underlying issues/ Comorbid conditions
- Hematologic status (Anemia, Bleeding?, Spleen size?)
- Vasovagal reaction
- Dehydration/ lack of intake
- Medication induced
- Adrenal axis – have they been on steroids?
- What is the current therapy? Is the patient heavily pre-treated?
- Note changes in Hgb, serum creatinine, albumin, body weight
- Review the treatments of other co-morbid conditions
Case Presentation

• Baseline Data: 75 W male with pancreatic cancer established with Moffitt on 12/2019
• 191 lbs after recent 15 lb weight loss (baseline weight 206 lbs)
• PMHx: HTN, HLD, glaucoma
• Meds: metoprolol succinate 25 mg QD, lisinopril 20 mg QD, lovastatin 40 mg daily, temazepam 15 mg QHS, timolol eye gtts
• Labs: WBC 6, Hgb 12, plts 188. Cr 0.5 CMP otherwise unremarkable
• Gemcitabine and nabpaclitaxel regimen ordered by MD
Case Presentation

- 2/26/2020 Intervisit note stating Pt has become “severely weak”
- IVF and labs ordered to be done at outpatient infusion area for 2/27
- Pt presents to lab draw and feels like he is “going to pass out”
- V/S: BP – 92/51, Pulse – 65, Temp – 37 c, RR – 18, SaO2 -96% Weight 186 lbs
Why is this patient hypotensive and how are you going to fix it?

• The assumption based on the triage call is that he is dehydrated
• He is eating and drinking well. Taking all meds as prescribed
• Labs available at presentation:
  • 2/19/2020 WBC 3.29, ANC 1840, Hgb 9.1 (Hgb on 12/19 was 12)
  • TAKING ALL MEDS AS PRESCRIBED!

• Is this patient dehydrated?
Diagnosis and Management

**Hemoglobin**

- Generalized Normal High
- Generalized Normal Low

**Systolic Blood Pressure**

- [Graph showing hemoglobin and systolic blood pressure over time]

- Graph data points from 1/5/2020 to 2/23/2020
Diagnosis

- Hypotension is due to 3 major factors
- 1- anemia secondary to chemo (Baseline Hgb 12, now 9.1)
- 2- persistent administration of antihypertensive meds and Beta blocker
- 3- weight loss (206 to 186 lb)

- His intake is adequate and he is not dehydrated
- He is hypovolemic from anemia
- His beta blocker is knocking out his compensatory mechanism for tachycardia
- His ACE inhibitor is contributing to the hypotension
- What is the reversal agent for beta blockers?
- Does he need a blood transfusion?
Management

- Thorough Hx and PE
- Review of entire chart including Serial BP measurements, current treatment, med list review, questioning caregiver about Pt intake.
- Glucagon given (1 mg IM)
- IVF given (2 liters)
- Type and Cross specimen drawn
- D/C Beta blocker (ONLY DO THIS IF THIS IS USED FOR HYPOTENSION – IF USED FOR AFIB DOSE REDUCE AND COORDINATE WITH PRESCRIBING MD)
- D/C ACEi until BP normalizes
- Pt advised to keep a BP diary and bring it to clinic.
Follow up

• Sx resolved after fluids

• Did not take meds the next day and sx did not return

• Did not need to resume antihypertensive meds over the next month – he became normotensive after weight loss

• He did not need blood

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</table>
New onset DM – Standard of Care

- Trend labs
- Uncomplicated presentation? Is Pt on steroids with treatment or for other medical issue?

Table 2.2—Criteria for the diagnosis of diabetes

<table>
<thead>
<tr>
<th>Criteria</th>
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<tbody>
<tr>
<td>FPG ≥126 mg/dL (7.0 mmol/L). Fasting is defined as no caloric intake for at least 8 h.*</td>
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<tr>
<td>OR</td>
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<td>2-h PG ≥200 mg/dL (11.1 mmol/L) during OGTT. The test should be performed as described by WHO, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water.*</td>
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<td>A1C ≥5.5% (48 mmol/mol). The test should be performed in a laboratory using a method that is NGSP certified and standardized to the DCCT assay.*</td>
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<td>OR</td>
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<tr>
<td>In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose ≥200 mg/dL (11.1 mmol/L).</td>
</tr>
</tbody>
</table>

DCCT, Diabetes Control and Complications Trial; FPG, fasting plasma glucose; OGTT, oral glucose tolerance test; WHO, World Health Organization; 2-h PG, 2-h plasma glucose. *In the absence of unequivocal hyperglycemia, diagnosis requires two abnormal test results from the same sample or in two separate test samples.

- Diagnostic criteria per Classification and Diagnosis of Diabetes: Standards of Medical Care in Diabetes—2022 Diabetes Care 2022;45(Suppl. 1):S17–S38
Management

• Does the Pt have a PMD?

• Yes - Consider adding Hgb A1c and referring to PMD with copies of labs and trends. Consider nutrition consult in conjunction with PMD referral

• No – Hgb A1c, Consider nutrition consult for DM education which will include dietary advice, calorie counting/ restriction, and use of a glucometer. Add standard of care meds based on clinical picture. First-line therapy depends on comorbidities, patient-centered treatment factors, and management needs but will generally include metformin and comprehensive lifestyle modification.

