Oncologic Emergencies Treated with Radiotherapy

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Disclosure Slide

- **Speaker: Dr. Marlon Hagerty**

- **Relationships with commercial interests:**
  - **Grants/Research Support:**
  - **Speakers Bureau/Honoraria: Discussion on Canadian Guidelines for testosterone suppression in prostate cancer**
  - **Consulting Fees: None to declare**
  - **Other: Enrolling patients for LUSTRE (lung cancer) trial, Site Principle Investigator for Prep (prostate cancer) trial, managing patients previously enrolled in previous radiotherapy trials.**

Objectives

1. To recognize cases requiring emergent radiotherapy

2. To review management of patients requiring emergent radiotherapy

3. To review acute and late side effects of radiotherapy

Overview

1. Overview of TBRHSC Radiation Oncology program

2. To recognize cases requiring emergent radiotherapy
   - spinal cord compression and cauda equina syndrome
   - superior vena cava obstruction
   - pain
   - airway obstruction
   - cerebral mass effect
   - bleeding

3. To review management of patients requiring emergent radiotherapy
   - initial management
   - radiotherapy

4. To review acute and late side effects of radiotherapy
   - common
   - critical

TBRHSC
Radiation Oncology
2017 Statistics

1 253 new patients

13 029 fractions

55 emergency cases

Priority levels

1. Emergent (within 24 hours)
2. Urgent (within 7 days)
3. Standard (within 14 days)

Interdisciplinary

• clinical (inpatient, outpatient)

• technical (physicist, dosimetrist, radiation therapist)

• related specialties

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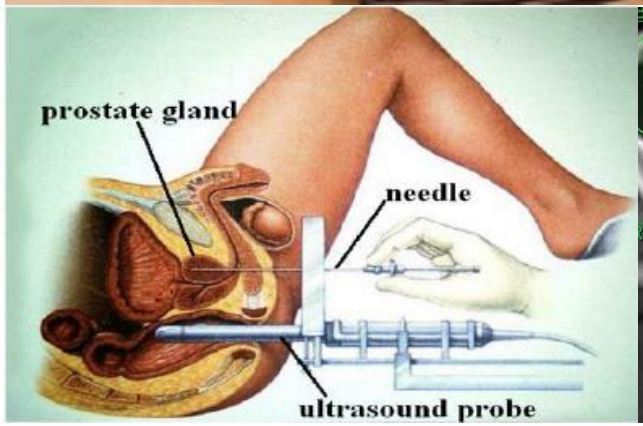
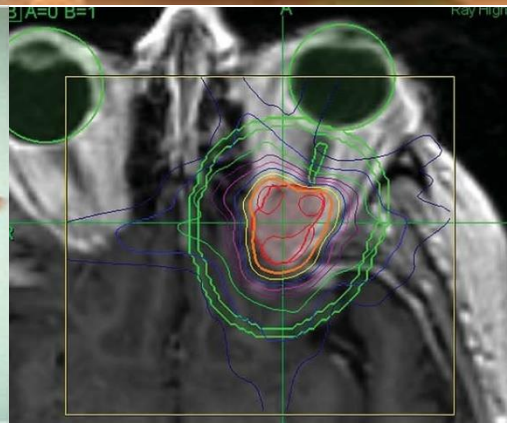
External referral

• prostate brachytherapy

• stereotactic radiosurgery





Case 1

75 year male with several months of abdominal pain and previous head and neck cancer. CT-A to rule out aortic dissection.

