NCODA | SETs

Student Educational Talks

Wednesday, April 29th, 2020

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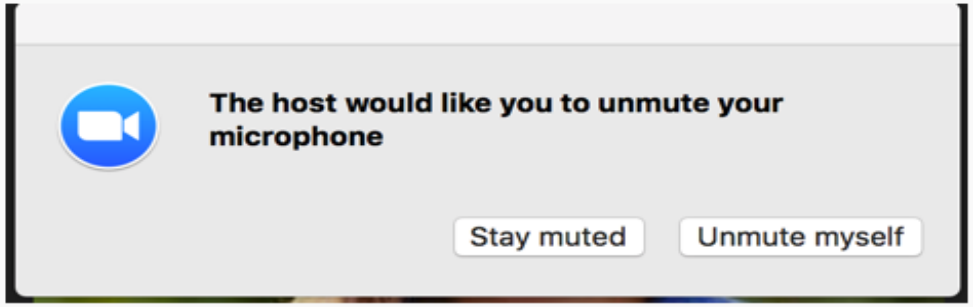

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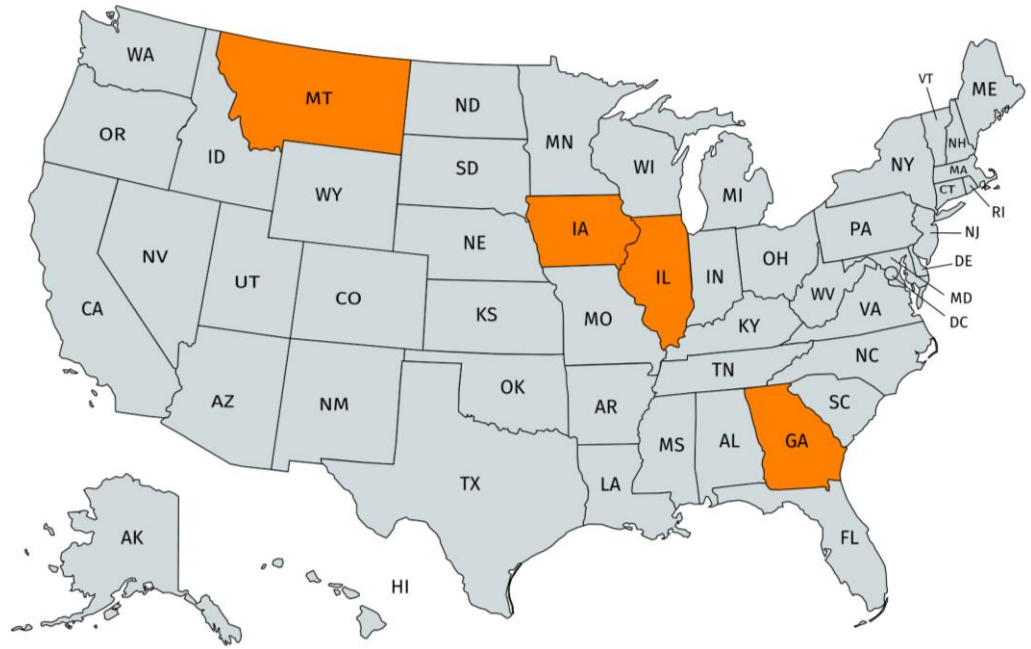
NCODA WEBINAR SERIES

Supporting Patients and Practices Through the COVID-19 Pandemic

Hear From 3 Expert Panelists

Student Educational Talks Agenda

- **NCODA PSO Mission Statement & Updates**
  - Andy Jatis, PharmD Candidate 2021, University of Iowa
- **Multiple Myeloma**
  - Hector Clarke, PharmD, BCOP, Kaiser Permanente
- **Cardiotoxicity in Anthracyclines**
  - Anna Howard, PharmD, BCOP, Billings Clinic
- **Head & Neck Cancer Epidemiology Review**
  - Sarah Stepanek, PharmD Candidate 2021, Midwestern University



PSO Mission Statement

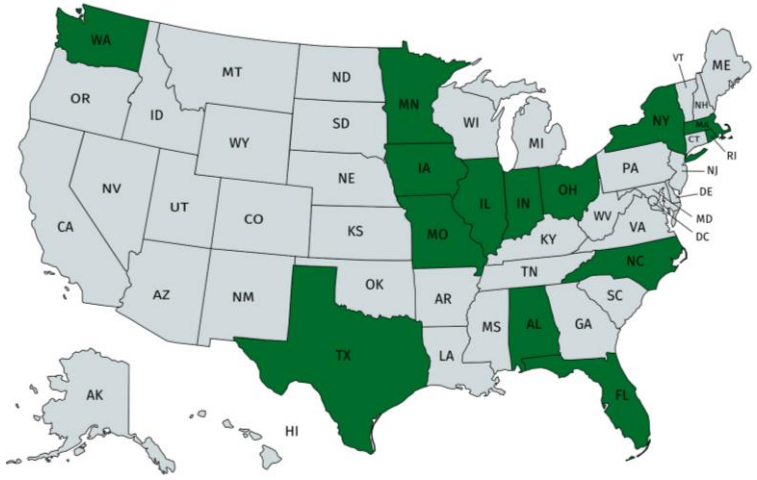
Our focus is to offer an international community for healthcare students with passion in oncology and pharmaceutical industry.

We provide education, leadership, mentorship and opportunities in research and community outreach.

We promote unique and dynamic experiences for students to collaborate with all oncology stakeholders.

Welcome Established NCODA PSO Chapters

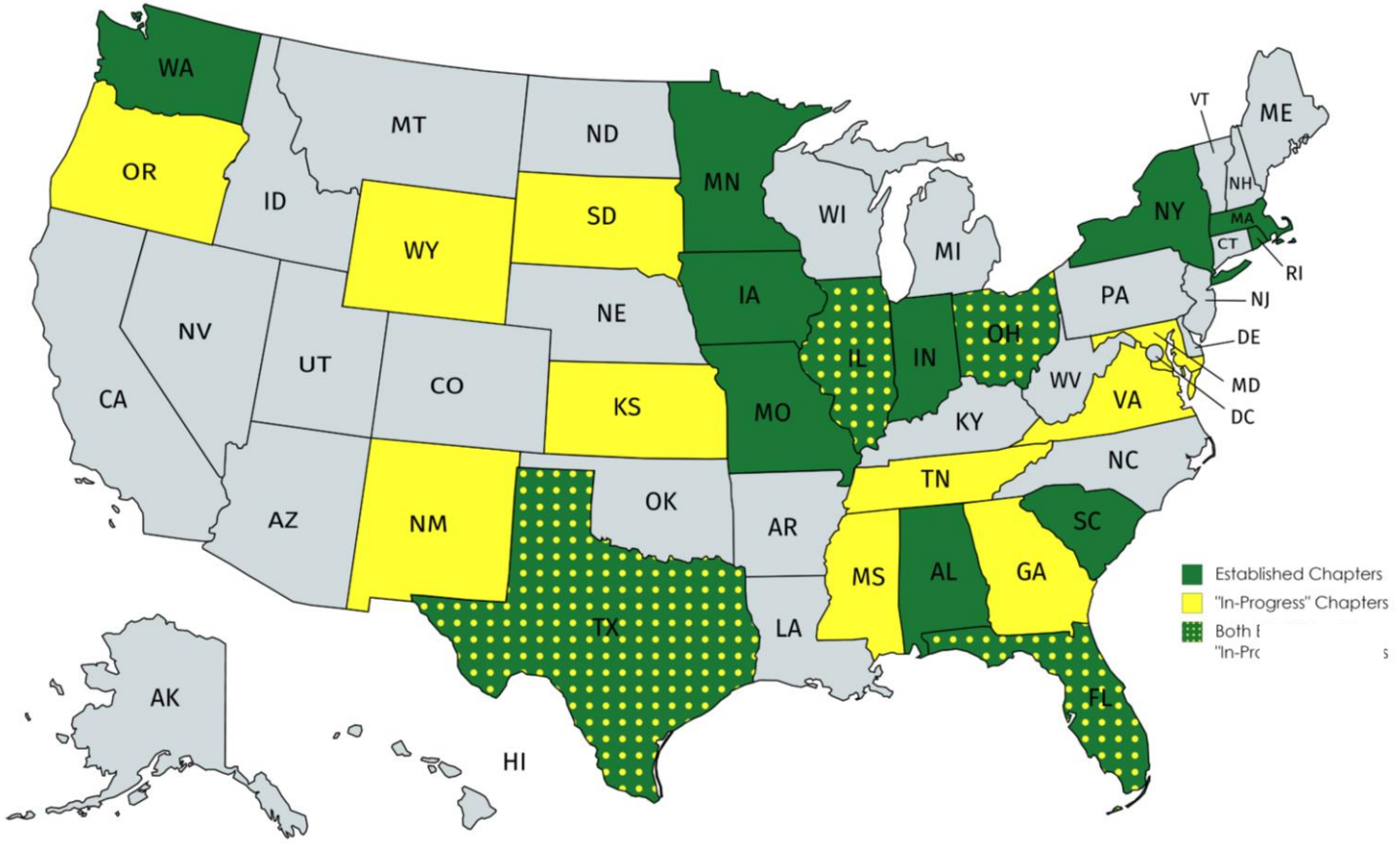
1. South University (SC & GA)
2. University of Rhode Island (RI)
3. Midwestern University (IL)
4. North Texas University (TX)
5. Washington State University (WA)
6. Texas Tech University (TX)
7. Purdue University (IN)
8. Nova Southeastern University (FL)



9. Massachusetts College of Pharmacy and Health Sciences University (MA)
10. University of Minnesota (MN)
11. University of Toledo (OH)
12. Albany College of Pharmacy and Health Sciences (NY)
13. University of Iowa (IA)
14. Lake Erie College of Osteopathic Medicine (FL)
15. Auburn University (AL)
16. University of Missouri-Kansas City (MO)

Welcome “In-Progress” NCODA PSO Chapters

1. Mercer University (GA)
2. Notre Dame University of Maryland (MD)
3. Oregon State University (OR)
4. South Dakota State University (SD)
5. Texas Southern University (TX)
6. The Ohio State University (OH)
7. University of Florida (FL)
8. University of Houston (TX)
9. University of Illinois at Chicago (IL)
10. University of Kansas (KS)
11. University of Maryland Eastern Shore (MD)
12. University of Mississippi (MS)
13. University of New Mexico (NM)
14. University of Tennessee (TN)
15. University of Texas at El Paso (TX)
16. University of Wyoming (WY)
17. Virginia Commonwealth University (VA)