Pharmacologic Approaches to Glycemic Treatment: Standards of Medical Care in Diabetes—2022 Diabetes Care 2022;45(Suppl. 1):S125–S143 | https://doi.org/10.2337/dc22-S009
Management

- Encourage PMD management.

- Metformin dosing: 500 mg PO daily, BID or 1000 mg PO BID

- Manage yourself? Refer to community? Refer to AIM?

- My approach is to start low dose 500 mg PO daily or 500 mg PO BID and review sugar diary. If well controlled, then I continue. If not, then refer out.
Hypercalcemia

- 90% of hypercalcemia is related to primary hyperparathyroidism and malignancy
- The talk will focus on these two items
- Normal Calcium levels 8.6-10.2 mg/dl. Ionized range 1.12-1.32 mmol/L
- First repeat test and correct for albumin. Trend previous labs
- If hypoalbuminemia, hyperalbuminemia, or a myeloma pt then order ionized calcium

- Primary hyperparathyroidism usually 11 or less.

- Values > 13 more c/w malignancy

Source: UpToDate Diagnostic Approach to hypercalcemia. Elizabeth Shane, MD
Hypercalcemia

- Are they on calcium supplements, thiazide diuretics or Vitamin D. If so Hold
- Order PTH. If normal high or elevated likely primary hyperparathyroidism → endocrine consult
- If PTH normal or low then likely related to malignancy or vitamin D intoxication
- What is the serum creatinine?
- Ca+ < 12 mg/dl does not require immediate treatment. Increase oral hydration. Stop inciting drugs if any. Consider IVF & repeat labs in a few days.
- Ca+ 12-14 give IVF. Consult clinic pharmacist and schedule zoledronic acid, denosumab or pamidronate
- Symptomatic or > 14 admit
- Treatment of underlying malignancy

Source: UpToDate Treatment of Hypercalcemia, Elizabeth Shane MD
Cancer-Associated Thromboembolic Disease

- Virchow’s Triad
  - 1-Venous Stasis
  - 2-Intimal damage
  - 3-Hypercoagulable state

- Clinical Suspicion without confirmation: Consider outpatient work up

- Incidental Finding, i.e. radiologist pages you with a finding of a small subsegmental PE: Start anticoagulation per guidelines and refer to AIM
Cancer-Associated Thromboembolic Disease

- NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Cancer-Associated Venous Thromboembolic Disease V.1.2022 [*]

- For the purposes of this talk I will discuss outpatients and incidental findings on imaging (i.e. Restaging scans)

- VTE affects 1 in 1,000 people. Cancer increases the risk 4-7 times [@@]

- If you see 1500 pts per year you might see ~5-10 pts with a VTE

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# NCCN Guidelines® Version 1.2022 Acute Vein Thrombosis

## Diagnosis
- Clinical suspicion of DVT:
  - Swelling of unilateral extremity
  - Heaviness in extremity
  - Pain in extremity
  - Unexplained persistent calf cramping
  - Swelling in face, neck, or supraclavicular space
  - Catheter dysfunction (If catheter is present, see Catheter-Related DVT [DVT-3])

## Workup/Imaging
- Incidental DVT
  - If not already performed:
    - Comprehensive medical H&P
    - CBC with platelet count
    - PT, aPTT ± fibrinogen
    - Liver and kidney function tests
    - Venous US

## Imaging Findings
- Positive for DVT
  - See Treatment (DVT-2)
- Negative or indeterminate
  - Venous imaging:
    - Repeat venous US
    - CT scan with contrast
    - Magnetic resonance venogram (MRV) with contrast
  - Consider venography with possible clot extraction or thrombolysis

## Additional Imaging
- See Treatment (DVT-2)
- Negative
  - Reassurance
  - Evaluate for other causes

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DVT Location and Treatment

**DVT LOCATION**

**PROXIMAL LOWER EXTREMITY**
- Pelvic/iliac/inferior vena cava (IVC)
- Femoral/popliteal

**DISTAL LOWER EXTREMITY**
- Peroneal, anterior and posterior tibial, and muscular (soleus and gastrocnemius)

**UPPER LIMB/CHEST**
- Brachiocephalic, subclavian, axillary, internal jugular, brachial
- Superior vena cava (SVC)

**DVT: TREATMENT**
- Anticoagulation\(^{c,e}\)
- Consider catheter-directed therapy (pharmacomechanical thrombolysis or mechanical thrombectomy) in appropriate candidates\(^{f,h,k}\)
- Consider GCS if the patient tolerates therapeutic anticoagulation\(^{g}\)

- **Contraindication to anticoagulation\(^{d}\)**
  - No → Anticoagulation\(^{c,e}\)
  - Yes → IVC filter (retrievable filter preferred)

- **Contraindication\(^{d}\)** persists or is likely to recur
  - **Progression to proximal vein**
    - Yes → See Pelvic/iliac/IVC and Femoral/popliteal pathway above
    - No progress → Continue to follow as clinically indicated
    - Follow-up with serial US

- Local progression (but not to proximal deep vein)