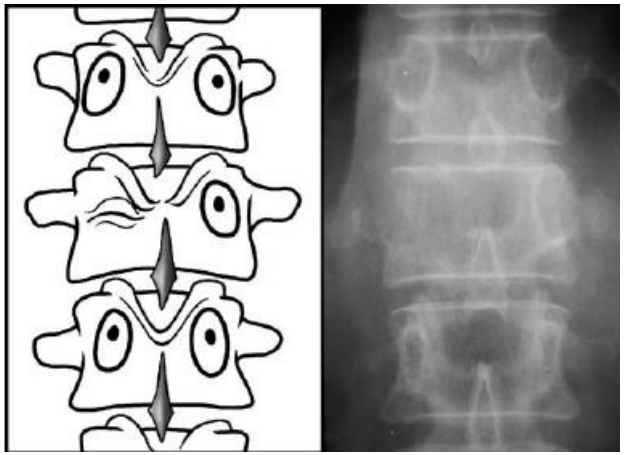
Case 1: Spinal Cord Compression and Cauda Equina Syndrome

Differential Diagnosis

- Spinal cord infarction
- Transverse myelitis
- Gullian Barre Syndrome
- ALS
- Diabetic or HIV-related neuropathy
- MS
- Peripheral neuropathy
- Muscular dystrophy
- Tuberculosis
- Medication-induced neuropathy (cisplatin)

Imaging

- Radiograph
- CT
- MRI



Physical Exam

- Identify spinal level

Spinal Cord Compression and Cauda Equina Syndrome

Subclinical

- identified by imaging
- spinal canal impingement vs cord/nerve compression

Management

- Workup is case specific
  - benign vs malignant
  - Neurosurgery or Orthopedics to assess spine stability (SINS)
  - inpatient vs outpatient

Clinical

- back pain (90-95% of cases)
- weakness/paralysis (60-90%)
- numbness (45-90%)
- urinary retention or bowel incontinence (40-55%)

Management

- admission
- emergent imaging
- if neoplastic: emergent consultations
  - Radiation Oncology
  - Neurosurgery or Orthopedics
- emergent high dose steroid
  - dexamethasone 10 mg IV
  - avoid if suspected lymphoma, XRT imminent
- emergent radiotherapy
- tissue diagnosis

Factors to consider surgical decompression in addition to radiotherapy

Favour surgery

- prognosis >3-6 months
- radioresistant tumour
- amulatory, nonambulatory <48 h
- solitary tumour
- no visceral or brain metastasis
- slowly progressive symptoms
- spinal instability or bone fragment compressing cord
- age <65 years
- KPS >= 70
- indolent tumour
- failure of previous radiotherapy
- No tissue diagnosis

Favour radiotherapy (alone)

- prognosis <6 months
- radioresponsive tumour
- neurologic symptoms >24-48 h
- multilevel or diffuse disease
- poor surgical candidate

Spinal Instability Neoplastic Score (SINS)

Stable: SINS 0-6

Potentially stable : SINS 7-12

Unstable: SINS 13-18

Fourney et al, 2011, J Clin Oncol.

Table 1. SINS

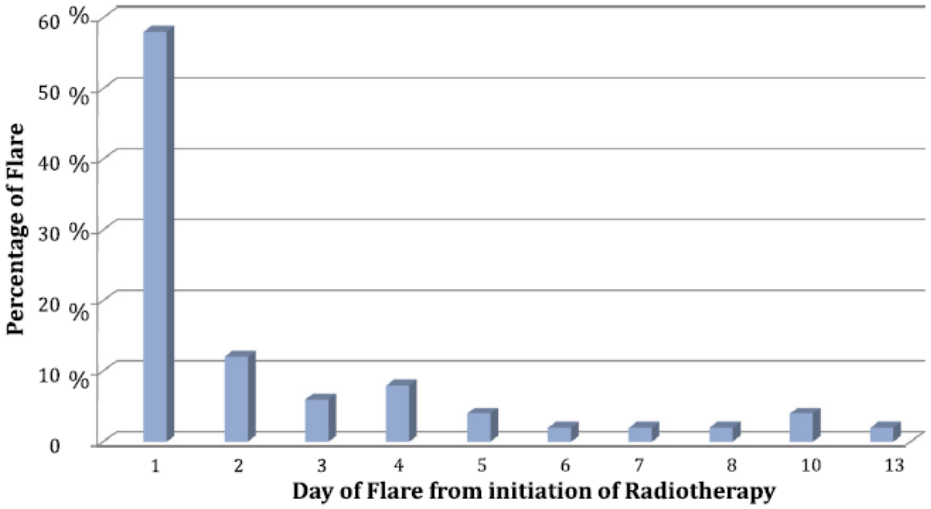
SINS Component	Score
Location	
Junctional (occiput-C2, C7-T2, T11-L1, L5-S1)	3
Mobile spine (C3-C6, L2-L4)	2
Semirigid (T3-T10)	1
Rigid (S2-S5)	0
Pain*	
Yes	3
Occasional pain but not mechanical	1
Pain-free lesion	0
Bone lesion	
Lytic	2
Mixed (lytic/blastic)	1
Blastic	0
Radiographic spinal alignment	
Subluxation/translation present	4
De novo deformity (kyphosis/scoliosis)	2
Normal alignment	0
Vertebral body collapse	
> 50% collapse	3
< 50% collapse	2
No collapse with > 50% body involved	1
None of the above	0
Posterolateral involvement of spinal elements†	
Bilateral	3
Unilateral	1
None of the above	0