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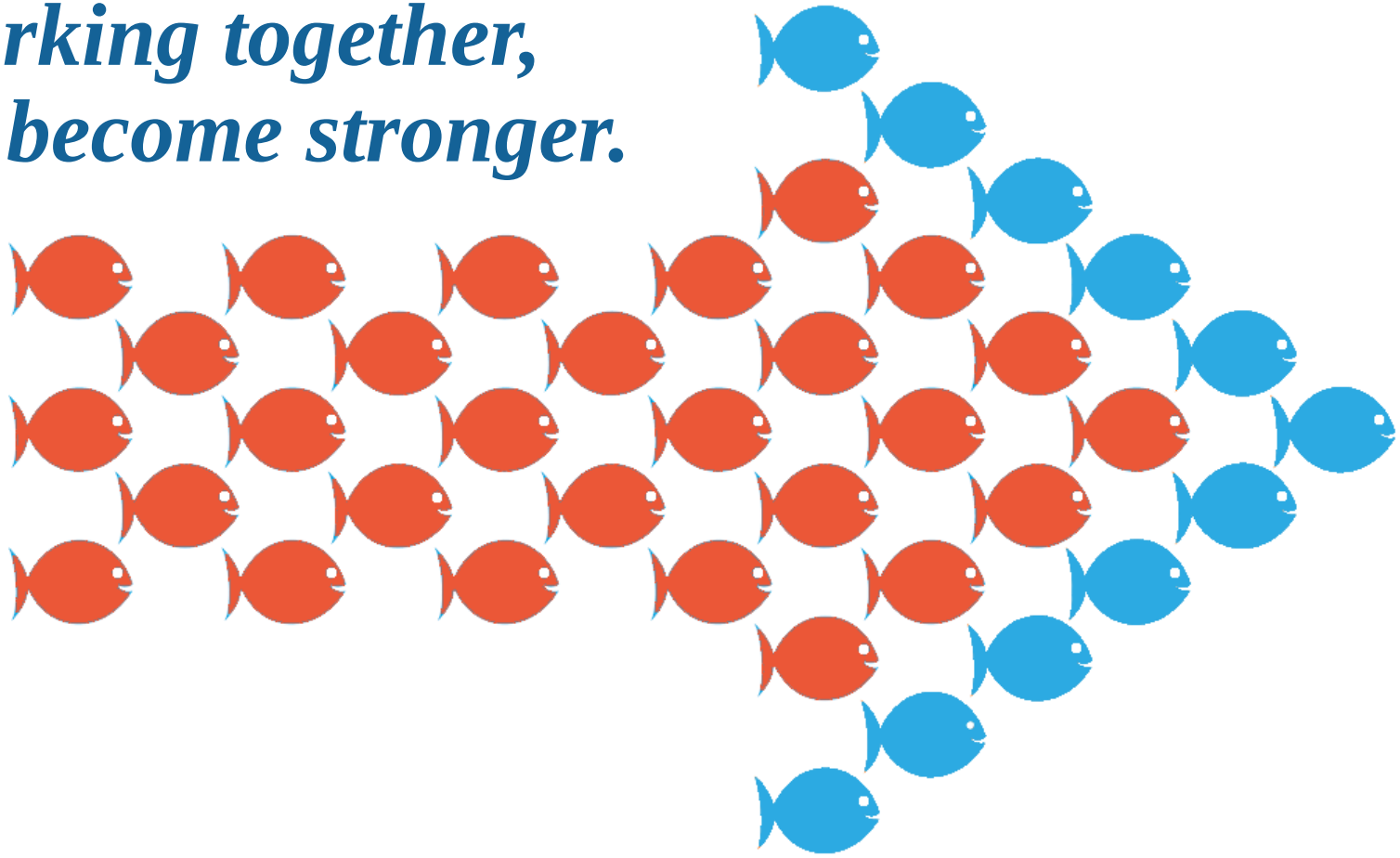
Working together,
we become stronger.



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Multiple Myeloma - The Pharmacist Role in Treatment

Hector G. Clarke, Pharm.D., BCOP
Senior Manager-Ambulatory Pharmacy Operations
Kaiser Permanente, Atlanta GA

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National Community Oncology Dispensing Association, Inc. (NCODA), has developed the Student Educational Talks presentation. This platform represents a brief summary of medications' uses and therapy options derived from information provided by the drug manufacturer and other resources. This platform is intended as an educational aid and does not provide individual medical advice and does not substitute for the advice of a qualified healthcare professional. This platform does not cover all existing information related to the possible uses, directions, doses, precautions, warning, interactions, adverse effects, or risks associated with the medications discussed in the platform and is not intended as a substitute for the advice of a qualified healthcare professional. The materials contained in this platform are for informational purposes only and do not constitute or imply endorsement, recommendation, or favoring of this medication by NCODA, which assumes no liability for and does not ensure the accuracy of the information presented. NCODA does not make any representations with respect to the medications whatsoever, and any and all decisions, with respect to such medications, are at the sole risk of the individual consuming the medication. All decisions related to taking these medications should be made with the guidance and under the direction of a qualified healthcare professional.

Learning Objectives

At the completion of this activity participants will be able to:

1. Discuss the role of the oncology pharmacist in the overall management of the Multiple Myeloma (MM) patient.

2. Discuss therapy selection in newly diagnosed transplant eligible and ineligible patients.

3. Discuss dose selection in patients with renal and hepatic impairment.

4. Identify strategies for minimizing and treating adverse effects associated with the treatment of MM.

Multiple Myeloma (MM)

- 2020 National Cancer Institutes (NCI) estimates
  - 14th most common among all cancers
    - 2nd most common hematologic malignancy
  - New Cases: 32, 270
  - Deaths: 12, 830
- Median Age of Onset: 69 years
  - Age range: 65-74 years
  - Increase number of younger patients <65 in recent years
- 5-yr survival from 2010-2016: 53.9%
  - Treatable , incurable

Cancer Stat Facts: Myeloma. (2020, April 15). Retrieved from http://www.seer.cancer.gov/statfacts/html/mulmy.html

International Myeloma Working Group (IMWG) Updated Disease Definition

Monoclonal Gammopathy of Undetermined Significance (MGUS)

- Serum M-protein <30g/dL clonal bone marrow plasma cells <10%
- Absence end organ damage such as:
  - **C**alcium
  - **R**enal insufficiency
  - **A**nemia
  - **B**one lesions

Smoldering Multiple Myeloma (Asymptomatic)

- Serum IgG/IgA ≥ 30g/L or urinary M-protein ≥ 500 mg/24 hr and/or clonal bone marrow plasma cells 10-60%
- Absence of myeloma-defining events or amyloidosis

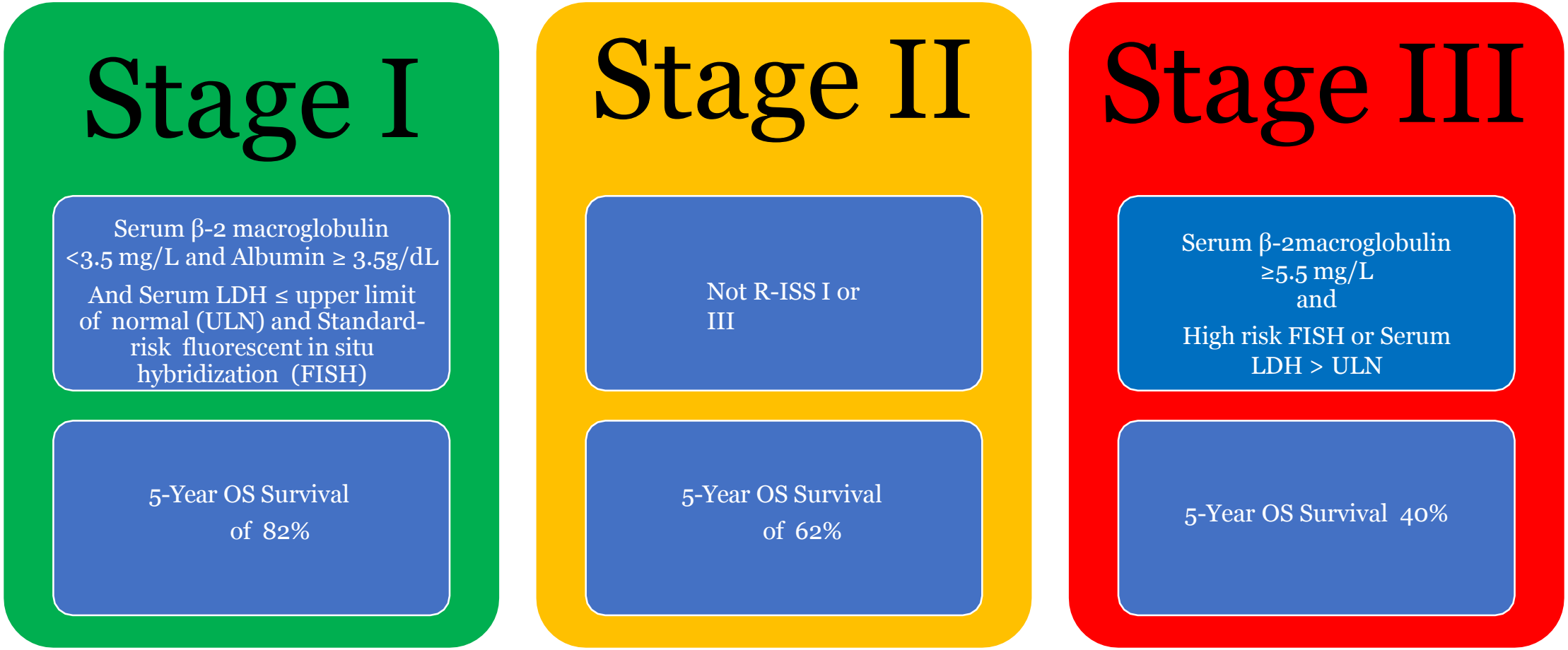
Active Multiple Myeloma

- Both criteria must be met:

1. ≥ 10% clonal bone marrow plasma cells or biopsy-proven bony or extramedullary plasmacytoma **AND**
2. Any CRAB feature **or** ≥ 60% clonal plasma cells in bone marrow or involved FLC ratio ≥100 or ≥1 focal lesion(s) on MRI studies (at least ≥5 mm)

American Society of Clinical Oncology Educational Book 36 (October 29, 2018) e418-e423

Revised International Staging System (R-ISS)