- **Follow until contraindication is resolved or progression of DVT**

- **Re-evaluate for risk/benefit of anticoagulation\(^{i}\)**

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CatheterRelatedDVT

CATHETER-RELATED DVT: DIAGNOSIS AND TREATMENT

**DIAGNOSIS**

Clinical suspicion of catheter-related DVT:
- Unilateral limb swelling
- Pain in supraclavicular space or neck
- Dysfunctional catheter

DVT

WORKUP/IMAGING

- Venous US
- CT venogram with contrast
- MRV with contrast
- X-ray venogram with contrast

TREATMENT

No contraindication to anticoagulation

- Anticoagulation for at least 3 months or as long as central venous access device (CVAD) is in place
- Consider catheter removal if symptoms persist or if the catheter is infected or dysfunctional or no longer necessary
- Consider catheter-directed therapy (pharmacomechanical thrombolysis or mechanical thrombectomy) in appropriate candidates

Contraindication to anticoagulation

- Remove catheter or follow with serial imaging
- Follow for change in contraindication as clinically indicated

Evaluate for other causes
- Consider further diagnostic imaging/testing if initial testing is unrevealing and clinical suspicion remains high

Contraindication resolved

- Anticoagulation for at least 3 months

Contraindication persists

- Re-evaluate for risk/benefit of anticoagulation

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Acute PE

**Diagnosis**
- Clinical suspicion of PE:
  - Current DVT or recent history of DVT
  - Unexplained shortness of breath, chest pain, tachycardia, apprehension, or tachypnea
  - Syncope
  - Hypoxemia

**Evaluation**
- Comprehensive medical H&P
- CBC with platelet count
- PT, aPTT
- Liver and kidney function tests
- NT-proBNP/
  troponin
- Chest x-ray
- ECG

**Imaging**
- CT angiography (CTA) with contrast
- X-ray pulmonary angiography with contrast (rarely used unless combined with clot extraction or thrombolytic therapy)
- MRI angiography with contrast
- Ventilation/perfusion (VQ) scan (lung scan) if CTA is contraindicated (e.g., renal insufficiency, allergy refractory to anaphylaxis prophylaxis)

**Incidental PE**
- If not already performed:
  - Comprehensive medical H&P
  - CBC with platelet count
  - PT, aPTT
  - Liver and kidney function tests
  - Electrocardiogram (ECG)

**PE: Diagnosis**
- Negative -> Evaluate for other causes
- Positive -> See PE Treatment (PE-2)
- Non-diagnostic -> Clinical judgment (See DVT-1)
- Negative -> Evaluate for other causes

**Recommended Treatments**
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Acute PE Treatment

PE: TREATMENT

• Continue anticoagulation
• Consider outpatient management
• Assess cancer status and consider:
  › Systemic or catheter-directed thrombolysis
  › or embolectomy for hemodynamically unstable PE in patients with lower bleeding risk
  › Rescue thrombolysis/thrombectomy can be considered in patients with hemodynamically stable PE who deteriorate despite anticoagulation
  › For hemodynamic compromise, consider venoarterial extracorporeal membrane oxygenation (VA-ECMO)

Contraindication to anticoagulation

No → Acute management using anticoagulation

Yes → Consider IVC filter (retrievable filter preferred) ± embolectomy

Follow frequently for change in clinical status

Contraindication resolved

Contraindication persists

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Treatment

• DOACs (Direct oral anticoagulants)
• Apixaban 10 mg PO every 12 hours for 7 days followed by 5 mg PO every 12 hours
• Rivaroxaban 15 mg PO every 12 hours for the first 21 days followed by 20 mg daily

• LMWH (given SQ)
• Dalteparin 200 units/kg SC daily for 30 days, then switch to 150 units/kg once daily
• Enoxaparin 1 mg/kg SC every 12 hours (can consider decreasing intensity to 1.5 mg/kg daily after first month)
Duration of Anticoagulation

• Duration of Anticoagulation as Recommended by Guidelines:

◊ At least 3 months or as long as active cancer or cancer therapy

◊ For non-catheter-associated DVT or PE recommend indefinite anticoagulation while cancer is active, under treatment, or if risk factors for recurrence persist.

◊ For symptomatic catheter-associated DVT, consider anticoagulation treatment for at least 3 months or as long as the catheter is in place.

◊ Providers should continue to discuss with patients the risks/benefits of anticoagulation to determine the appropriate duration of therapy.
UTI - Definitions

- **Asymptomatic Bacteriuria**
  - Presence of 1 or more species of bacteria in urine at specified counts
  - +/- pyuria
  - Absence of signs or symptoms attributable to UTI

- **Acute Uncomplicated Cystitis**
  - Acute UTI presumed to be confined to the bladder

- **Acute Complicated Urinary Tract Infection (cUTI)**
  - Acute UTI accompanied by signs that suggests extension of infection beyond the bladder
    - Fever, flank pain, costovertebral (CVA) tenderness
Definitions

- **Bacteriuria**
  - Standard threshold: $\geq 100,000$ CFUs/mL of a single organism/uropathogen in urine of uncatheterized patient
  - OR
  - $\geq 10,000$ CFU/mL of $\geq 1$ bacterial species of catheterized sample (“in and out” catheterization)

- Presence of bacteriuria alone does not define UTI
Asymptomatic Bacteriuria (ASB) Concerns