NOTE. Data adapted.[14]
Abbreviation: SINS, Spinal Instability Neoplastic Score.
*Pain improvement with recumbency and/or pain with movement/loading of spine.
†Facet, pedicle, or costovertebral joint fracture or replacement with tumor.

Side Effects: Spine Radiotherapy

Early (up to 3 months)

- tiredness
- pain flare (tumour in bone)
  - ~20% patients
  - typically lasts 1-3 days
  - onset within 2 weeks
  - treated with PRN pain medication
  - does not predict pain response
  - prevented with concurrent steroid
- L'hermitte's (transient demyelination)



Gomez-Iturriaga et al, 2015, BMC Pall Care.

Side Effects: Spine Radiotherapy

Early (up to 3 months)

- tiredness
- pain flare (tumour in bone)
- L'hermitte's (transient demyelination)

Late (3 months or more)

- bone marrow suppression
- myelopathy
- necrosis
- paralysis

Case 2

55 year female with 2 months of progressive shortness of breath, 2 weeks of face and arm swelling, post bronchoscopy with biopsy

Case 2: Superior Vena Cava Obstruction

Subclinical

- identified by imaging

Management

- workup
  - benign vs malignant
  - stable vs unstable
  - inpatient vs outpatient

Clinical

- edema: facial, upper extremity, upper chest
- shortness of breath
- superficial veins