J Clin Oncol. 2015 Sep 10; 33(26): 2863-2869

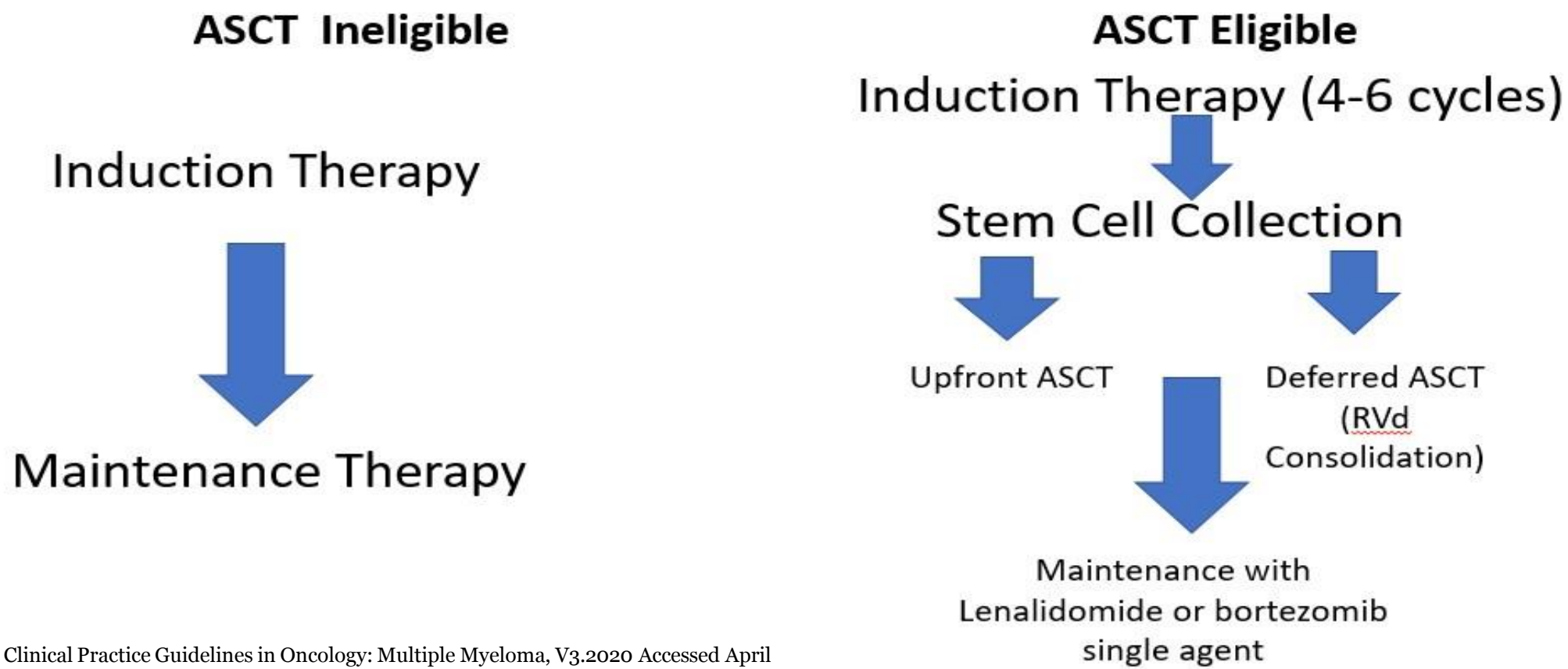
Multiple Myeloma-Treatment Paradigm

Stem cells harvested after Primary Induction Therapy
If response then patient will be consolidated with transplant
If no response then patient will needed recuse with secondary therapy

If patient relapses after transplant while on maintenance therapy then recuse with salvage therapy

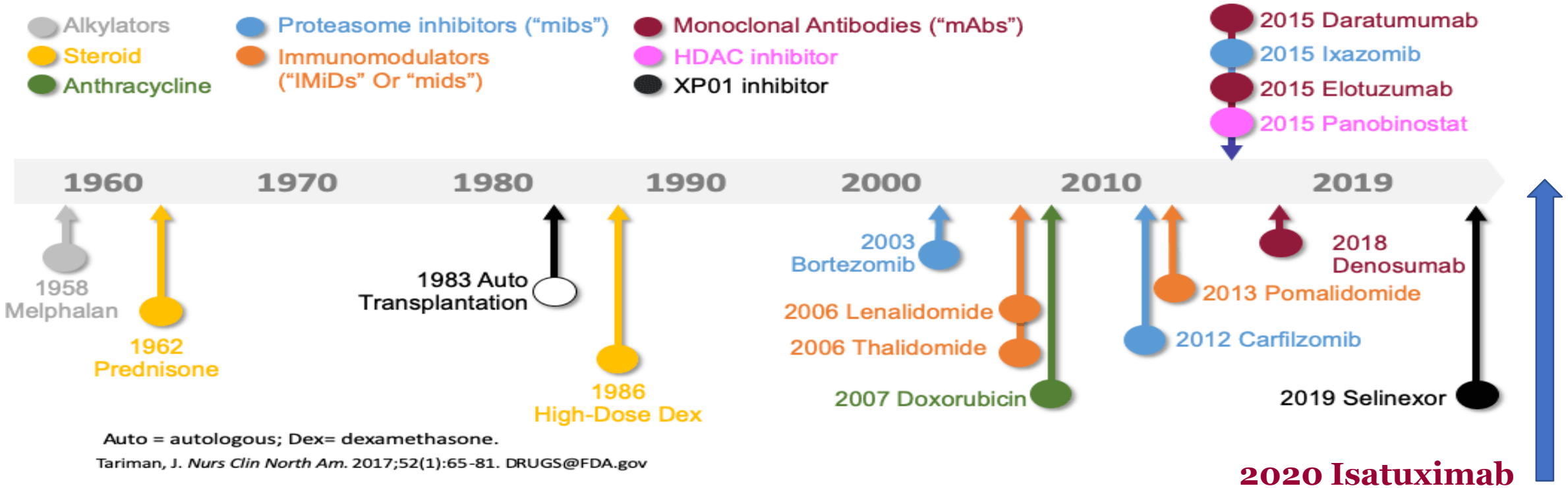
NCCN Clinical Practice Guidelines in Oncology: Multiple Myeloma, V3.2020 Accessed April 27, 2020.

Multiple Myeloma –Treatment Paradigm



NCCN Clinical Practice Guidelines in Oncology: Multiple Myeloma, V3.2020 Accessed April 27, 2020.

Myeloma Drug Timeline



Auto = autologous; Dex= dexamethasone.

Tariman, J. *Nurs Clin North Am.* 2017;52(1):65-81. DRUGS@FDA.gov

Adapted from: International Myeloma foundation website: Multiple Myeloma drug guide. Accessed April 27, 2020. www.myeloma.org/multiple-myeloma-drug

Multiple Myeloma Treatment
Pharmacist Roles

- Treatment Selection
  - Clinically assess patient disease state and comorbidities,
  - ASCT determination to direct therapy
  - Manage drug selection in special populations (Diabetes, Preexisting neuropathy, renal dysfunction, Hx of DVT)
- Dose Selection
  - Renal dosing adjustment recommendations
  - Hepatic dosing adjustment recommendations
- Adverse event prevention and management of MM Treatment Options

Audience Response Question #1

- K.R is a 62 year old African American male with newly diagnosed monoclonal gammopathy of undetermined significance (MGUS).
  His baseline labs include, SCr 0.9mg/dL, calcium 8.9 mg/dL and Hgb 13 mg/dL.
  According to the National Comprehensive Cancer Network(NCCN) Guidelines, which of the following would be the most appropriate therapy for K.R.?

A. Melphalan + prednisone
B. Bortezomib + dexamethasone
C. Ixazomib + dexamethasone
D. Do nothing (Observation)

Audience Response Question #2

- A.S 60 year old female presented with symptomatic (SCr 4.5 mg/dL, correct calcium >12 mg/dL, bone marrow with 30% plasma cells) ISS Stage III MM (high risk del 17p, t(4,14) and β2M of 5.8 mg/L). ECOG Status 0.
  She is eligible for autologous hematopoietic stem cell transplant (ASCT).
  Which of the following is the most appropriate treatment option for Induction Therapy?

A. Bortezomib, lenalidomide, dexamethasone
B. Bortezomib, melphalan, prednisone
C. Pomalidomide, dexamethasone
D. Elotuzumab, lenalidomide dexamethasone

Primary Therapy

ASCT Candidates	Non-ASCT Candidates	Treatment Options
Preferred (Category 1)	Preferred (Category 1)	Bortezomib/lenalidomide/dexamethasone (RVd or VRd)
Preferred (Category 2A)	Preferred (Category 2A)	Bortezomib/cyclophosphamide/dexamethasone (CyBorD)
	Preferred (Category 1)	Daratumumab/lenalidomide/dexamethasone
	Preferred (Category 1)	Lenalidomide/low dose dexamethasone* (Rd)
Other (Category 2A)		Carfilzomib/lenalidomide/dexamethasone(KRd)
Other (Category 2B)	Other (Category 2A)	Ixazomib/lenalidomide/dexamethasone (Ird)
	Other (Category 1)	Daratumumab/bortezomib/melphalan/prednisone

NCCN Clinical Practice Guidelines in Oncology: Multiple Myeloma, V3.2020. Access April 28, 2020

Relapsed and Refractory (R/R) MM Treatment Options

- Preferred Regimens: Repeat primary induction therapy if relapse at > 6 months
- Preferred Category 1 Options
  - Carfilzomib (BIW)/dexamethasone
  - Carfilzomib/lenalidomide/dexamethasone
  - Daratumumab/bortezomib or lenalidomide/dexamethasone
  - Elotuzumab/lenalidomide/dexamethasone
  - Ixazomib/lenalidomide/dexamethasone
- Preferred Category 2A
  - Bortezomib/lenalidomide/dexamethasone
  - Carfilzomib (BIW)/dexamethasone

NCCN Clinical Practice Guidelines in Oncology: Multiple Myeloma, V3.2020. Access April 28, 2020

Audience Response Question #3

Which of the following agents may require renal doing adjustment prior to the initiation of therapy?

A. Panobinostat
B. Lenalidomide
C. Pomalidomide
D. B and C
E. All of the above

MM Treatment –Pharmacist role in dose selection

Renal dosing adjustment	Hepatic dosing adjustment	Geriatric dosing recommendation
• Melphalan • Lenalidomide • Pomalidomide • Ixazomib • Selinexor	• Pomalidomide • Elotuzumab • Panobinostat • Ixazomib	• Melphalan • Thalidomide • Lenalidomide • Elotuzumab

Lenalidomide (prescribing information). Celgene; 2019; Pomalidomide (prescribing information). Celgene; 2019; Melphalan (prescribing information). Spectrum Pharmaceuticals; 2016 Elotuzumab (prescribing information). Bristol-Myers Squibb Company 2015; Panobinostat (prescribing information). Novartis; 2015; Thalidomide (prescribing information). Celgene; 1998 Selinexor (prescribing information). Karyopharm Therapeutics Inc; 2019.

Audience Response Question #4

Our 60 y/o patient AS was started on RVd and was admitted to the hospital due to left lower leg pain that was swollen and warm. After medical work AS was diagnosed with a DVT. What is the mostly likely cause for her DVT?

A. Patient's Age
B. Therapy with bortezomib
C. Therapy with lenalidomide and dexamethasone
D. All of the above

MM Treatment Toxicities-IMiDs

Drug Therapy	Toxicity
Thalidomide	Constipation • Recommend holding antihistamines • Recommend stool softeners Sedation
Lenalidomide	Diarrhea •Recommend Antidiarrheal (Cholestyramine) Hematologic • Monitor counts •May need to hold dose, dose reduce Secondary Malignancies
Pomalidomide	Neutropenia • Monitor counts • May need to hold dose, dose reduce

ALL IMiDs cause:
- VTE
- Rash/Itching
- Fatigue
- Birth Defects

VTE Prophylaxis
No risk Factor or any 1 risk factor
- ASA 81-325 mg daily

≥2 individual risk factors or a myeloma therapy risk factor
- LMWH equivalent of enoxaparin 40 mf once daily
- Warfarin (INR goal 2-3)
- Apixaban 2.5 mg twice daily

NCCN Clinical Practice Guidelines in Oncology: Cancer-Associated Venous Thromboembolism Disease, V1 2019.
Cornell RF, et al. Front Oncol. 2019;9:45
Khorana AA, Streiff MB, Farge D et al. Venous thromboembolism prophylaxis and treatment in cancer: A consensus statement of major guidelines panels and call to action. *J Clin Oncol.* 2009; 27(29): 4919-26.
Lyman GH, Khorana AA, Kuderer NM et al. Cancer and thrombosis: Back to the future renewed interest in an old problem. *Cancer Invest.* 2009; 27(5): 472-3.
Lyman GH, Khorana AA, Kuderer NM et al. Venous thromboembolism prophylaxis and treatment in patients with cancer: American society of clinical oncology clinical practice guideline update. *J Clin Oncol.* 2013; 31(17): 2189- 204.