- Symptomatic infection cannot be differentiated from ASB on the basis of urinalysis or urine culture

- ASB remains one of the most common causes of antimicrobial overprescription
  - Prospective study of hospitalized patients showed overtreatment of ASB contributed 17% of total antimicrobial overprescription

Hecker et al., Arch Int Med. 2003, 163(8)
ASB Treatment and Adverse Outcomes

- Increased risk of antimicrobial resistance
- Increased risk of symptomatic UTI
- Disturbance of intestinal flora
- Increased risk of Clostridioides difficile (C. difficile) infection
- Increased health-care associated costs
Three Components of UTI

1. Clinical symptoms

2. Laboratory evidence
   - Pyuria
   - Bacteriuria

3. Thorough search for other causes of patient’s symptoms, especially if non-specific symptoms present

***Diagnostic work-up for UTI (specifically urine culture) is recommended when high clinical suspicion is present based on clinical presentation/diagnostic criteria***
UTI- Clinical Symptoms

ASB
- Presence of bacteria in urine
- With/without pyuria
- Absence of UTI symptoms

Acute Uncomplicated Cystitis
- Dysuria, frequency with urination
- Suprapubic pain
- Gross hematuria
- CVA tenderness
- New worsening urgency or new onset incontinence

Acute cUTI
- Flank pain, CVA tenderness
- Fever, rigors (non-localizing symptoms)
  - In addition to one of the above OR
  - No symptoms suggesting infection at another site
Suggested Algorithms/Resources

Symptom-Free Pee: LET IT BE

Asymptomatic bacteriuria (bacteria in the urine with no symptoms) is colonization of the bladder that occurs frequently in the elderly, especially those with diabetes, immobility, fecal incontinence, prostatic enlargement, or post-menopausal changes. Urine microscopic WBCs may also be present.

STOP

ANTIBIOTICS NOT INDICATED!
Asymptomatic bacteriuria is not an infection
- Do not test urine even if foul-smelling, dark, or cloudy

For hemodynamically stable patients with cognitive changes, seek other causes: drug interactions / side effects, dehydration, sleep disturbances, sensory deprivation, hypoxia, hypoglycemia, constipation, etc.

Note: Falls, decreased appetite, verbal aggression, wandering, are not indications for urine testing.

WAIT

HOLD URINE TESTING
- Monitor frequently
- Rehydrate/push fluids for 24 hours if not contraindicated

Send urine for UA w/micro & urine culture
Possible urinary tract infection if at least 2/3 are present:
- Fever, rigors
- Flank pain
- Suprapubic pain
- Pain on urination
- New frequency
- Hematuria
- New incontinence

GO

IT IS HARD TO IGNORE A POSITIVE URINE TEST...
Unnecessary testing in colonized patients results in unnecessary antibiotics, which lead to adverse events (antibiotic resistance / failure, C. difficile infection, GI upset, etc.)

Think “S.M.A.R.T.” about antibiotics! Stewardship at Moffitt for improving Antimicrobial use and reducing resistance: Team approach

Adapted from the tool created by Tampa J.A.S.K.A. Antimicrobial Stewardship Program
Fig. 1. Algorithmic approach to diagnosing ASB and possible, probable, or definite UTI.
Choose Empiric Antibiotics based on local susceptibilities

- Your patient meets the criteria for UTI and you are waiting for the culture results. What bacteria is the likely cause? You choose which of the following empirically? The patient does not have any allergies.

