Radiation Oncology: for the Hospitalist

Gulf States Hospital Medicine Conference, 2026

Edward “Eddie” Mannina, MD, MPH, MS

Medical Director, Dept. of Radiation Oncology

Ochsner MD Anderson Cancer Center

at Slidell Regional Cancer Center

SMH

SLIDELL REGIONAL CANCER CENTER
A Campus of Ochsner Medical Center

Ochsner MD Anderson Cancer Center
Making Cancer History®

About the speaker…

- Born and raised in greater New Orleans
- Where'd you go to school?
  - Thank God Almighty, I am a RAIDER!
- B.A. Psychology, B.S. Biology: University of New Orleans
- M.S. Pharmacology: Tulane Medical School
- M.D./M.P.H. Epidemiology: Tulane Medical School and Tulane SPHTM
- Internship: Tulane Hospital and Clinics
- Radiation Oncology Residency: Indiana University
- Practice at Slidell Regional Cancer Center since 2016
- My heart and soul belongs in the Gulf South
- WHODAT?!
- *No disclosures or conflicts of interest to report.*

SCHOOL OF MEDICINE
INDIANA UNIVERSITY

Objectives

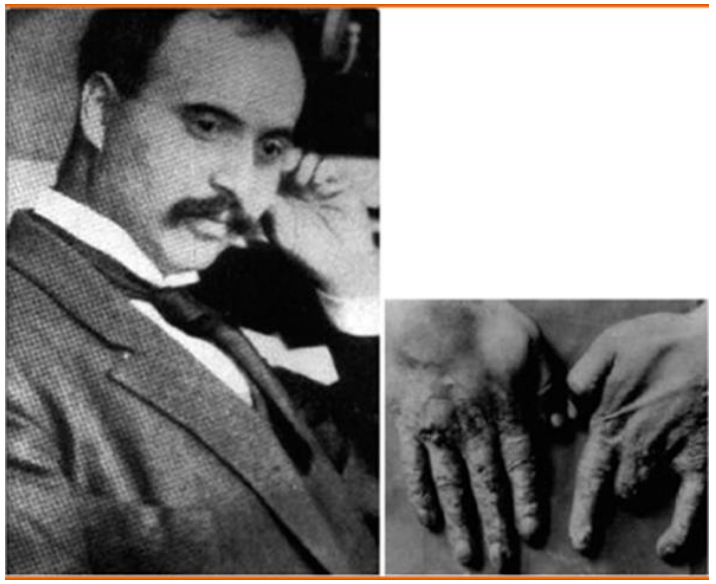
- Understand basic principles of radiation including interaction in biological systems.
- Develop an understanding of the practice of Radiation Oncology and role of radiation in treatment of malignancy.
- Discuss Radiation Oncology considerations for the inpatient.
- Discuss emergent vs urgent radiation.
- Address variety of special considerations for the inpatient with cancer.
- Q & A


What doctors think I do

Radiation: a brief history

- 1896: Wilhelm Conrad Röntgen

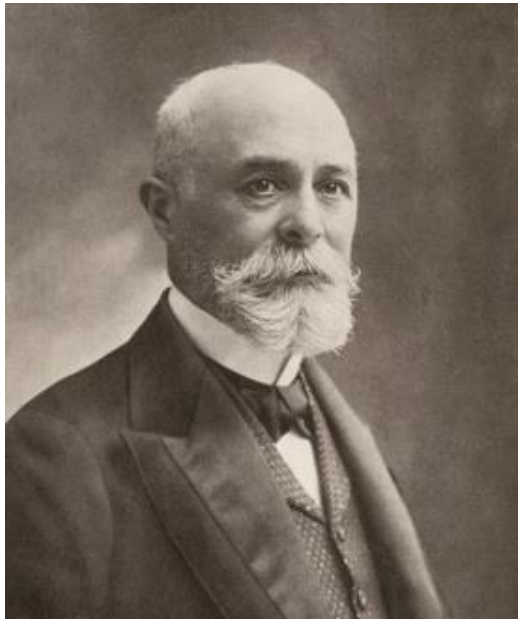
  "…it soon appeared from the tests that the rays had penetrative power to a degree hitherto unknown…it seemed natural that they should penetrate flesh, and so it proved in photographing the hand…"