Audience Response Question #5

Our 60 y/o patient AS presents to the pharmacy for a refill of acyclovir. Which of the following medications in her RVd regimen required Varicella-Zoster reactivation prophylaxis?

A. Bortezomib
B. Dexamethasone
C. Lenalidomide
D. Both A and C
E. All of the above

MM Treatment Toxicities-PIs

Drug Therapy	Toxicity
Bortezomib	Peripheral Neuropathy
Carfilzomib	Hematologic Pulmonary Toxicity Acute Renal Failure Cardia Dysfunction
Ixazomib	GI Toxicity (Nausea, Vomiting Diarrhea) Peripheral Neuropathy

All PI cause: Hematologic abnormalities and Varicella Zoster Virus (VZV) reactivation

VZV Prophylaxis with antiviral therapy required for all PIs
- Acyclovir: 400 mg daily
- Valacyclovir: 250-500 mg daily

Peripheral Neuropathy:
- Hold dose, dose reduce
- Pharmacological Intervention
  - Amitriptyline: 10-100 mg daily
  - Venlafaxine: 75-150 mg daily
  - Duloxetine: 60-90 mg daily

GI Toxicity: Antiemetics, Antidiarrheal

Acute Renal Failure (ARF): Hydration, hold/discontinue, reduce dose

Cardiac Dysfunction: Verify patient risk factors that increase risk; discontinue, reduce dose if resolved

Drug-Drug Interaction- Avoid Concomitant use with strong CYP3A4 inducers Ixazomib)

Shah C, etl. Leuk Lymphoma. 2018;21:1-13.; Jain N, et al. Blood. 2016.125: Abstr 2126; Delforge M, Ludwig H. *Blood*. 2017;129(17):2359-2367;

Audience Response Question #6

Which of the following agents requires pre type and cross screening prior to initiation of therapy?

A. Denusomab
B. Elotuzumab
C. Isatuximab
D. Daratumumab

Audience Response Question #7

HC is a transplant ineligible patient that will begin therapy with Daratumumab+lenalidomide+dexamethasone.
He presents to the pharmacy to pick up his pre-medications.
You reviewed his baseline labs and studies and his most recent FEV1 <70%.
Which of the following is the most appropriate Pre-medication before Daratumumab Infusion?

A. Corticosteroid + H1 and H2 antagonist + APAP + Montelukast
B. Corticosteroid + H1 and H2 antagonist + APAP + Montelukast + Albuterol
C. Corticosteroid + H1 and H2 antagonist + APAP
D. A and B

MM Treatment Toxicities-mABs

Drug Therapy	Toxicity/Management
Daratumumab	VZV Reactivation • Prophylaxis with antiviral (e.g, acyclovir) Interferes with cross-matching and RBC AB linking • Recommend to type and cross prior
Elotuzumab	Peripheral Neuropathy • May require pharmacological intervention or hold/discontinuation
Isatuximab	Infusion Reaction • Premeds required: Corticosteroid + APAP + H1 and H2 antagonist

All:

- Infusion reactions and require premedication with corticosteroid + APAP + H1 and H2 antagonists
- Montelukast recommended for Daratumumab but not required

Daratumumab (prescribing information). Janssen; 2019; Sarclisa (prescribing information). Sanofi-Aventis; 2020; Elotuzumab (prescribing information). Bristol-Myers Squibb; 2019.

Audience Response Question #8

E.M is a 69 y/o AAM who was started on new medication for MM. Using your institution's integrated EMR you performed prospective DUR prior to dispensing this medication. You note that his QTc was 490 msec, Serum K+ 5.9 mmol/L

A. Refill his Panobinostat
B. Hold Panobinostat and contact the provider
C. Call the provider and recommend a lower dose of Panobinostat and fill the order
D. None of the above

MM Treatment Toxicities-HDAC Inhibitor

Histone Deactylase Inhibitors (HDAC)

Panobinostat

Toxicities

Cardia Arrhythmias

- **Monitor QTc**
- **Hold for QTc > 480 msec**
- **Avoid use with other QTc prolonging agents**
- **Correct and monitor electrolyte abnormalities**

Diarrhea

- **Recommend Antidiarrheal PRN**

Farydak (prescribing information). Secura Bio; 2019.

Audience Response Question #9

Which of the following agents requires VZV and VTE Prophylaxis?

A. Daratumumab
B. Selinexor
C. Isatuximab
D. Panobinostat

MM Treatment Toxicities-Nuclear Export Inhibitor

Nuclear Export Inhibitor

Selinexor (PO)

Toxicities

Hematological
- Neutropenia- consider giving GCSF; Hold/ dose adjust
- Thrombocytopenia- monitor for bleeding

GI: N/V
- Recommend scheduled 5HT3 antagonist (e.g, ondansetron 8mg)
- Recommend PRN antiemetics

Hyponatremia
- Monitor sodium and fluid intake

VZV Reactivation
- Antiviral prophylaxis needed

VTE
- VTE Prophylaxis needed

Xpovio (prescribing information). Bristol-MyersSqibb; 2019.

Multiple Myeloma Drug Classes

Steroids

- Prednisone (PO)
- Dexamethasone (PO)

Alkylators

- Melphalan
- Cyclophosphamide (IV/PO)

Immunomodulators (IMiDs)*

- Thalidomide (PO)
- Lenalidomide (PO)
- Pomalidomide (PO)

International Myeloma Foundation website. Multiple myeloma drug guide. Accessed April 28, 2020. www.myeloma.org/multiple-myeloma-drugs

Multiple Myeloma Drug Classes

Proteasome Inhibitors (PIs)

- Bortezomib (IV or SC)
- Carfilzomib (IV)
- Ixazomib (PO)

Monoclonal Antibodies (mABs)

- Elotuzumab (IV)
- Daratumumab (IV)
- Isatuximab (IV)
- Denosumab (SC)

Histone Deacetylase Inhibitors (HDAC)

- Panobinostat (PO)

International Myeloma Foundation website. Multiple myeloma drug guide. Accessed April 28, 2020. www.myeloma.org/multiple-myeloma-drugs

Summary

- Multiple Myeloma is a constantly evolving hematologic malignancy
- Pharmacist play an active role in regimen selection, drug selection and supportive care
- Pharmacists are also key player in patient outcomes

Questions?

Hector G. Clarke, Pharm.D., BCOP
Senior Manager-Ambulatory Pharmacy Operations
Kaiser Permanente, Atlanta GA

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Cardiotoxicity with Anthracyclines

Anna Howard, PharmD, BCOP
NCODA SET
April 29, 2020

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Objectives

- Understand updated theory of anthracycline-induced cardiotoxicity
- Define risk factors for anthracycline-induced cardiotoxicity
- Discuss monitoring for anthracycline-induced cardiotoxicity
- Identify and compare prevention strategies

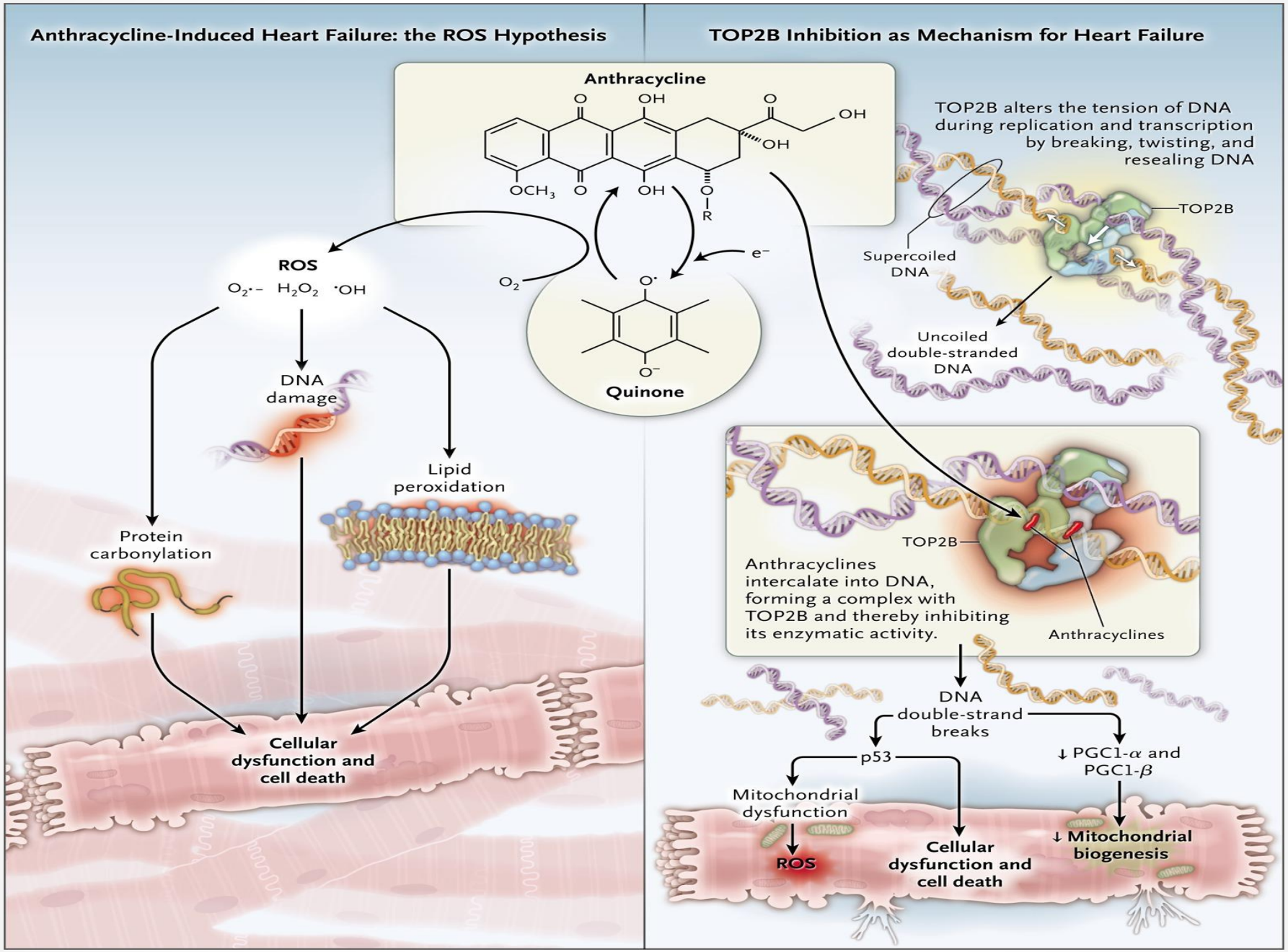
Anthracyclines

- Daunorubicin, Doxorubicin, Epirubicin, Idarubicin, Mitoxantrone
- Mechanism of action: Topoisomerase 2 inhibitor
- Cancers responsive to anthracyclines:
  - Breast, small cell lung, bladder, esophagus, stomach, liver, thyroid, acute lymphoblastic leukemia, acute myeloid leukemia, Hodgkin's lymphoma, non-Hodgkin's lymphoma, cutaneous T-cell lymphoma, Ewing sarcoma, soft tissue sarcoma, etc.