- A- oral fluoroquinolone – ciprofloxacin
- B- oral sulfonamide – TMP/SMX
- C- oral beta lactam – ampicillin
- D- oral cephalosporin – cefdinir, cephalexin
<table>
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<tr>
<th>ANTIBIOTIC</th>
<th>Acinetobacter baumannii (%)</th>
<th>Enterobacter cloacae (%)</th>
<th>E. coli (%)</th>
<th>Klebsiella aerogenes (%)</th>
<th>Klebsiella pneumoniae (%)</th>
<th>Proteus mirabilis (%)</th>
<th>Pseudomonas aeruginosa (%)</th>
<th>Serratia marcescens (%)</th>
<th>Staphylococcus epidermidis (%)</th>
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<tr>
<td>AMIKACIN</td>
<td>14.3% (7)</td>
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<td>99% (930)</td>
<td>100% (35)</td>
<td>99.3% (400)</td>
<td>99% (72)</td>
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<td>99% (77)</td>
<td>66% (66)</td>
</tr>
<tr>
<td>AMPICILLIN</td>
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<td>55% (833)</td>
<td>79% (410)</td>
<td>90% (72)</td>
<td>95.9% (265)</td>
<td>31% (68)</td>
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<td>AMPICILLIN/SULBACTAM</td>
<td>58% (12)</td>
<td>88% (12)</td>
<td>92% (5)</td>
<td>97% (93)</td>
<td>94% (84)</td>
<td>98% (2)</td>
<td>92% (5)</td>
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<td>55% (66)</td>
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<td>95% (72)</td>
<td>95% (52)</td>
<td>92% (83)</td>
<td>56% (66)</td>
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<td>25% (12)</td>
<td>74% (156)</td>
<td>61% (144)</td>
<td>64% (36)</td>
<td>92% (410)</td>
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<td>96% (83)</td>
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<td>CIPROFLOXACIN</td>
<td>85% (13)</td>
<td>87% (156)</td>
<td>50% (44)</td>
<td>57% (411)</td>
<td>92% (72)</td>
<td>82% (515)</td>
<td>95% (83)</td>
<td>72% (267)</td>
<td>65% (445)</td>
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<td>CLINDAMYCIN</td>
<td>67% (156)</td>
<td>65% (84)</td>
<td>92% (64)</td>
<td>100% (77)</td>
<td></td>
<td>96% (83)</td>
<td>56% (445)</td>
<td>58% (263)</td>
<td>73% (66)</td>
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<tr>
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<td>99% (832)</td>
<td>100% (35)</td>
<td>99% (404)</td>
<td>98% (64)</td>
<td>100% (77)</td>
<td>96% (83)</td>
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<tr>
<td>ERYTHROMYCIN</td>
<td>96% (156)</td>
<td>89% (841)</td>
<td>97% (36)</td>
<td>99% (416)</td>
<td>98% (72)</td>
<td>96% (515)</td>
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<td>58% (445)</td>
<td>23% (66)</td>
</tr>
<tr>
<td>GENTAMICIN</td>
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<tr>
<td>LEVOFLOXACIN</td>
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<td></td>
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<td></td>
<td>72% (267)</td>
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<tr>
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<td>96% (65)</td>
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<td>MEROPENEM</td>
<td>85% (13)</td>
<td>99% (155)</td>
<td>98% (34)</td>
<td>100% (35)</td>
<td>98% (513)</td>
<td>98% (82)</td>
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<td></td>
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<td>85% (13)</td>
<td>79% (156)</td>
<td>53% (444)</td>
<td>61% (36)</td>
<td>92% (411)</td>
<td>100% (72)</td>
<td>94% (515)</td>
<td>94% (81)</td>
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<td>RIFAMPIN</td>
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<tr>
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<td>23% (268)</td>
<td>24% (67)</td>
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<tr>
<td>SYNERCID</td>
<td>64% (69)</td>
<td>100% (445)</td>
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<td>99% (87)</td>
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<td></td>
<td></td>
<td>100% (263)</td>
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<td>TOBRAMYCIN</td>
<td>63% (12)</td>
<td>95% (158)</td>
<td>97% (36)</td>
<td>99% (400)</td>
<td>96% (72)</td>
<td>98% (511)</td>
<td>98% (82)</td>
<td>100% (263)</td>
<td>79% (263)</td>
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<tr>
<td>TRIMETHOPRIM/SULFA</td>
<td>69% (13)</td>
<td>91% (147)</td>
<td>63% (159)</td>
<td>97% (34)</td>
<td>97% (381)</td>
<td>90% (72)</td>
<td>100% (79)</td>
<td>98% (46)</td>
<td>99% (263)</td>
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<td>VANCOMICYCIN</td>
<td>99% (269)</td>
<td>40% (68)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>99% (269)</td>
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</tbody>
</table>
Questions about antimicrobial coverage?

- There is always a pharmacist from the antimicrobial stewardship carrying a pager.
Acute Cellulitis

- Common in our patients. Straight forward versus red flag conditions.
- Most commonly caused by staph aureus, but must empirically cover both beta-hemolytic strep and MSSA

**Indications for MRSA coverage** — Empiric coverage for MRSA is indicated for patients with MRSA risk factors and those who have increased morbidity if suboptimal antibiotics are administered

- Clinical Pearl: Perform an accucheck on an otherwise healthy patient that has a simple cellulitis or yeast infection. If blood glucose > 200 this Pt is now a new onset diabetic.

- *UpToDate Acute cellulitis and erysipelas in adults: Treatment*
Antibiotic dosages for individuals with normal kidney function:

**Oral antibiotics:**
- Amoxicillin 875 mg every 12 hours
- Cefadroxil 500 mg every 12 hours or 1 g once daily
- Cephalexin 500 mg every 6 hours
- Clindamycin 300 mg every 8 hours
- Doxycycline 100 mg every 12 hours
- Framicillin 500 to 1000 mg every 6 hours
- Linezolid 500 mg every 12 hours
- Trimethoprim-sulfamethoxazole 1 to 2 double-strength tablets twice daily (for patients who weigh more than 70 kg, the typical dose is two double-strength tablets twice daily)

**Parenteral antibiotics:**
- Cefazolin 1 to 2 g every 8 hours (the higher dose is typically favored)
- Cefepime 2 g every 6 hours
- Fluoroquinolones 2 g every 6 hours
- Meropenem 1 g every 8 hours
- Nafcillin 1 to 2 g every 4 hours (the higher dose is typically favored)
- Oxacillin 1 to 2 g every 4 hours (the higher dose is typically favored)
- Vancomycin 20 to 35 mg/kg one-time loading dose followed by 15 to 20 mg/kg IV every 8 to 12 hours in most patients, with adjustments based on trough levels

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Are there features that warrant specific management considerations?
- **Red flag conditions, such as:**
  - Toxic shock syndrome
  - Necrotizing infection
  - Deep infection (e.g., pyomyositis, joint or graft infection)
  - Compartment syndrome
  - Wound or injury (e.g., bite, diabetic foot ulcer)
  - Environmental exposure (e.g., water, travel)
  - Involvement of face, neck, hand, perineum, or genitals