Radiation: a brief history

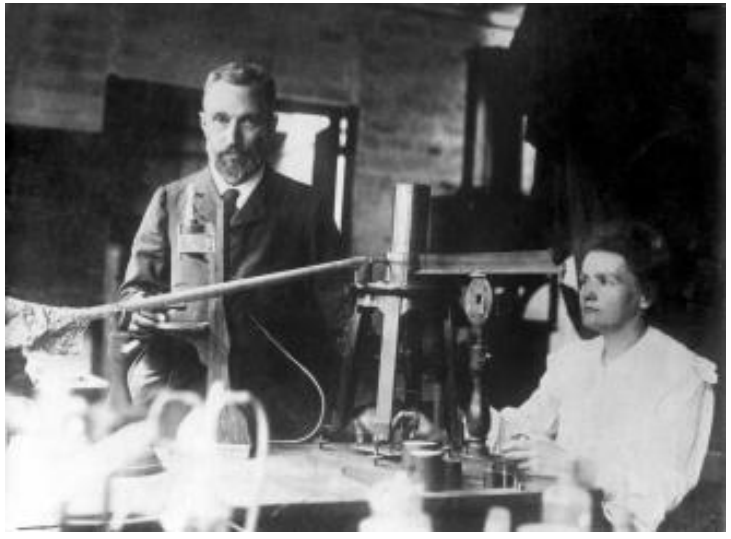
1896: Henri Becquerel

- Fluorescence experiments
- Becquerel's burn: 1901



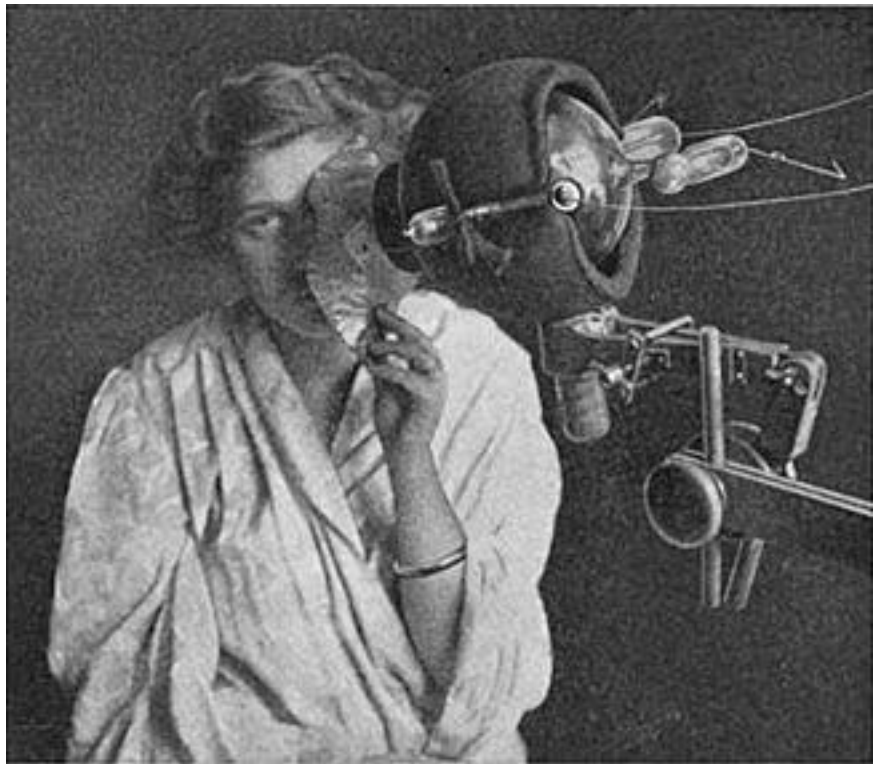
1898: Pierre and Marie Curie

- Tested Becquerel experiments
- "…obvious that a new science was in the course of development…I coined the term *radioactivity*."
- Polonium: namesake Poland
- Radium: latin "rays"



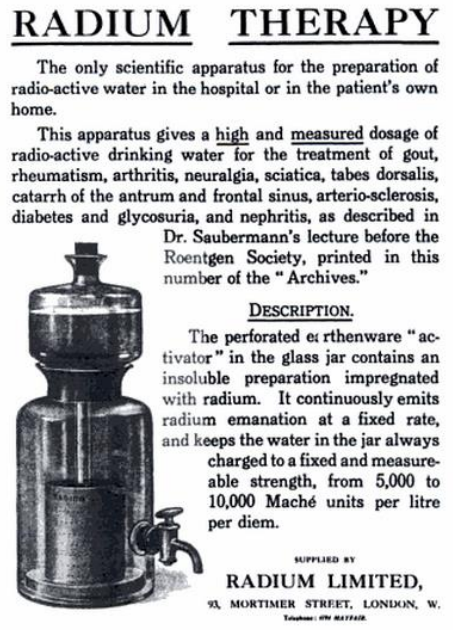
Radiation Therapy Begins

- 1896: Röntgenotherapy
- Teletherapy: radiation administered “at a distance” from tumor
  - External beam radiotherapy (EBRT)
  - X-ray therapy (XRT)
  - Radiation therapy (RT)



Radiation Therapy Begins

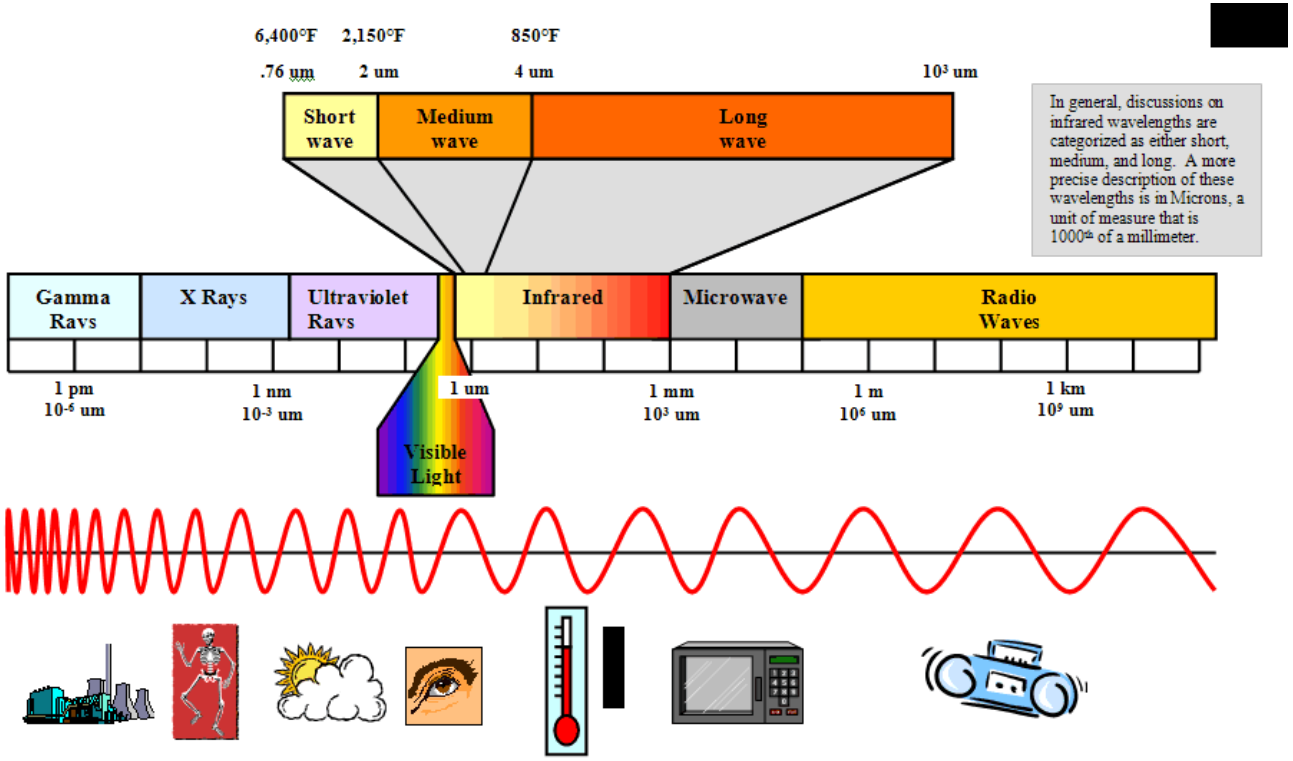
- Brachytherapy: placing a radioactive source a “short distance” from tumor.
  - 1903: Radium-223 for skin and GYN malignancies
  - Shortly after, Radium for everything?