Anthracycline-Induced Cardiomyopathy Issues

- Affect QOL
- Cardiac outcome:
  - May have poorer prognosis than other forms of cardiomyopathy
- Affect further oncologic treatment choices

Cardinale et al. JACC 2010



Sawyer DB. NEJM 2013

Mechanism of Anthracycline Cardiotoxicity

- Previously thought: Reactive Oxygen Species (ROS)
  - But…neither antioxidants nor Iron chelation prevented cardiomyopathy
- Topoisomerase 2
  - Unwinds DNA during replication, transcription, or recombination.
  - Top2a
    - Found especially in proliferating cells (like cancer)
    - Chromosome segregation and DNA replication roles
  - Top2β
    - Found in all quiescent cells
    - Transcriptional regulation primarily
  - Delete Top2β from mice= no cardiotox from anthracyclines

Sawyer DB. NEJM 2013

Definition Cardiotoxicity

- Left Ventricular Dysfunction (LVD)
  - Decr LVEF 10% from baseline and <50%
  - Decline in LVEF at least 5% to less than 55% w/ accompanying signs or symptoms of CHF
- Reversible vs non-reversible damage
  - Type 1 chemo related- related to cell loss (ex: anthracycline)
  - Type 2 chemo related- related to cellular dysfunction (ex: trastuzumab)

Tajiri et al. JJCO 2017.
Curigliano et al. Ann Oncol 2012.
Herrmann. Mayo Clin Proc 2014.

Anthracycline Cardiotoxicity Onset

- Acute (rare):
  - Immediately after infusion (acute, transient decline in myocardial contractility)
- Early-onset:
  - During therapy or within 1 year after tx
- Late-onset:
  - At least 1 year after treatment; maybe 10-20 years after therapy

Curigliano et al. Ann Oncol 2012.
Tajiri et al. JJCO 2017.

Non-Treatment-Related Risk Factors

- Age:
  - ≥60 yrs = 1.6-6.8x risk
- Comorbidities
  - Multiple modifiable risk factors (≥ 2 factors)= highest risk
  - Smoking, HTN, DM, dyslipidemia
- Compromised cardiac function= 3.6-11.8x
  - Borderline low LVEF (50-54%), hx MI, hx Cardiac dysfunction, other cardiac comorbidities

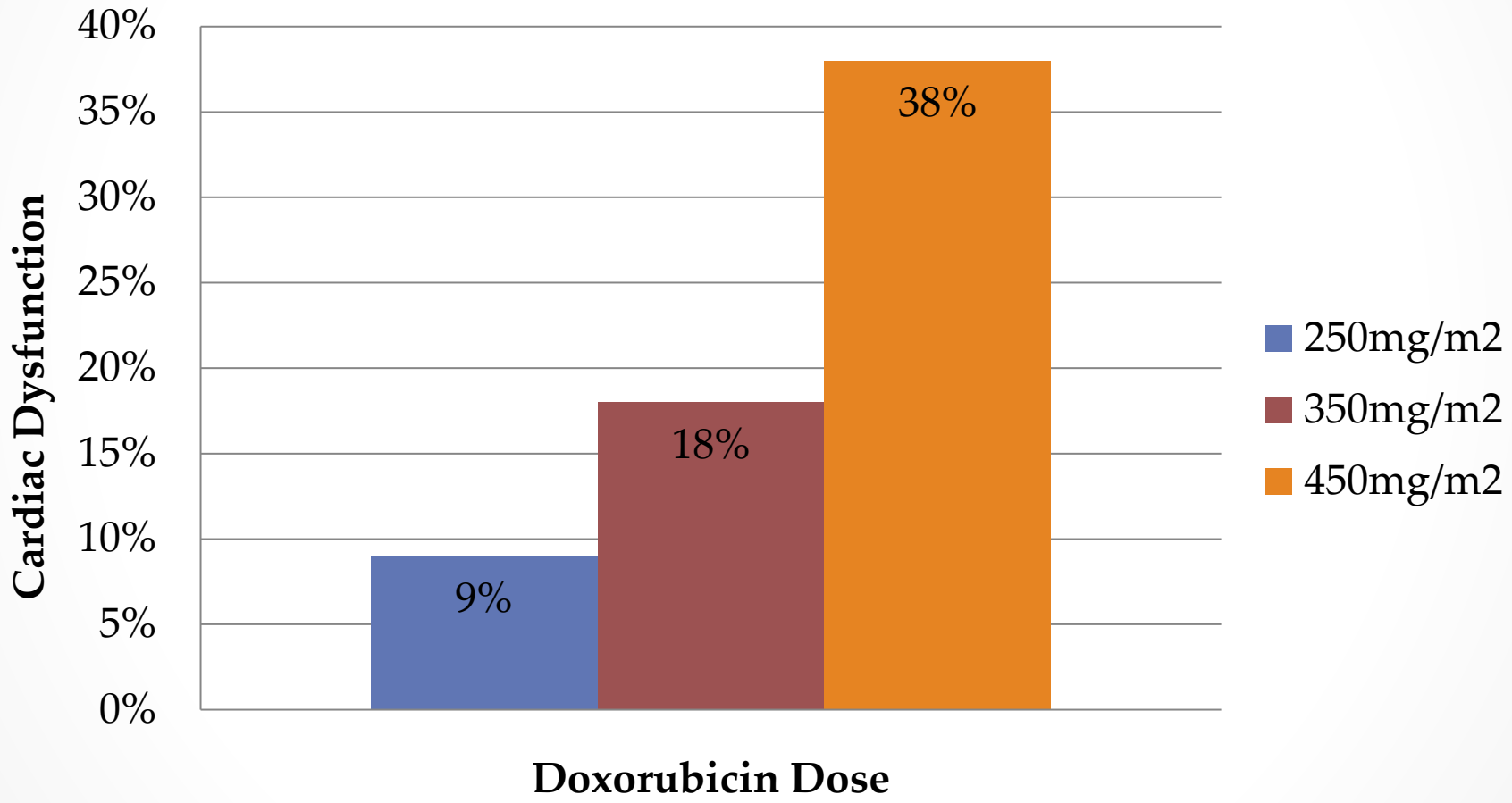
Curigliano et al. JCO 2012

Treatment-Related Risk Factors

- High dose anthracycline
  - Eg: doxorubicin ≥ 250 mg/m^2, epirubicin ≥600 mg/m^2
- High-dose RT where heart is in tx field
- Lower-dose anthracycline in combination + lower-dose RT where heart is in treatment field
- Lower-dose anthracycline or trastuzumab alone + non-treatment-related risk factors
- Lower-dose anthracycline followed by trastuzumab

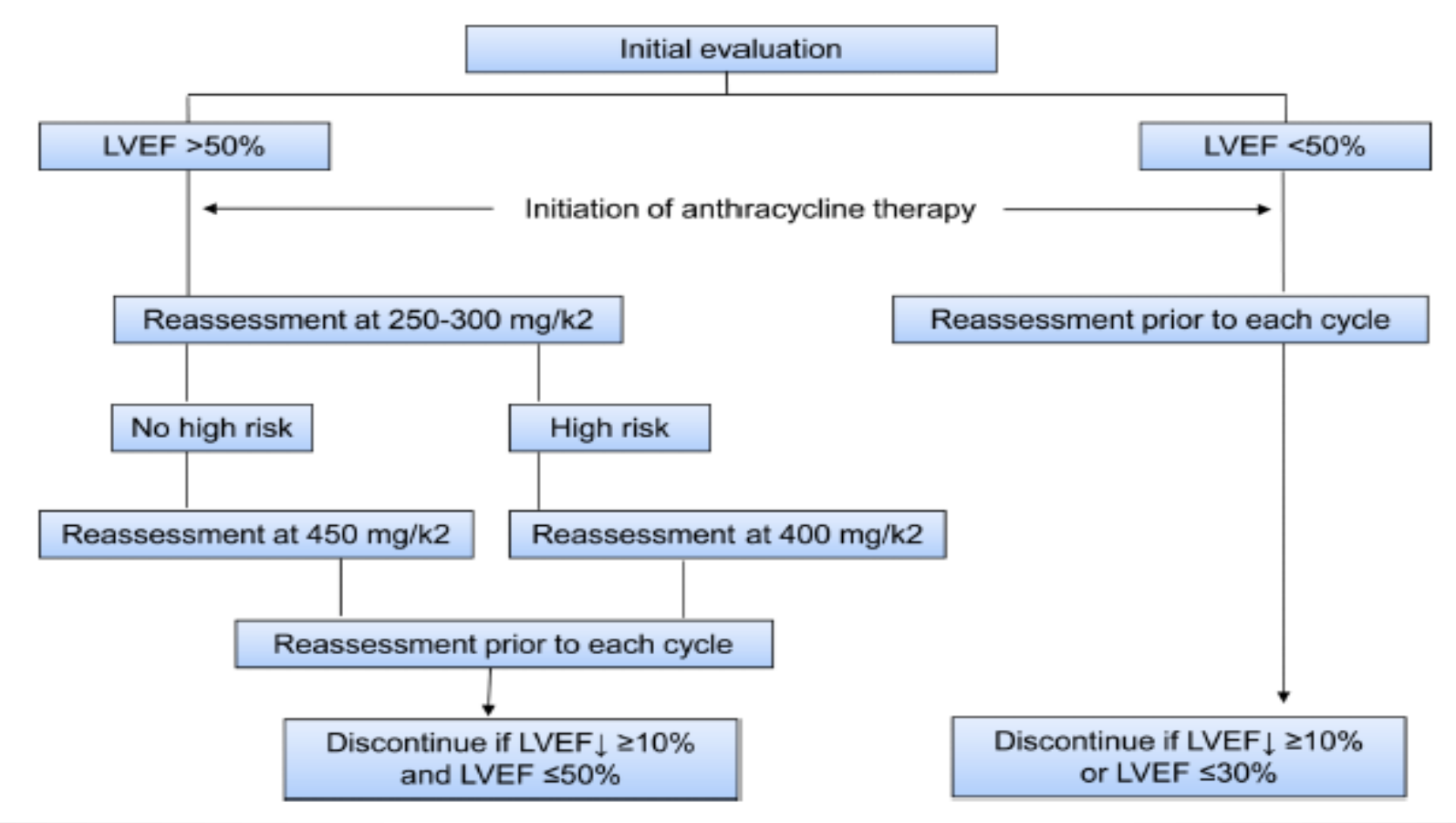
Armenian et al. JCO 2016.
Herrmann et al. Mayo Clin Proc 2014.