Is there severe sepsis, septic shock, or immunocompromising condition (e.g., neutropenia, immunosuppressive drugs such as chemotherapy for malignancy)?
- Yes
  - Refer to UpToDate content for details
- No

Is there an indication for parenteral antibiotics?
- Yes
  - Systemic toxicity (e.g., fever >105.5°F/39.8°C; sustained tachycardia)
  - Rapid progression of erythema
  - Extensive erythema or lymphangitis
  - Inability to tolerate or absorb oral therapy
  - Vancomycin plus one of the following:
    - Cefazolin or
    - Meropenem (for patients suspected to have an ESBL-positive organism)
- No

Is there an indication with MRSA coverage?
- Yes
  - Purulent drainage or exudate
  - Presence of other risk factor for MRSA infection, including:
    - Known MRSA colonization or past infection
    - Recent healthcare exposure
    - Recent antibiotic use
    - IDU
- No

---

**Box A**
- Initiate therapy targeting beta-hemolytic Streptococcus and MRSA:
  - Dicloxacillin, or
  - Fluoroquinolone, or
  - Cephalexin, or
  - Cefadroxil, or
  - For severe beta-lactam allergy:
    - Trimethoprim-sulfamethoxazole, or
    - Linezolid, or
    - Clindamycin (alternative)

---

**Box B**
- Initiate therapy targeting beta-hemolytic Streptococcus and MRSA:
  - Dicloxacillin, or
  - Fluoroquinolone, or
  - Cephalexin, or
  - Cefadroxil, or
  - Linezolid, or
  - Clindamycin (alternative)

---

**Initiate therapy targeting beta-hemolytic Streptococcus and MRSA:**
- Dicloxacillin, or
- Cephalexin, or
- Cefadroxil, or
- Linezolid, or
- Clindamycin (alternative)

For severe beta-lactam allergy:
- Trimethoprim-sulfamethoxazole, or
- Linezolid, or
- Clindamycin (alternative)

Initiate therapy targeting beta-hemolytic Streptococcus and MRSA:
- Vancomycin

Once patient has clinically improved, switch to an oral regimen in Box B.

---

**Initiate therapy targeting beta-hemolytic Streptococcus and MRSA:**
- Vancomycin

Once patient has clinically improved, switch to an oral regimen in Box A.
Cellulitis Uncomplicated

- For straightforward cases IV ABX not indicated unless oral treatment failure
- For those on IV therapy once there is improvement then switch to oral regimen
Nausea

- The medical person hearing the complaint (APP, triage nurse, etc) must qualify the complaint.

- Ask the patient to “Explain the sensation of nausea without using the word nausea”

- Relate the timing of the complaint to the last treatment

- Choose antiemetic based on quality and timing of complaint. Always give pt more than one Rx for antiemetics (different classes)

- Clinical Pearl: Chewing gum makes you brain think you are eating and can help churn the stomach to help with nausea and GERD
36 female presents on 11/13/2009 with “Nausea and Vomiting”

- Baseline body weight 80 kg, now 58.5 kg
“Nausea and Vomiting”

11/13/2009: M.R. was last seen in clinic by us on 09/25/2009. Since then, she continued to lose a slight amount of weight. She is failing to thrive in the outpatient setting. She complains today and is seen acutely for vomiting, which has been going on over the last few days. She denies feeling chronic nausea. She will state for example that she will have a full dinner and then the next morning she will wake up and have a very short bout of nausea and sweating followed by vomiting the dinner that she ate in the previous night before. This has been going on for several days. She states she feels unsteady on her feet when she stands up.

- Acute treatment: IVF and IV metoclopramide 10 mg.