What patients think I do

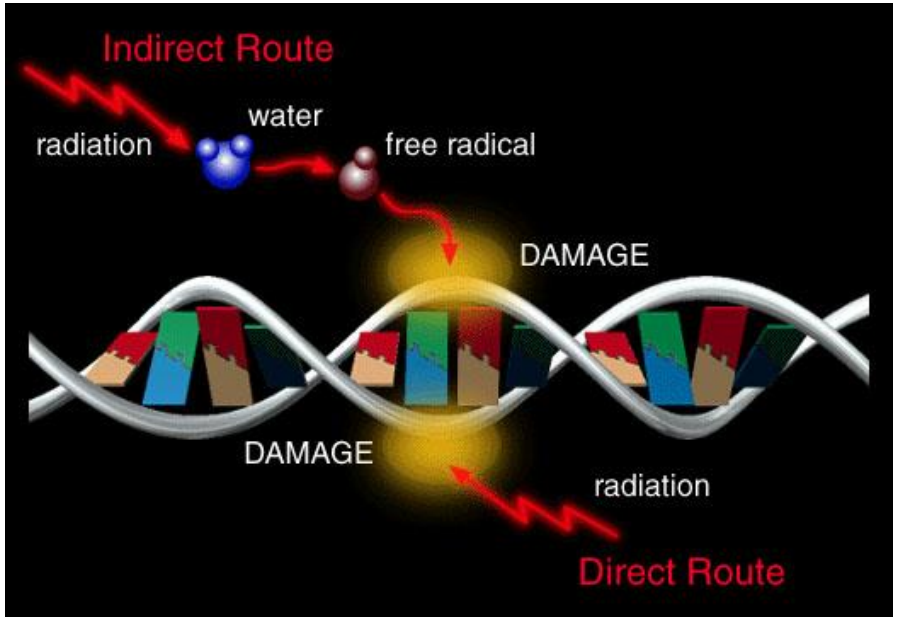
So…What is “radiation?”

- Pure energy or particles that move in a wavelike fashion.



What is “radiation?”

- Ionizing radiation: radiation capable of altering the structure (=damaging) of a target molecule (such as DNA) by ejecting an electron (creating charged ions)
  - Radiation does NOT “burn up” tissues
  - Similar mechanism as chemotherapy
  - Damage to the cancer DNA → mitotic catastrophe
  - Normal tissue has repair mechanisms



Where does radiation come from?

- Environmental sources
- In the clinic:
  1. Sources: pieces of radioactive material that give off gamma rays, beta or alpha particles
     - "brachytherapy": radiation "close to" target
  2. Linear accelerator: accelerates electrons to speed of light, slams them into tungsten metal which ejects X-rays
     - "teletherapy": radiation "far from" target