Management

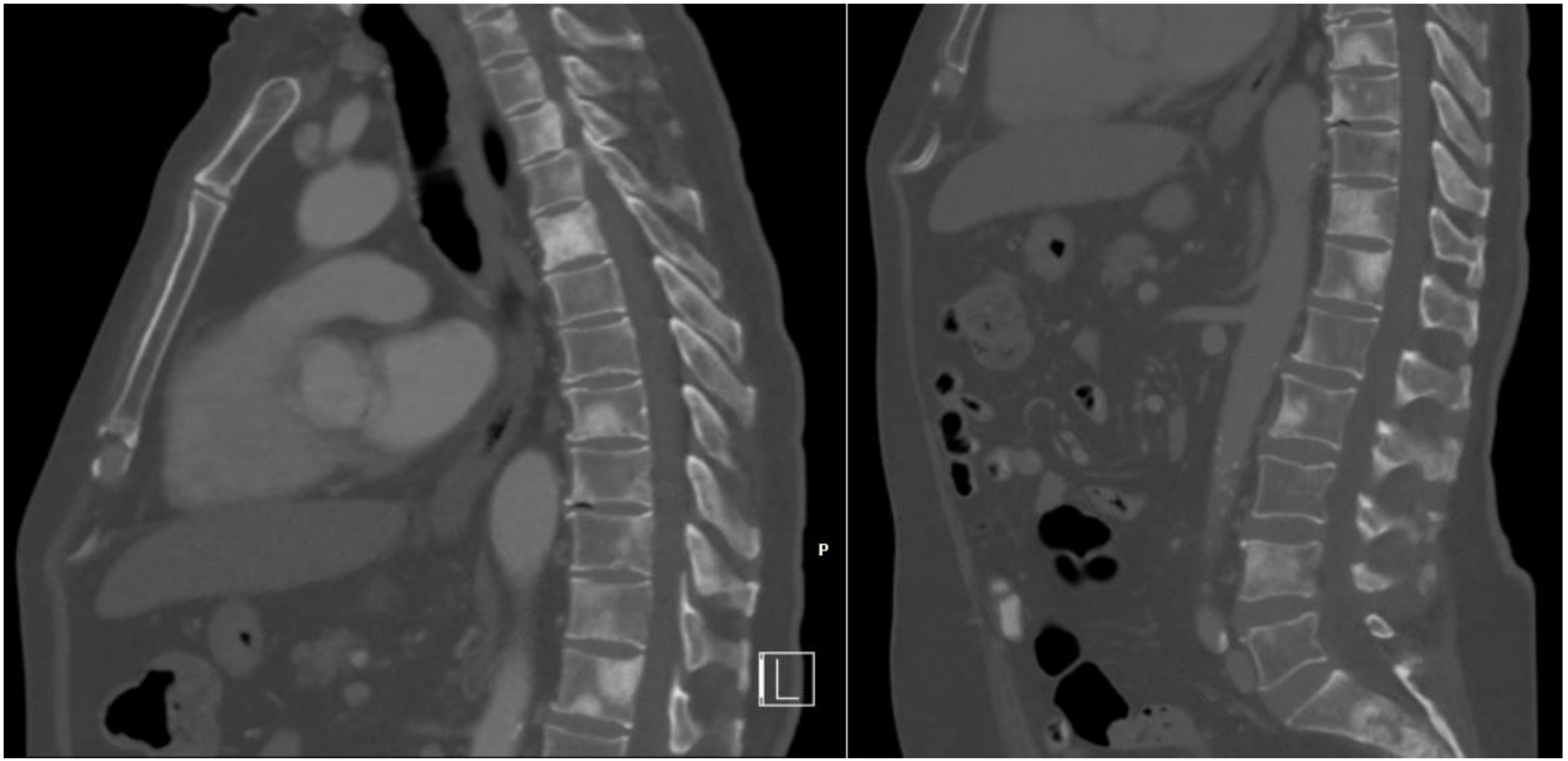
- admission
- emergent imaging
- if suspected tumour: emergent Radiation Oncology consultation
- emergent high dose steroid
  - dexamethasone 10 mg IV
- emergent radiotherapy
- tissue diagnosis

Case 2: Emergent mediastinum radiotherapy

- patient treated with 40.05 Gy in 15 daily fractions over 3 weeks
- profound improvement after 1st day of treatment
- concurrent chemotherapy after tissue diagnosis obtained

Case 3

80 year male with extensive stage small cell lung cancer, with progressive leg pain on chemotherapy, able to weight bear



Case 3

80 year male with history of prostate cancer, rising PSA with aggressive kinetics, unable to manage at home with weight loss, left foot drop, and severe back pain

Case 3: Pain

Not Emergent

- low clinical concern
- mild to moderate pain
- expected control with medication