- Sent home with metoclopramide 10 mg PO 30 min Q AC and HS
Body weight improves with correct Rx
<table>
<thead>
<tr>
<th>Class</th>
<th>Mechanism</th>
<th>Indications</th>
<th>Drugs</th>
<th>Side Effects</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antidopaminergic therapies</td>
<td>• Block emetic pathways originating from the GI and CTZ &lt;br&gt; • Antidopaminergic (D₂) &lt;br&gt; • Direct pro-kinetic effect (metoclopramide)</td>
<td>Opioids, chemotherapy, toxins or drugs associated nausea and vomiting</td>
<td>• Prochlorperazine &lt;br&gt; • Promethazine &lt;br&gt; • Metoclopramide &lt;br&gt; • Haloperidol</td>
<td>• Extra-pyramidal effects &lt;br&gt; • Sedation &lt;br&gt; • Hypotension &lt;br&gt; • Contraindicated in bowel obstruction</td>
<td>Low</td>
</tr>
<tr>
<td>Serotonin receptor antagonists</td>
<td>Block emetic pathways occurring through vagal stimulation, 5-HT₃ receptors in the GI tract, and/or the CTZ</td>
<td>Chemotherapy, toxins (CTZ, GI tract) associated nausea and vomiting</td>
<td>• Ondansetron &lt;br&gt; • Granisetron &lt;br&gt; • Dolasetron &lt;br&gt; • Tropisetron &lt;br&gt; • Palonosetron (second generation)</td>
<td>• Constipation &lt;br&gt; • Headache</td>
<td>Moderate</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>Uncertain action at the vomiting center</td>
<td>Inner ear pathology, adjuvant to other agents</td>
<td>• Diphenhydramine &lt;br&gt; • Hydroxyzine &lt;br&gt; • Meclizine &lt;br&gt; • Doxepin</td>
<td>• Sedation &lt;br&gt; • Constipation &lt;br&gt; • Confusion &lt;br&gt; • Orthostatic hypotension &lt;br&gt; • Dry mouth</td>
<td>Low</td>
</tr>
<tr>
<td>Anxiolytics – Benzodiazepines</td>
<td>Works via the cerebral cortex pathway</td>
<td>Anxiety, PTSD post-chemotherapy &lt;br&gt; Useful as an adjunct</td>
<td>• Lorazepam &lt;br&gt; • Oxazepam &lt;br&gt; • Diazepam</td>
<td>• Sedation &lt;br&gt; • Confusion &lt;br&gt; • Falls and fractures</td>
<td>Low</td>
</tr>
<tr>
<td>Corticosteroids</td>
<td>• May relieve cancer associated nausea through effects on reducing inflammatory mediators, tumor edema, pressure on GI tract, and reducing intracranial pressure from tumor mass. &lt;br&gt; • The exact mechanism in nausea and vomiting is unknown</td>
<td>Bone pain &lt;br&gt; Stimulate appetite</td>
<td>• Dexamethasone &lt;br&gt; • Methylprednisolone &lt;br&gt; • Prednisone</td>
<td>• Fluid retention &lt;br&gt; • Increased blood pressure &lt;br&gt; • Mood swings &lt;br&gt; • Weight gain &lt;br&gt; • Increased risk of infections &lt;br&gt; • Thinning bones (osteoporosis) and fractures</td>
<td>Low</td>
</tr>
<tr>
<td>Cannabinoids</td>
<td>Cannabinoid receptors are widespread in the central nervous system and the mechanism of action is unknown</td>
<td>Nausea unresponsive to conventional treatment &lt;br&gt; May be used in combination with other antiemetic therapies &lt;br&gt; Combination antiemetic therapy with dronabinol and prochlorperazine may result in synergistic antiemetic effects and minimize the toxicities</td>
<td>Dronabinol</td>
<td>• Tachycardia &lt;br&gt; • Low blood pressure &lt;br&gt; • Blood shot eyes &lt;br&gt; • Muscle relaxation &lt;br&gt; • Slowed digestion &lt;br&gt; • Dizziness &lt;br&gt; • Depression &lt;br&gt; • Hallucinations &lt;br&gt; • Paranoia</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Nutrition screening

• Ask both the patient and caregiver(s) about intake

• Three commonly used nutritional screening tools used in assessment of oncology patients are Nutritional Risk Screening (NRS2002), Malnutrition Screening Tool (MST), and the more detailed Patient-Generated Subjective Global Assessment (PG-SGA)

• Get a nutrition consult early and reconsult if needed

• Supportive care consult if nutritional deficiencies are exacerbated by uncontrolled symptoms despite intervention
Protein Calorie Malnutrition

• Protein-Calorie Malnutrition (PCM) refers to a nutritional status in which reduced availability of nutrients leads to changes in body composition and function.

• PCM in cancer patients is caused by several factors including loss of appetite, altered taste, and smell, physical inability to ingest food and metabolic alterations including insulin resistance, glucose intolerance, energy imbalance and increased lipolysis and proteolysis.

• Metabolic Alterations: Increased resting energy expenditure and a wide range of metabolic activity from hypo- to hypermetabolism have been reported in cancer patients. Hypermetabolism in malnourished patients contributes to a negative energy balance, which manifests in weight loss.

Chemotherapy and Nutrition

• Toxicity of chemotherapy induces a host of complications in cancer patients including nausea, vomiting, anorexia, taste and smell changes, early satiety, mucositis, esophagitis, diarrhea, xerostomia, and constipation (Table 1). These symptoms occur as a function of the length and number of treatments. One of the most notable features of chemotherapy is nausea, which occurs in 84% of patients. Nausea occurring within 24 hrs of treatment is mediated by activation of serotonin type 3 receptors, while delayed symptoms involve several factors including adrenal hormones, substance P, and gastrointestinal motility disruption.