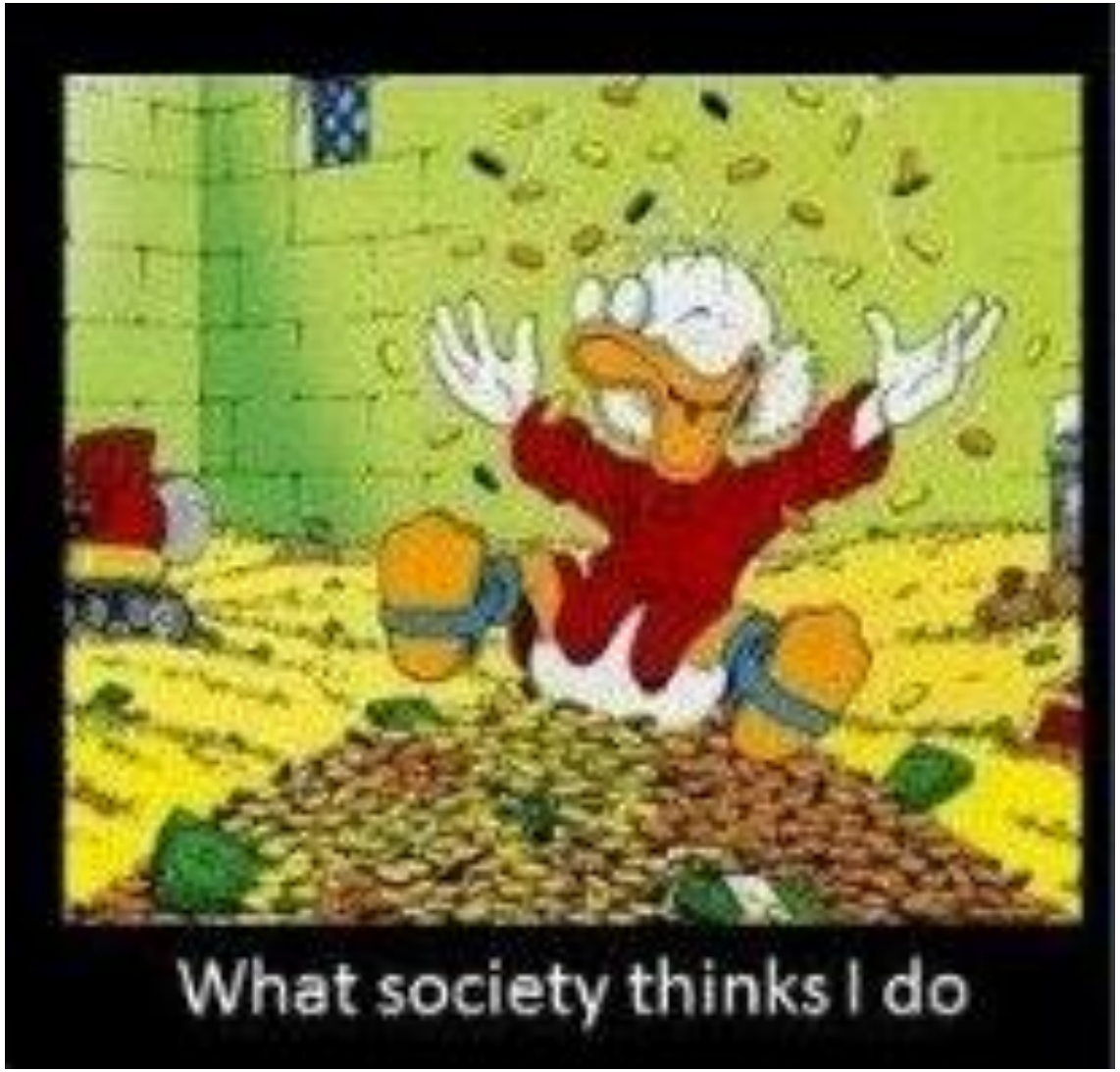
https://www.youtube.com/watch?v=JvBuArOTui4

Radiation Oncology

- Radiation is 2nd only to surgery in utility for the treatment of malignancy.
- Approximately 70% of cancer diagnoses will be treated with radiation.
- New cancer diagnoses require pathologic confirmation (histology dictates behavior) and complete staging (labs, imaging, additional biopsies, etc…) to formulate a treatment plan.
- Devising a thorough treatment plan involves intimate collaboration of a medical oncologist, radiation oncologist and surgical oncologist.
- While most cancer diagnoses are made in the hospital, almost all cancers are treated in the outpatient setting.
- There are innumerable uses of radiation mirroring the innumerable clinical scenarios that arise when mixing histology, stage and performance status.
- Radiation delivery commonly fractionated (5d/wk for weeks) but may be given in few (SBRT or SABR) or even single (SRS) fractions.
- Radiation is highly focused, limiting its risks and benefits to targeted region of the body.

Radiation Oncology

- Curative vs palliative intent
  - With modern medicine, not all incurable cancers are death sentences
- Definitive radiotherapy +/- concurrent medications
  - Ex: head and neck ca, prostate ca, lung ca, SBRT (or SABR)
- Neoadjuvant radiotherapy: prior to surgery
  - Ex: rectal ca, esophagus ca, sarcoma
- Adjuvant radiotherapy: after surgery
  - Ex: breast ca, incomplete resections
- Multimodal: external beam + brachytherapy
  - Ex: cervical ca, uterine ca
- Benign disease
  - Ex: osteoarthritis, keloids, heterotopic ossification, trigeminal neuralgia
- Future is now…
  - Ex: functional neurologic disorders, cardiac arrhythmia


What society thinks I do

Emergency?!

- Rare in radiation oncology as radiation does not work fast enough to fix an emergency (surgery does)
- True emergencies
    1. Spinal cord compression by tumor causing loss of nerve function → weakness, incontinence
    2. Superior vena cava syndrome: tumor compresses superior vena cava preventing blood return to heart and airway causing shortness of breath, venous congestion

Spinal Cord Compression

- Clinical vs radiographic compression
  - Attention to bowel or bladder incontinence or retention on exam
  - Consider polypharmacy of cancer patients when evaluating bladder and bowel function
  - Cord ends at L1-2 in adults
- Temporal nature of deficits
  - More recent = more reversible
  - Acute: instability (call surgery!)
  - Prior imaging?
- New cancer diagnosis vs known diagnosis
  - Histology dictates responsiveness
  - Prior treatment: RT to that area? Chemotherapy still in system? Prior surgery in area?
  - Rushing to RT can be dangerous in these circumstances
- Workup
  - (Total) spine MR: cord edema or signal changes; mild-moderate-severe compression
  - Neurosurgery evaluation for instability: surgery + RT > RT alone
  - Neurosurgery recommendations for brace, lift or movement restrictions
- Decadron addresses peri-tumoral inflammation/edema, often with clinical improvement
  - 8mg IV x 1 loading, then 4mg q6-12

SVC Syndrome

- Clinical vs radiographic compression
  - Venous distention in neck, face/neck/arms edema, laryngeal edema (stridor), increased ICP
- Temporal nature of deficits
  - More recent = more reversible
  - Prior imaging?
  - Presence of collaterals suggests chronic process; most cases will collateralize
  - High grade histologies can outpace collateral formation: small cell, lymphoma
- New cancer diagnosis vs known diagnosis
  - Histology dictates responsiveness
  - Prior treatment: RT to that area? Chemotherapy still in system? Prior surgery in area?
  - Rushing to RT can be dangerous in these circumstances
- Workup
  - Contrasted CT C (or CTA): assess SVC flow
  - PULM evaluation: need for respiratory support? O2?
  - Rarely addressed surgically
- Decadron addresses peri-tumoral inflammation/edema
  - 8mg IV x 1 loading, then 4mg q6-12