Anthracycline Cumulative Dose Effects on HF



Adapted from Armenian et al JCO 2016

Anthracycline CV Monitoring



Hermann et al. Mayo Clin Proc 2014.

Prevention

- Screen for and manage modifiable CV risk factors
  - Smoking, HTN, DM, dyslipidemia, obesity
- Cardioprotectant
  - Dexrazoxane
- Variations in anthracycline administration:
  - Continuous infusion
  - Liposomal formulation
  - Dose threshold
- Sequential administration of anthracycline and trastuzumab
- Prophylactic ACEI/ARB, BB
  - under investigation

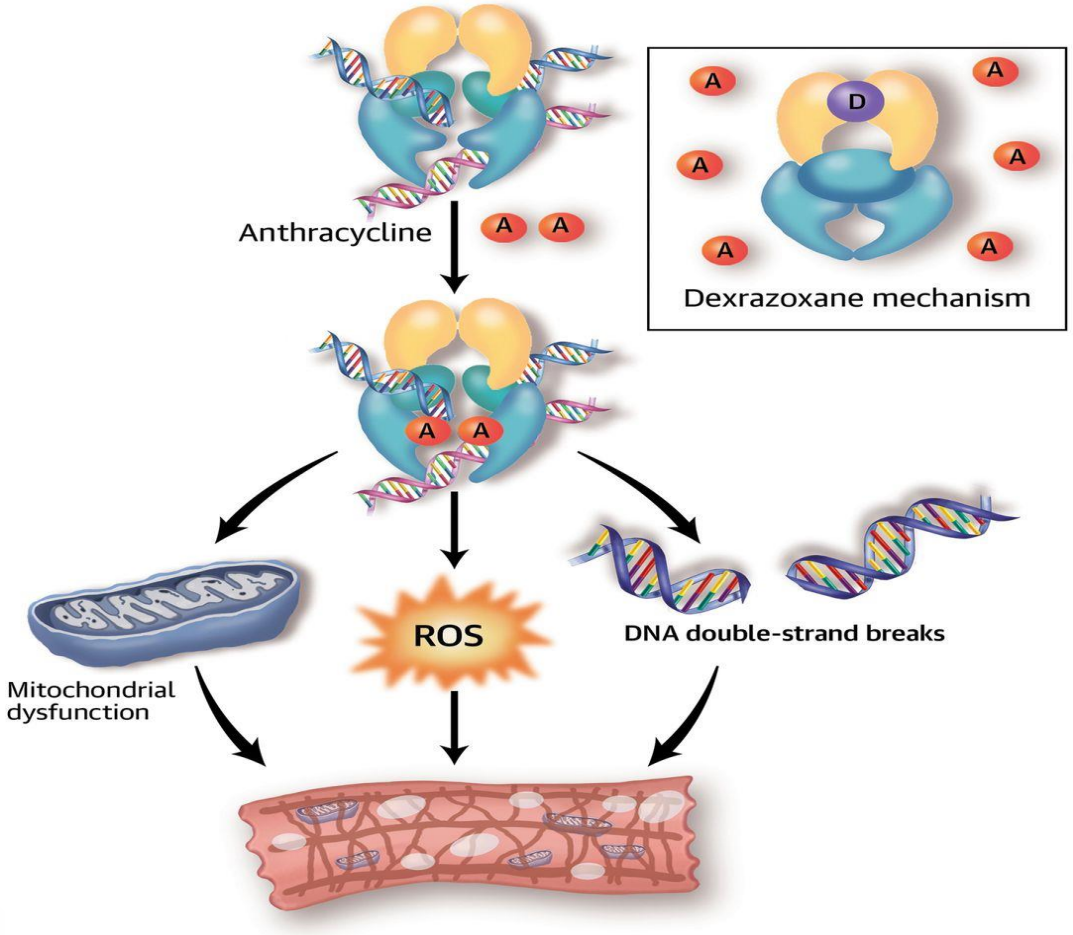
Armenian et al. JCO 2016.

Dexrazoxane

- Dose:
  - 10x doxorubicin dose
- Administration:
  - Prior to anthracycline, starting anthracycline within 30 min of end of dexrazoxane administration
- PK:
  - Half-life: ~2 hrs
- Short stability
  - 1-4 hours depending on storage/mixing
- Risk reduction 0.21 to 0.31 of acute clinical and/or subclinical HF without compromising antitumor efficacy

Armenia et al. JCO 2016
Micromedex.

Dexrazoxane- Top2β

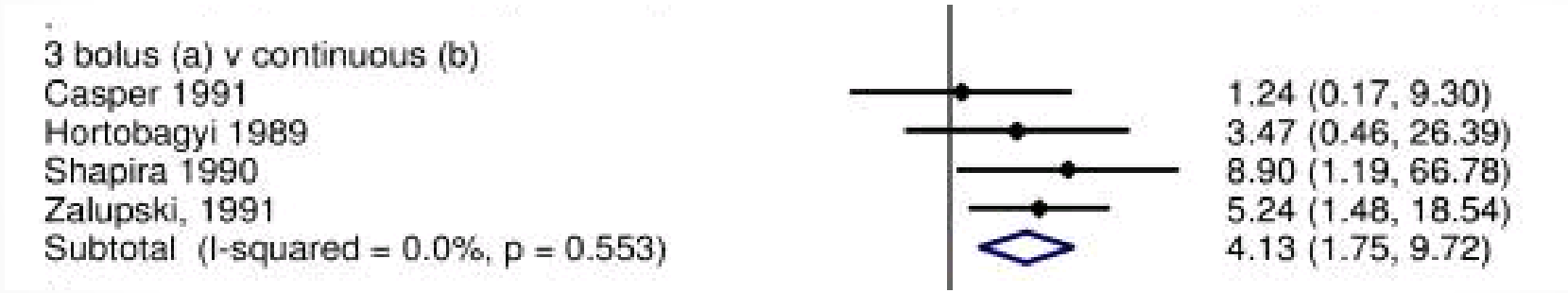


Vejpongsa P, Yeh ETH. JACC 2014

Prolonged Infusion Anthracycline

- Meta-analysis: bolus vs ct infusion (6 to 96hrs)
  - Bolus ↑ risk subclinical HF (OR 3.04 95% CI 1.66-5.58)
  - Bolus ↑ risk clinical HF (OR 4.13 95% CI 1.75-9.72)

Subclinical HF



Armenian et al. JCO 2016.
Smith LA et al. BMC Ca 2010.

Liposomal Doxorubicin vs Conventional

- ↓ risk clinical cardiotox (OR 0.18 95% CI 0.08-0.38)
- ↓ risk subclinical cardiotox (RR 0.31 95% CI 0.2-0.48)
- No differences in outcomes though all pts advanced cancers
  - Can't extrapolate to curative setting or non-BrCa pts

https://www.doxil.com/hcp/mechanism-of-action/

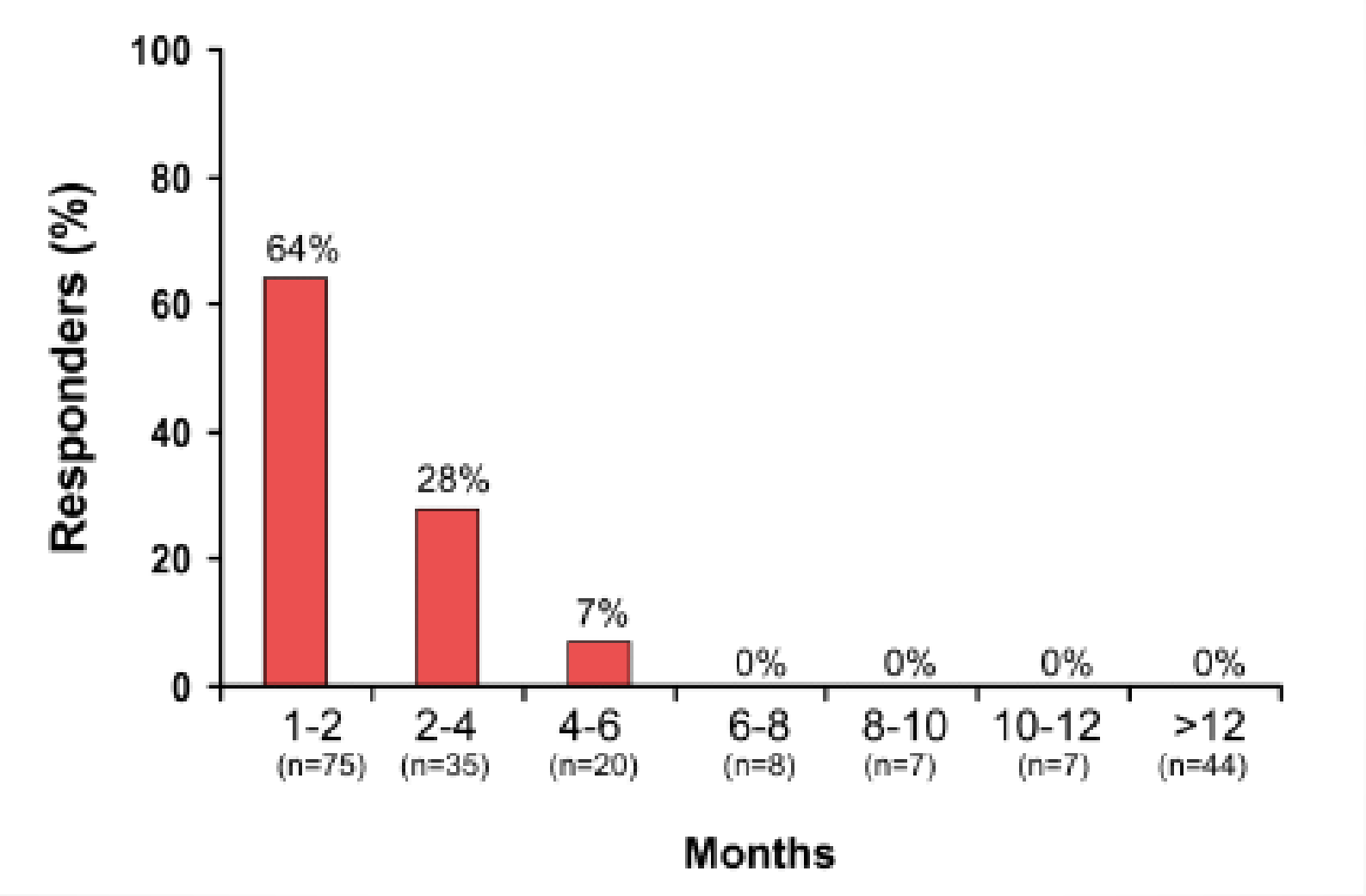
Armenia et al. JCO 2016.