## Dietician Consultation

### Outpatient Consultation

**Details for Outpatient Diet**

**Order Name**: Diet for Risk Reduction

**Order Comments**:
- Carb Consistent Diet Education
- ERAS
- Glucose Monitoring Education
- Insulin Injection Education
- Involuntary Weight Loss
- Malnutrition
- Other - Add Comments
- PeriOperative Glucose - Standard Number
- Poor Appetite
- Tube Feeding Recommendations
- Weight Reduction

**Request for Signature**

**Order Name**: MIP - Infusion Center

**Status**: Admit: 8/18/2022 9:19 EDT

**Start**: Routine, 8/29/2022 12:38 EDT, Rehab

**Details**

- **Requested Start Date/Time**: 08/29/2022, 1238 EDT
- **Performed at Moffitt Facility**: Yes/No
- **Nutrition Consult Type**: Diabetes Consult
  - Nutrition Consult
  - Tube Clinic
  - Vitality Clinic - Nutrition Consult
- **Special Instructions**:

**Stop Date/Time**: 

**Reason for Referrals**: 

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PA Foundation Nutrition Outreach Fellowship

- 1 year program covering the following topics:
  - Nutrition for Healthy Aging
  - Nutrition and Wound Healing
  - Nutrition for Diabetes
- Megan Uribe, PA-C will be providing more information at a future APP Grand Rounds talk

Apply on the PA Foundation website: https://pa-foundation.org/our-programs/nutrition-outreach-fellowship/
Supportive Care

- Supportive care is synonymous with palliative care
- Goals of care discussions and help with advanced planning
- Intractable nausea
- Malignancy related pain
- Curbside the providers
- Always try treating with standard of care before referring or while waiting for an appt.
Supportive Care

- ADCC – Alliance of Dedicated Cancer Centers collaborative Initiative called Improving Goal Concordant Care (IGCC)

- The IGCC is a three-year initiative designed to address system gaps across our centers and to establish new expectations for when and how goals-of-care conversations occur.

- Initiative includes formal training for oncologists and APPs

- Initiative will include structured goals of care in an EHR

- Each of us should be comfortable discussing Goals of Care – discuss early and often. Can also refer to supportive care dept for this purpose
New Onset Afib

- Afib: Most commonly treated arrhythmia. Affects > 4% population > 65

- Your clinic Pt: an asymptomatic patient with an irregularly irregular and often rapid pulse (with an electrocardiogram consistent with AF)

- Unstable, symptomatic Pts require hospitalization

- What if Stable and asymptomatic with RVR (Rate > 100)?

- What if stable and asymptomatic and rate < 100

- UpToDate New onset atrial fibrillation. Authors Robert Phang & Brian Olshansky
Stable Afib work up

• 12 Lead EKG, complete H&P, labs: CBC, CMP, TSH, free T4, TTE

• Was the Afib caused by a known or acute event?

• Do you need rate control or cardioversion?

• Determine the need for acute and long-term anticoagulant therapy.

UpToDate New onset atrial fibrillation. Authors Robert Phang & Brian Olshansky
80 y.o. male w/ MDS who was seen by me 7 times in previous year
80y.o. male with new onset Afib that was stable

- H & P: 80 y.o. male with MDS. HTN on losartan and HCTZ prn. HLD on atorvastatin

- There was a cardio oncology APP (Ashley Austin- Johnson) next door when this happened!

- Started Pt on metoprolol 25 mg PO BID and ASA 325 mg

- TFTs (normal) and TTE done within the week. TTE showed LVEF 55-60%, moderate concentric LVH, moderate LAE, mild MR, moderate TR. He wore cardiac event monitor which showed 100% atrial fib burden.

- Anticoagulation changed apixaban

- Pt is still in afib with HR < 100. He is doing extremely well
81 y.o. male presents for Immunotherapy - Physical Exam with asymptomatic, irregular bradycardia

Vitals & Measurements **T:** 36.44 CELSIUS (Oral) **HR:** 40 **RR:** 17 **BP:** 156/67 **SpO2:** 100%
Abnormal EKG

- Atrial fibrillation with slow ventricular response with a competing junctional pacemaker
- Pt was seen 6 days prior. HR 40 noted on VS. No EKG done
- Pt sent to TGH for EP work up
- Cardio Oncology pager in smart web!
Immune related thyroiditis

- ↑ TSH and ↓T4 hypothyroid, ↓ TSH and ↑T4 hyperthyroid, ↓ TSH and ↓T4 hypophysitis
- Checkpoint inhibition induces T-cells to attack (preferably only the cancer)
- Thyroiditis caused by immunotherapy is an autoimmune process
- Often thyroiditis with transient hyperthyroidism (low TSH and high free T4) may be followed by more longstanding hypothyroidism (high TSH and low free T4). For such patients, we do not suggest initial treatment of the hyperthyroid phase with anti-thyroid medication, since the phase is usually brief and almost invariably leads hypothyroidism. Instead, for select patients with significant symptoms attributed to hyperthyroidism, we suggest evaluating patients for the use of beta-blockers or other supportive medications.

UpToDate Toxicities associated with checkpoint inhibitor immunotherapy, Michael Postow, MD
Wait for the condition to play out if asymptomatic
Hypothyroidism

- If asymptomatic/ subclinical monitor TSH, free T4 Q 4-6 weeks or each cycle
- Subclinical hypothyroidism = elevated TSH with normal T4
- If elevated TSH (>10) with normal free T4 continue immunotherapy, consider levothyroxine. Condition will be permanent if caused by immunotherapy. Reversible if caused by targeted therapy

- Clinical (overt) Hypothyroidism – Continue IO treatment. Consider endocrine Consult. Initiate levothyroxine therapy (1.6 mcg/kg/day – with consideration of comorbid conditions). **Always safer to dose lower.**

- Guidelines recommend TSH monitoring Q 4-6 weeks to guide adjustments

- Consider waiting 10 weeks for adjustments. Consider Endocrine consult
References

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