Radiation for True Emergencies

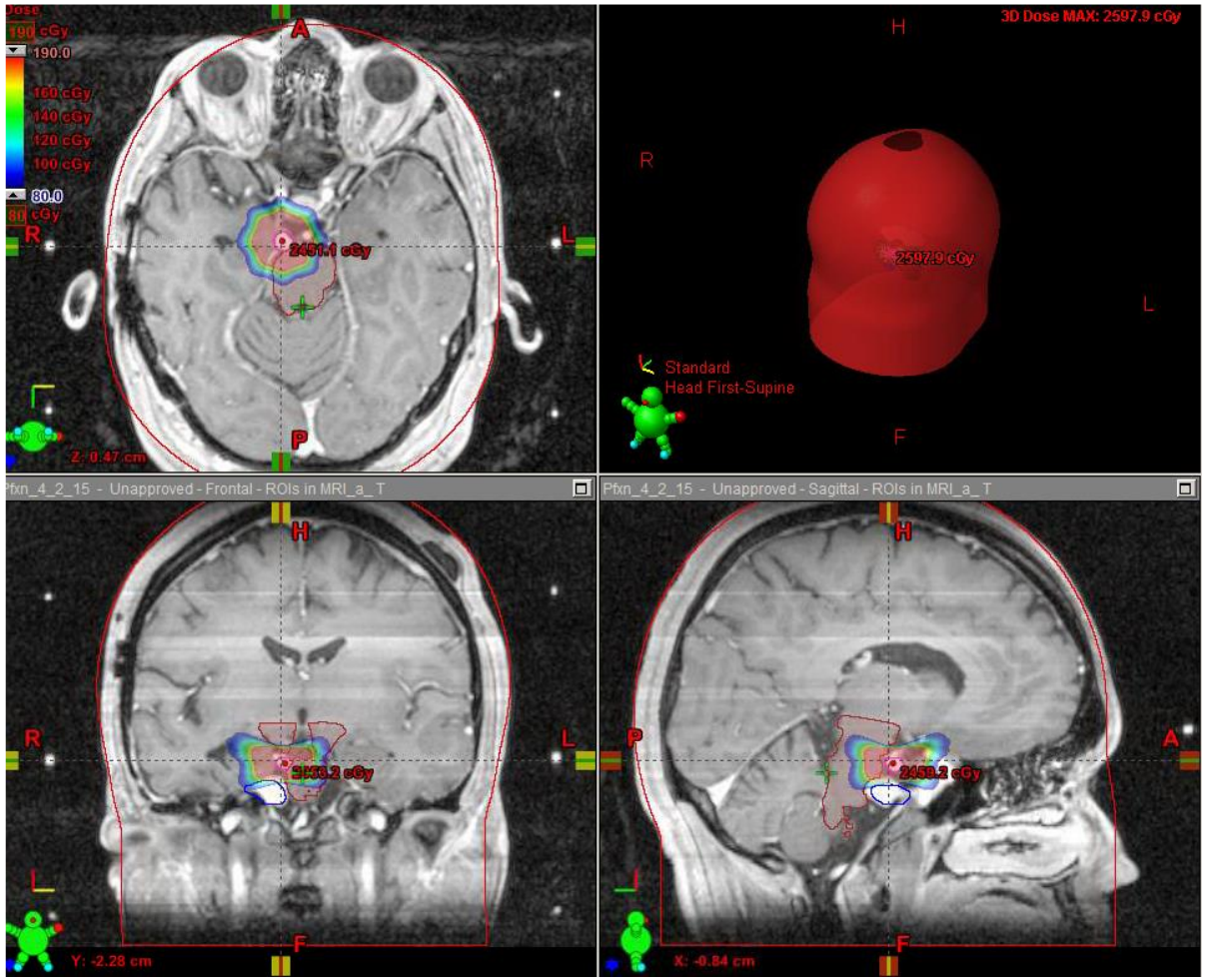
- Treatment Planning Session (“CT Simulation”)
  - Immobilization
  - Imaging with CT scanner indexed to linear accelerators
  - RadOnc and dosimetrist design beam angles
- Prescription: 5-10 fractions given daily
- Pending histology, benefits may appear within days to weeks
  - Faster growing (= more radiosensitive) histologies like small cell and lymphoma comprise many clinical SVC cases.
- Palliative SVC dosing can be converted to definitive dosing in select non-metastatic lung cancer cases