Sequential Administration Anthracycline and Trastuzumab

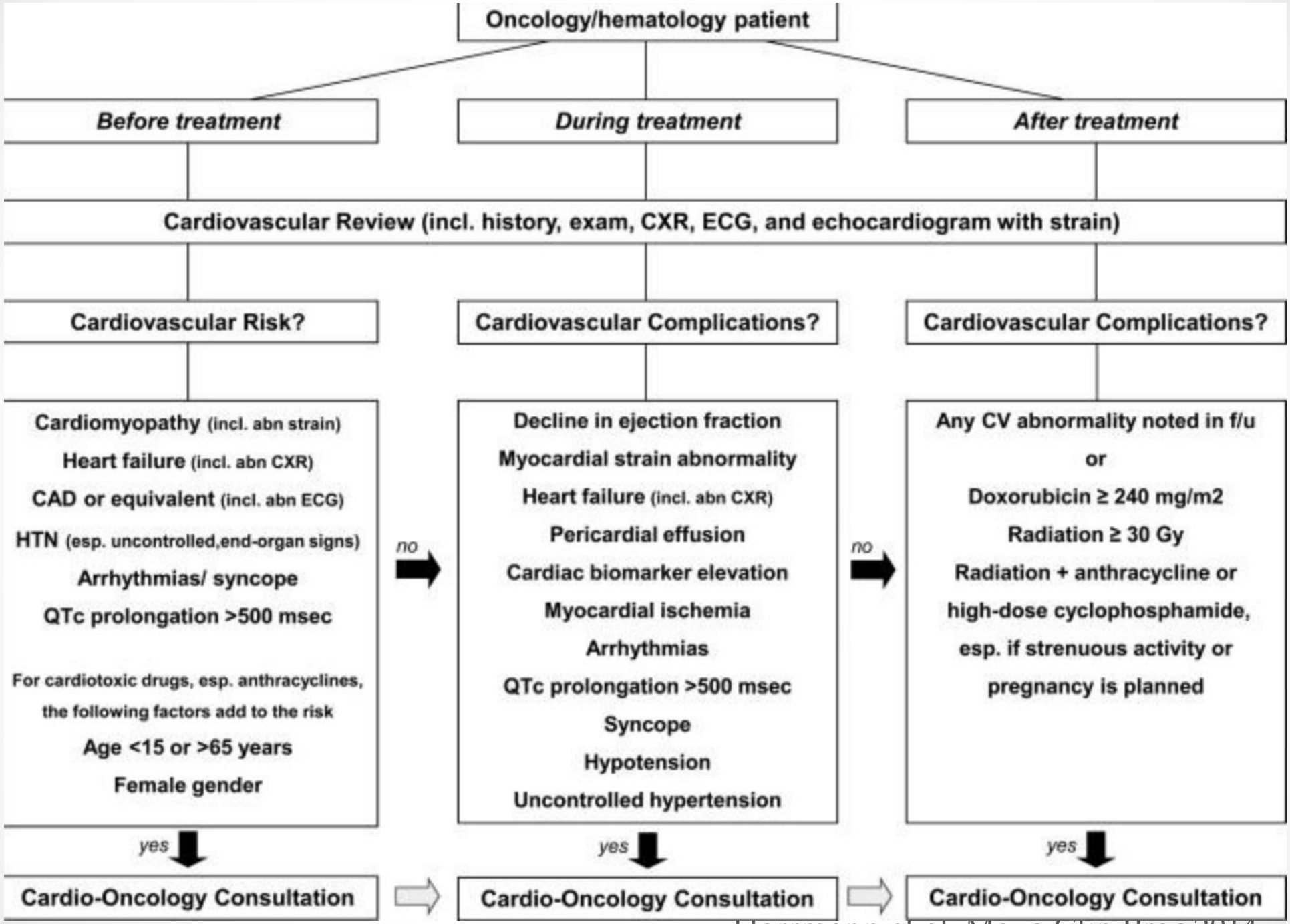
- 7x risk HF if low dose doxorucibin then trastuzumab therapy V.S. trastuzumab with no anthracycline or only standard anthracycline based adjuvant therapy.
  - Trials mostly in older adults
- Low incidence if no anthracycline:
  - Ex: trastuzumab/paclitaxel 0.5% cardiac dysfunction @3 yrs

Armenia et al. JCO 2016.
Zeglinski M et al. Ex Clin Cardiol 2011

Treatment Timing Matters



Cardinale et al. JACC 2010.



Herrmann et al. Mayo Clin Proc 2014.

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- Zeglinski M, Ludke A, Jassal DS, Singal PK. Trastuzumab-induced cardiac dysfunction: a ‘dual-hit.’ Ex Clin Cardiol 2011;16(3):70-74.

Questions?

Anna Howard, PharmD, BCOP
NCODA SET
April 29,2020

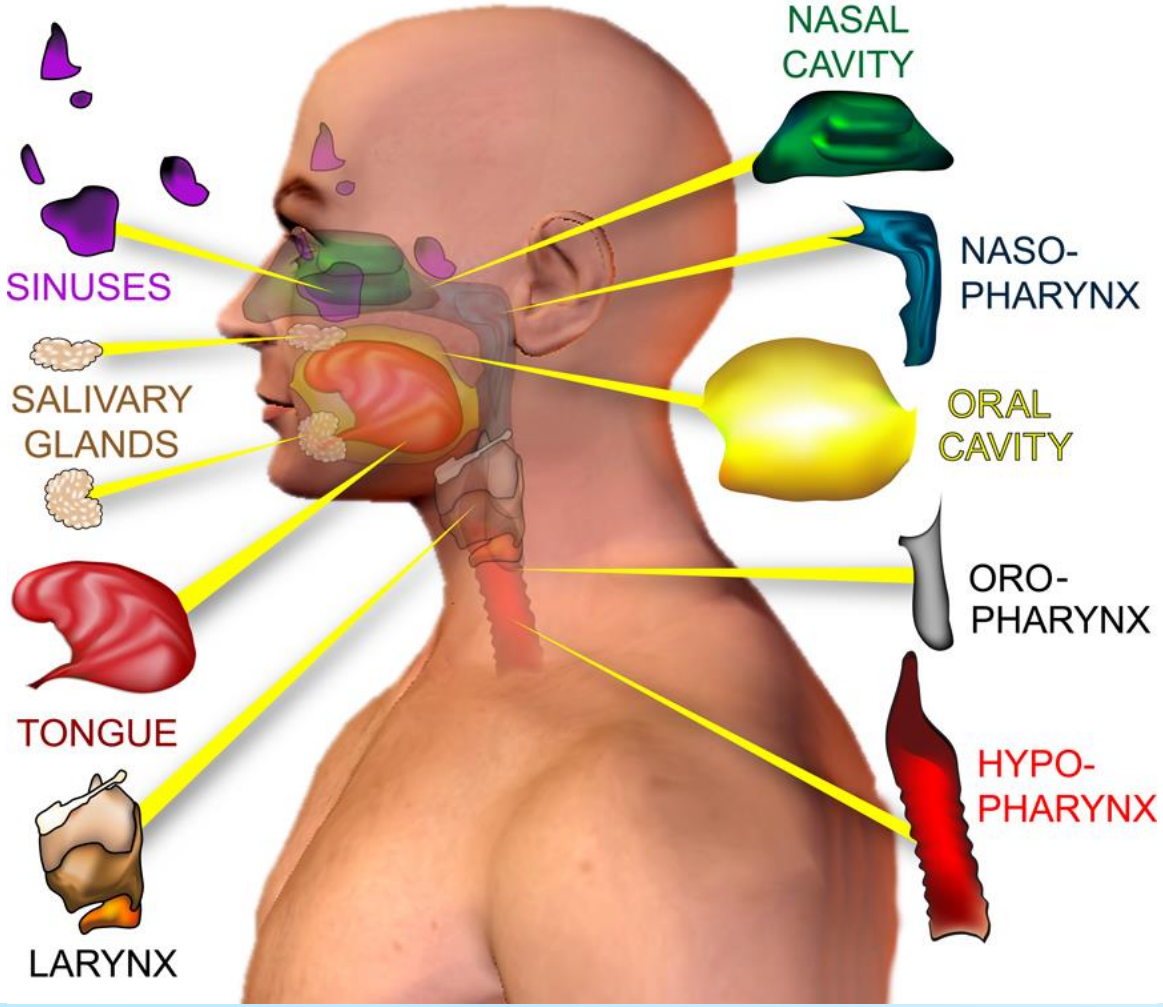
Head and Neck Cancer Review

Sarah Stepanek

PharmD Candidate, 2021

Midwestern University – Chicago College of Pharmacy

What is it?


NASAL CAVITY
NASO-PHARYNX
ORAL CAVITY
ORO-PHARYNX
HYPO-PHARYNX
SINUSES
SALIVARY GLANDS
TONGUE
LARYNX

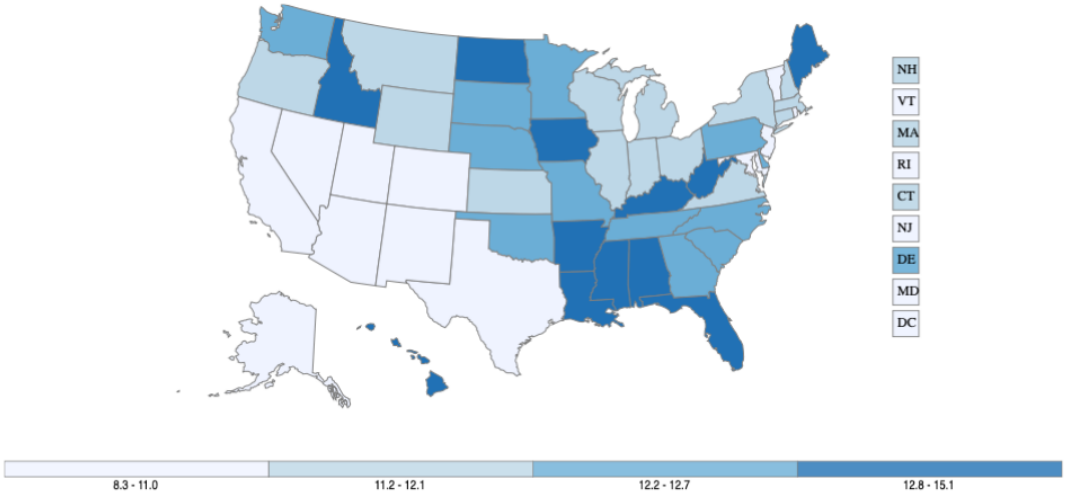
Epidemiology

- 4% of all cancers in the US
- More than twice as common in males
- More often diagnosed in people 50+

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Rate of New Cancers in the United States

Oral Cavity and Pharynx, All Ages, All Races/Ethnicities, Male, and Female, Rate per 100,000 people , 2016



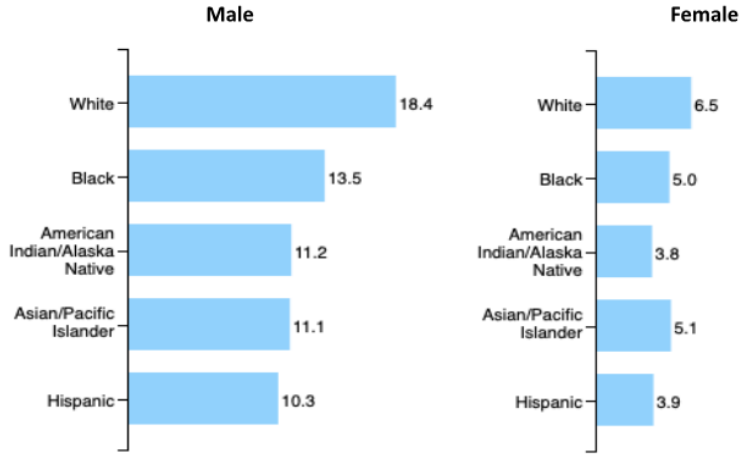
Rate per 100,000 people

Data source – U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2018 submission data (1999-2016): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; https://www.cdc.gov/cancer/dataviz, June 2019.