What my friends think I do

Urgent but not Emergent: brain mets

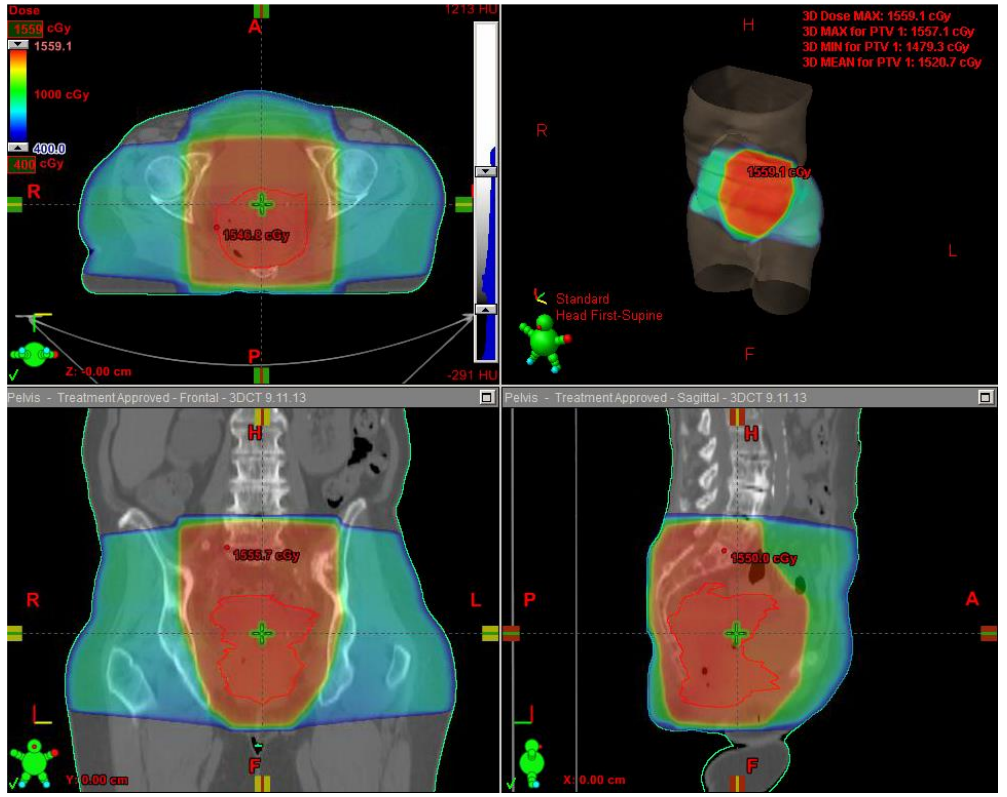
- Sadly, brain mets are a standard in RadOnc
  - Traditional chemotherapy agents poorly penetrate BBB
  - Newer agents (small molecule inhibitors) and immunotherapy have improved penetration with some agents being designed specifically for BBB penetrance
- Large symptomatic brain metastases should be evaluated for surgical decompression
  - Consider new onset deficits, intractable seizures, radiographic midline shift/risk of herniation
  - Radiation required after surgical decompression
- Workup
  - MRI brain with and without contrast + stealth (thin slice) sequences
  - Decadron 8mg IV x 1 loading, then 4mg q6-12 followed by outpatient tapering (usually by treating RadOnc)
  - GI prophylaxis with PPI
  - Reserve anti-epileptics for patients who have had seizure due to risk of lowering seizure threshold
- Development of brain metastases like other forms of disease progression requires thoughtful discussion of therapy between medical and radiation oncology to optimize outcomes and safety
- Modern RT techniques
  - Whole brain
  - Whole brain with hippocampal sparing
  - Stereotactic Radiosurgery