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Rate of New Cancers by Sex and Race/Ethnicity

Oral Cavity and Pharynx, United States, 2016



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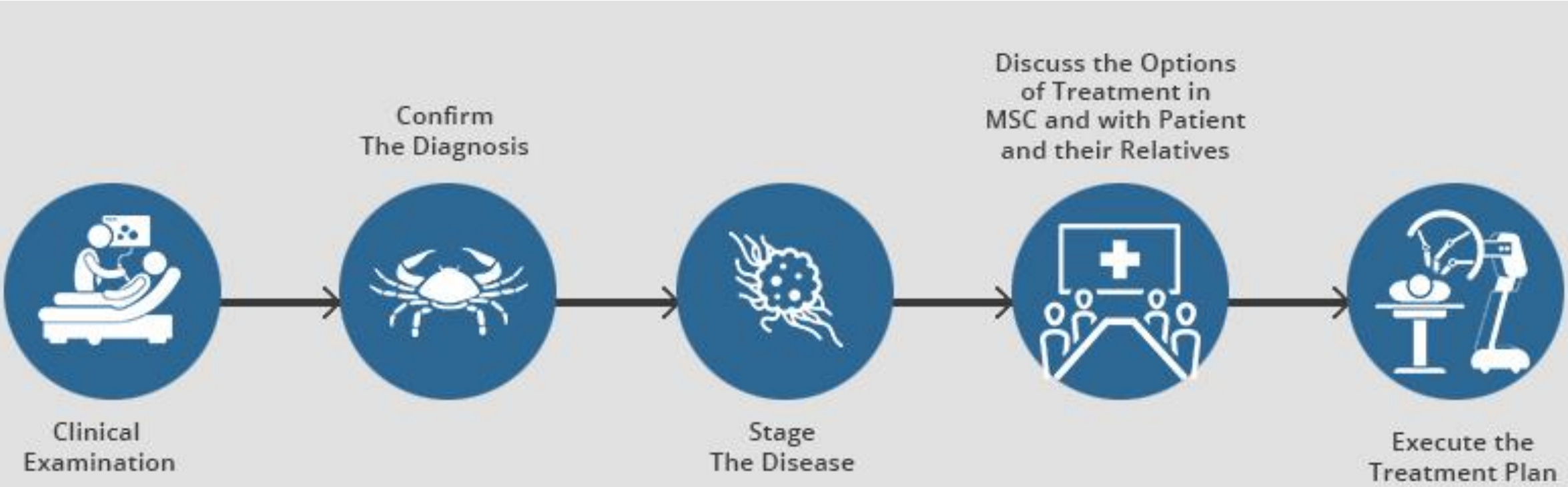
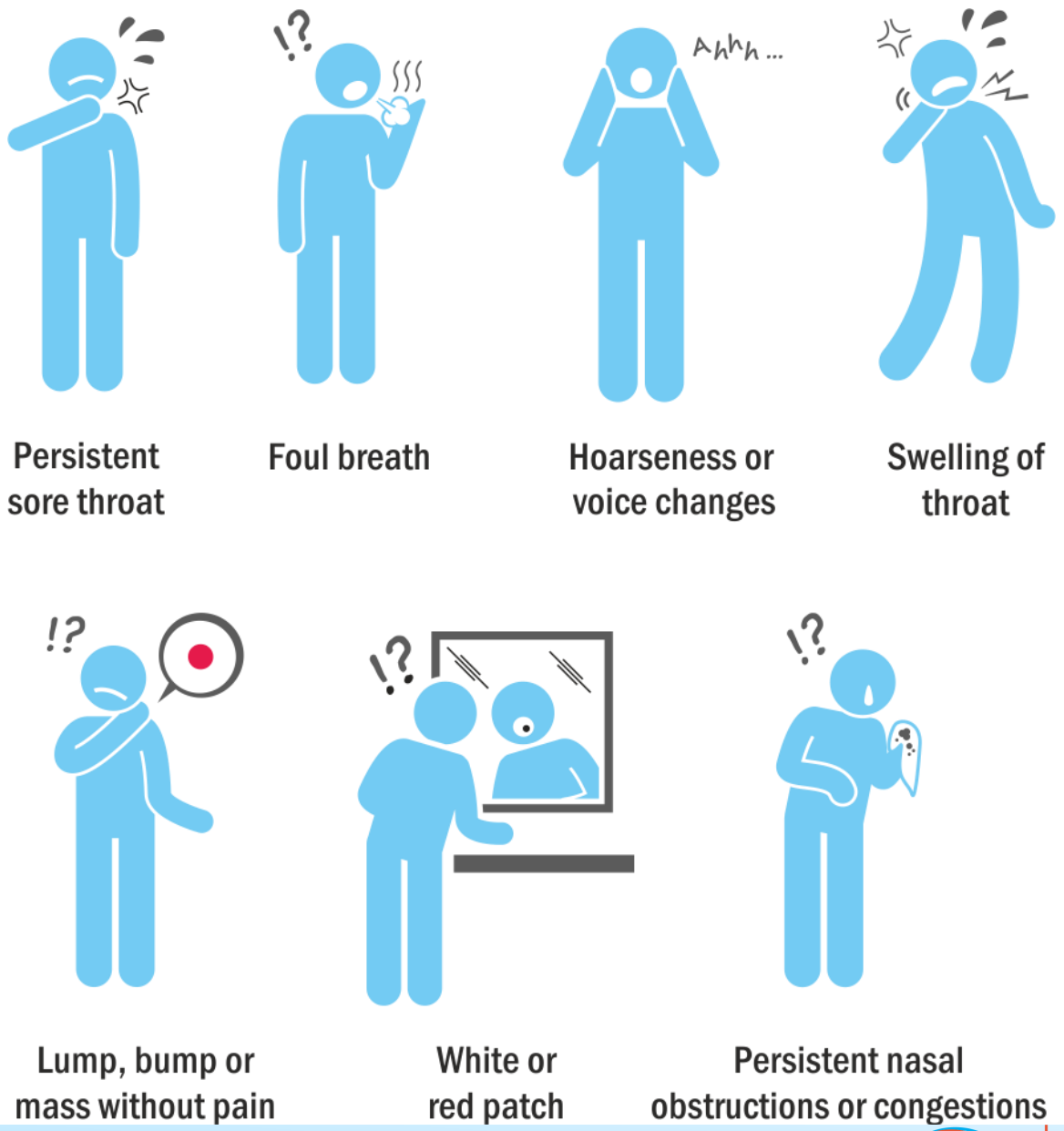
Risk Factors

Epstein-Barr virus (EBV)	Male gender	Poor nutrition	Poor oral hygiene
Ancestry	GERD	Environmental/Occupational exposure	


Clinical Examination
Confirm The Diagnosis
Stage The Disease
Discuss the Options of Treatment in MSC and with Patient and their Relatives
Execute the Treatment Plan

Signs and Symptoms

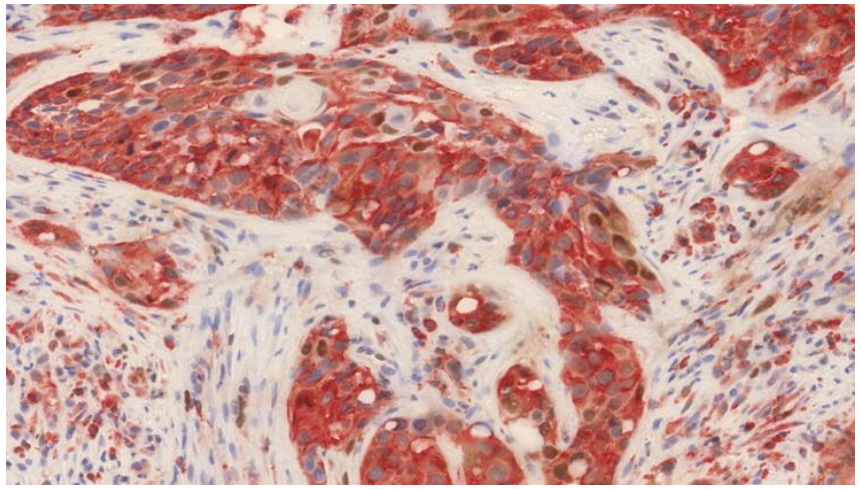
- Symptoms will vary depending on locations
- Generally
  - Lump, mass, or sore in the region that does not heal/go away



Diagnosis

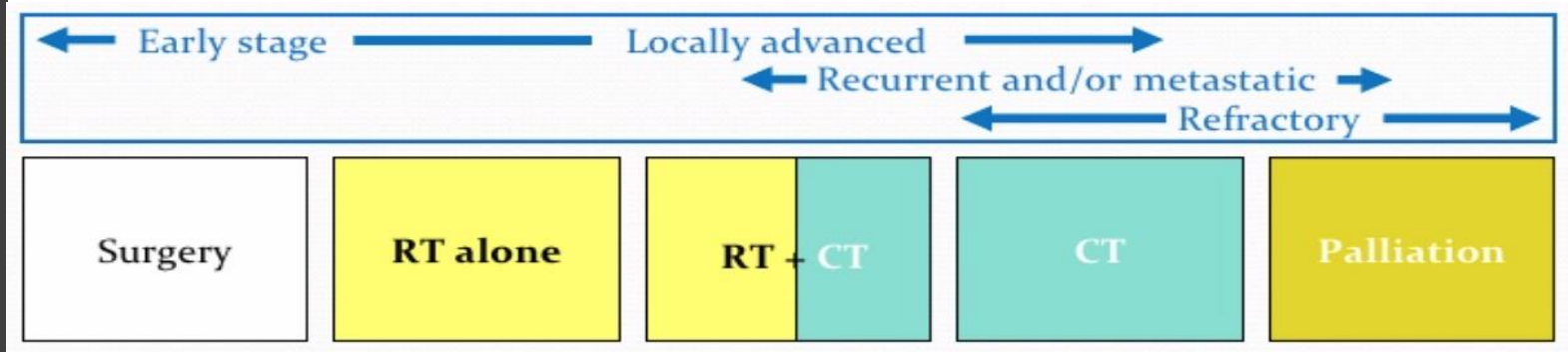
- Endoscopy
- Ultrasound
- Barium swallow
- Panorex
- CT scan
- MRI scan
- PET scan

} Biopsy



Treatment

- Surgery
- Radiation therapy
- Proton beam radiation therapy
- Chemotherapy
- Chemoradiation
- Targeted Therapy
- Clinical trials



Thank you for attending!

Join us next month on May 27th at 8 PM EST!