SRS vs whole brain radiotherapy



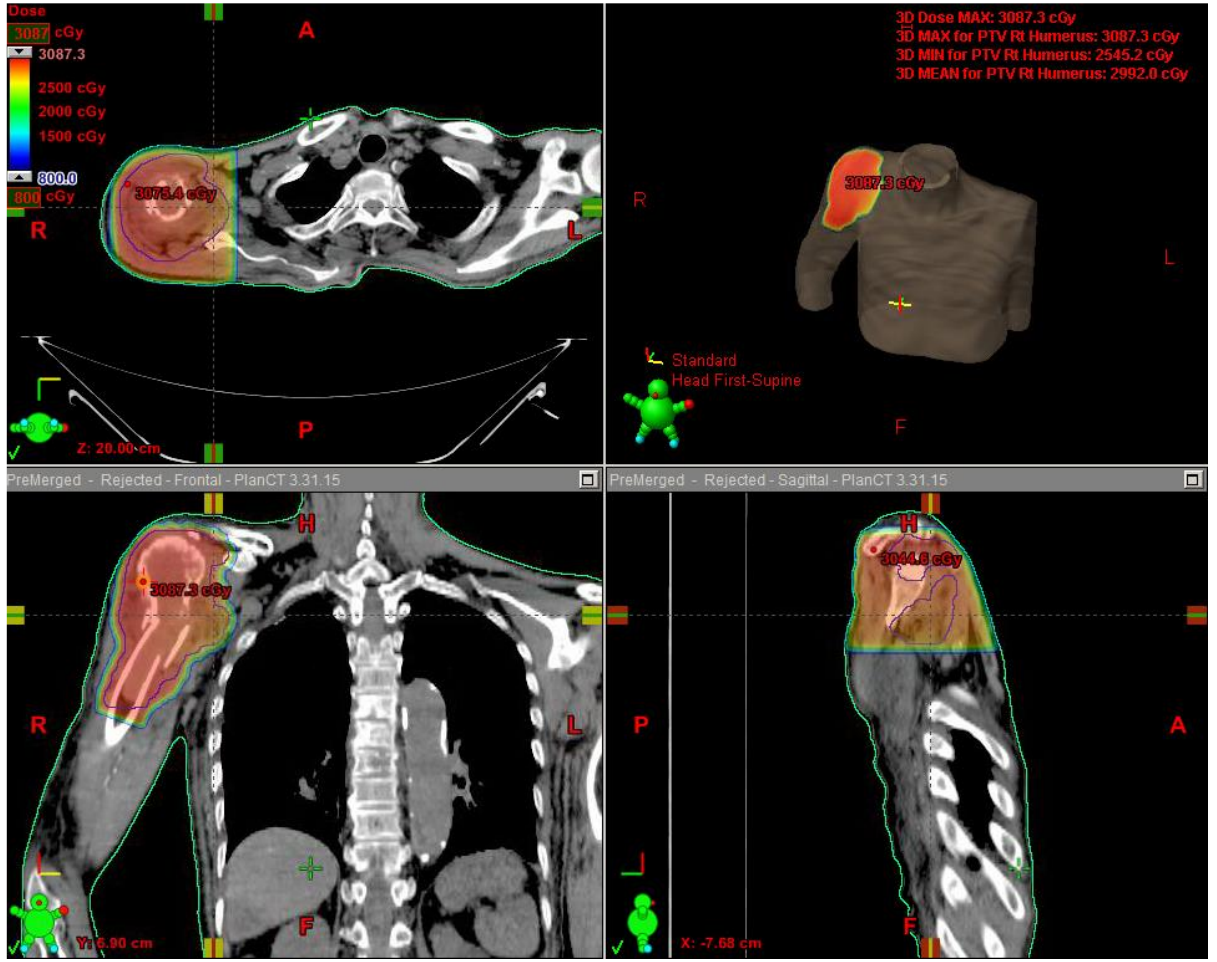
Urgent but not Emergent: bleeding

- Patient admitted with symptomatic anemia
- Appropriate site-specific assessment by specialist to confirm source and potentially treat
  - GI: cautery, surgery, embolization
  - GYN: packing
  - Uro: fulguration
  - H/N: airway safe?
  - PULM: bronchoscopic argon
- Recommend hematologist evaluation if symptomatic: transfuse?
- Radiotherapy can be used to stop bleeding
  - Benefit usually 1-2 weeks into RT course.
  - Done as outpatient
  - If candidate for definitive therapy, be careful not to burn bridge with palliative course



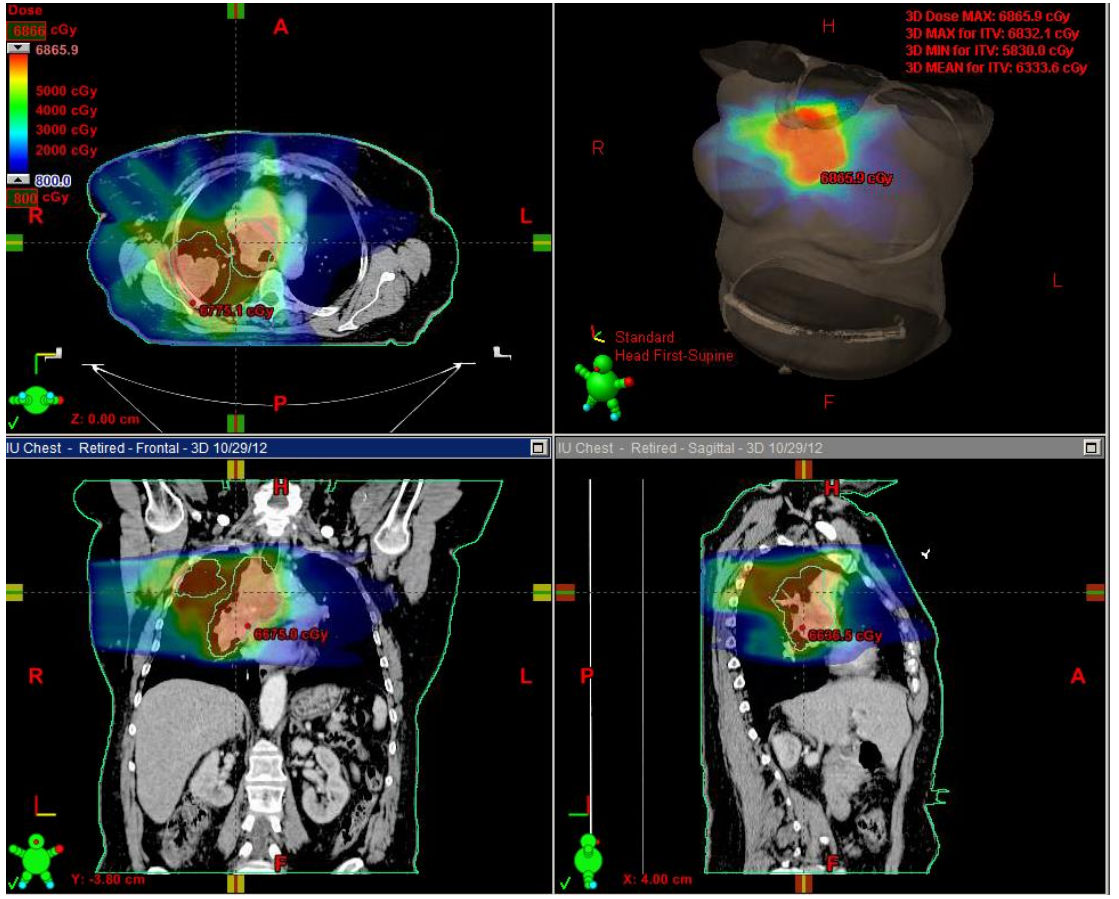
Urgent but not Emergent: pain

- Common call
- Extremely rare inpatient radiation course
- Unfortunately, pain is a common chronic symptom of patients with cancer
- If bone is unstable, call orthopedics
- Palliative care or pain management can be very helpful in optimizing pain control to transition to outpatient
- Radiation can be 1-10 fractions
- Pain relief typically 1-2 weeks after course
- Done as outpatient.



Urgent but could be Emergent: airway

- Degree of respiratory support?
  - ICU? O2, CPAP, BIPAP, intubated?
  - Watch these patients closely; can crump quick
  - Consider: smoker? Prior RT? Surgery? Chemo?
- Need PULM (+intensivist) on board
  - Interventional PULM or CTS, if available
- Location, location, location.
- Radiation once all other measures failed
  - Medications
  - Respiratory Support
  - Bronchoscopic intervention
- Significant logistical challenges to treating a patient on respiratory support
  - Consider escalating to facility with available specialists (and if needed, inpatient RT capabilities)
- If patient pulls out of it, can transition radiation plan to more definitive dosing



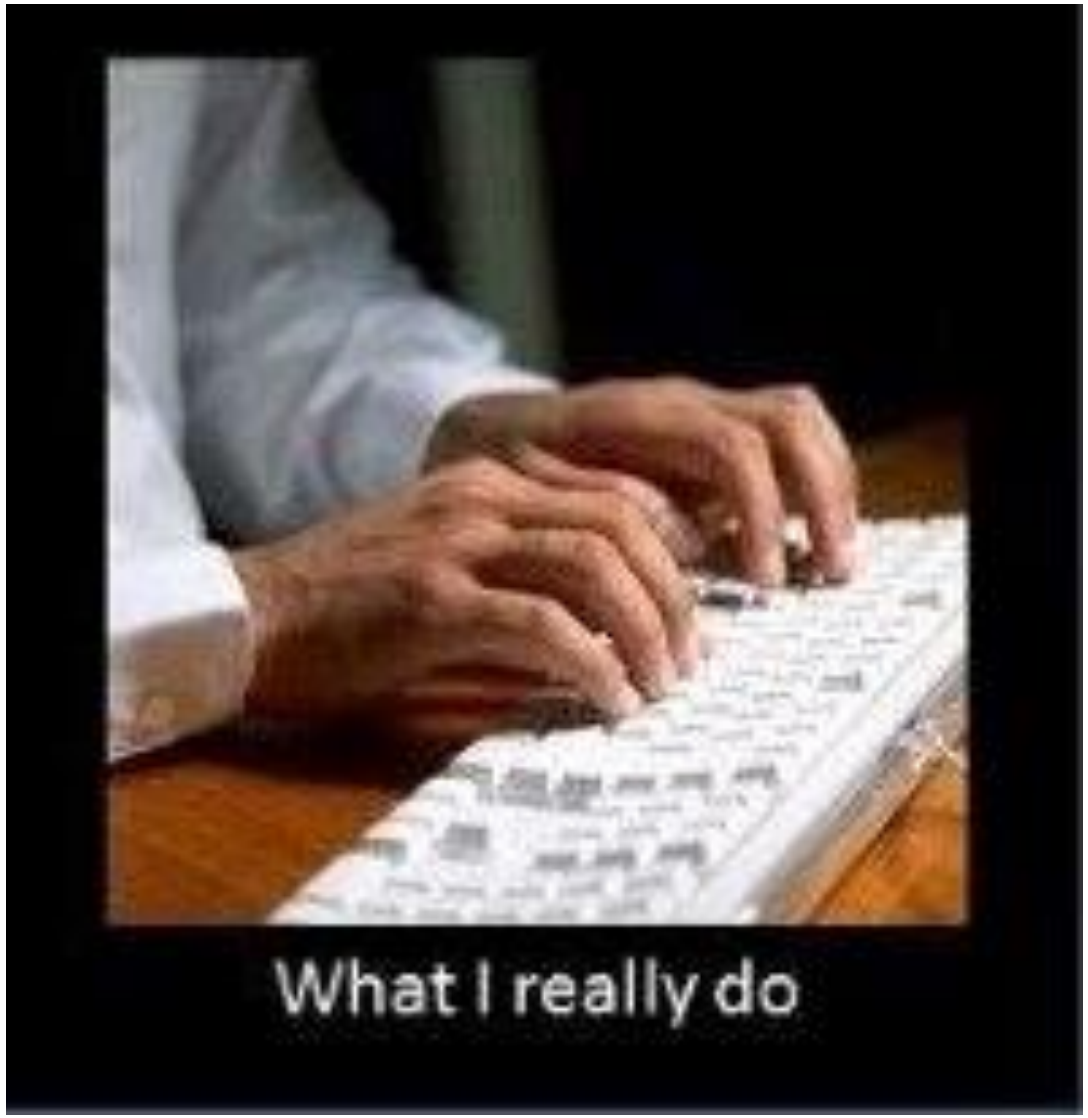

What I think I do

Special Considerations

- Courtesy call for admitted patient currently “under beam”
- New diagnoses: medical oncology should see first
- Location of cancer center (free standing vs. attached to hospital)
- New diagnosis considerations
  - Performance status difficult to assess while admitted.
  - Patient overwhelmed with admit
  - Patient not completely staged.
  - Awaiting tissue + additional testing on specimen
- “Tissue is the issue”: different rates of response for different cancers
- Caution patience with new diagnoses
  - May only have one path in treatment algorithm to reach cure
  - Additional courses of radiation may not be possible (overwhelm normal tissue tolerances): geography and temporal considerations

Special Considerations: histology

- Small Cell
  - Commonly likes the proximal lung and multistation mediastinal lymph nodes
  - Due to fast growth, common cause of symptomatic SVC syndrome
  - “Definitive” treatment reserved for no-extrathoracic (“limited”) disease
  - Backbone of therapy for limited and extensive stage disease is chemotherapy
  - For limited stage, RT is used concurrent with chemotherapy with OS benefit
  - For extensive stage, RT can be used in consolidative fashion with OS benefit
  - If new diagnosis, best to address SVC with chemotherapy, if feasible
- Lymphoma
  - Innumerable entities with vastly different prognoses (HD vs Burkitt, ie)
  - Several types have a predisposition to mediastinum (or involve mediastinal LNs) = SVC syndrome
  - Most are addressed with chemotherapy following extensive workup and subtyping
  - May be challenging to get a tissue diagnosis via FNA or core
  - Steroids are part of treatment algorithm with anti-neoplastic effects and thus, may produce a good response but hinder histologic confirmation and typing
  - Radiotherapy often used in curative cases in a consolidative fashion
  - Medical Oncologist should see these patients first


What I really do

Q&A