Management

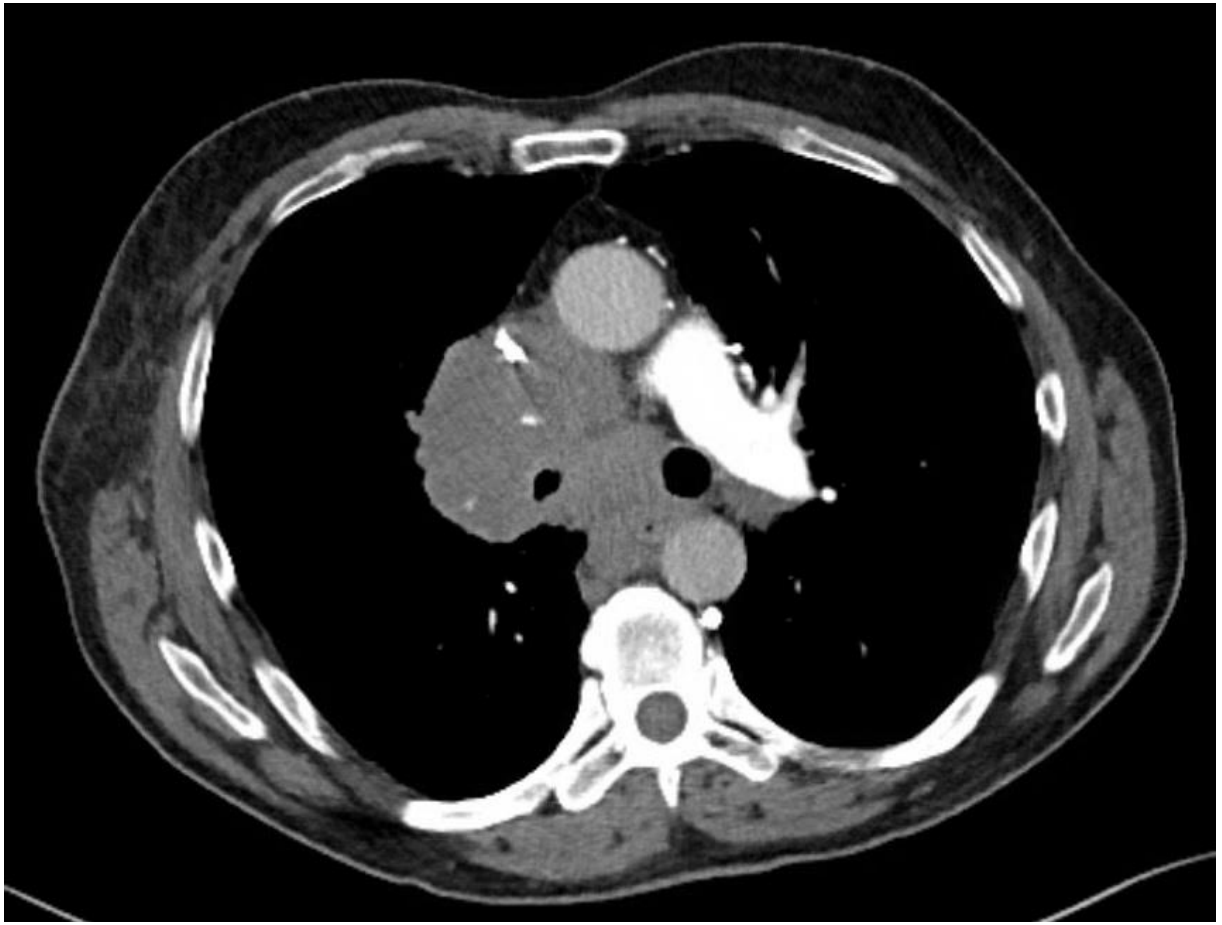
- outpatient vs inpatient
- medication review
- consider narcotic rotation

Emergent

- high clinical concern
- severe pain
- unable to control with medication

Management

- admission
- medication review
- consider narcotic rotation
- consider consulting palliative care, anaesthesia, orthopedic surgery
- imaging to identify source
- urgent or emergent radiotherapy



Case 4

46 male with metastatic lung cancer and in severe respiratory distress

Case 4: Airway Obstruction

Not Emergent

- low clinical concern
- peripheral tumour
- non-aggressive pathology
- minimal symptoms

Management

- outpatient workup
  - lung Diagnostic Assessment Program (DAP)

Emergent

- respiratory distress
- bulky disease
- aggressive pathology

Management

- admission
- suspected tumour: emergent Radiation Oncology and Surgery consultations
- airway management
- emergent high dose steroid
  - dexamethasone 10 mg IV
- emergent radiotherapy

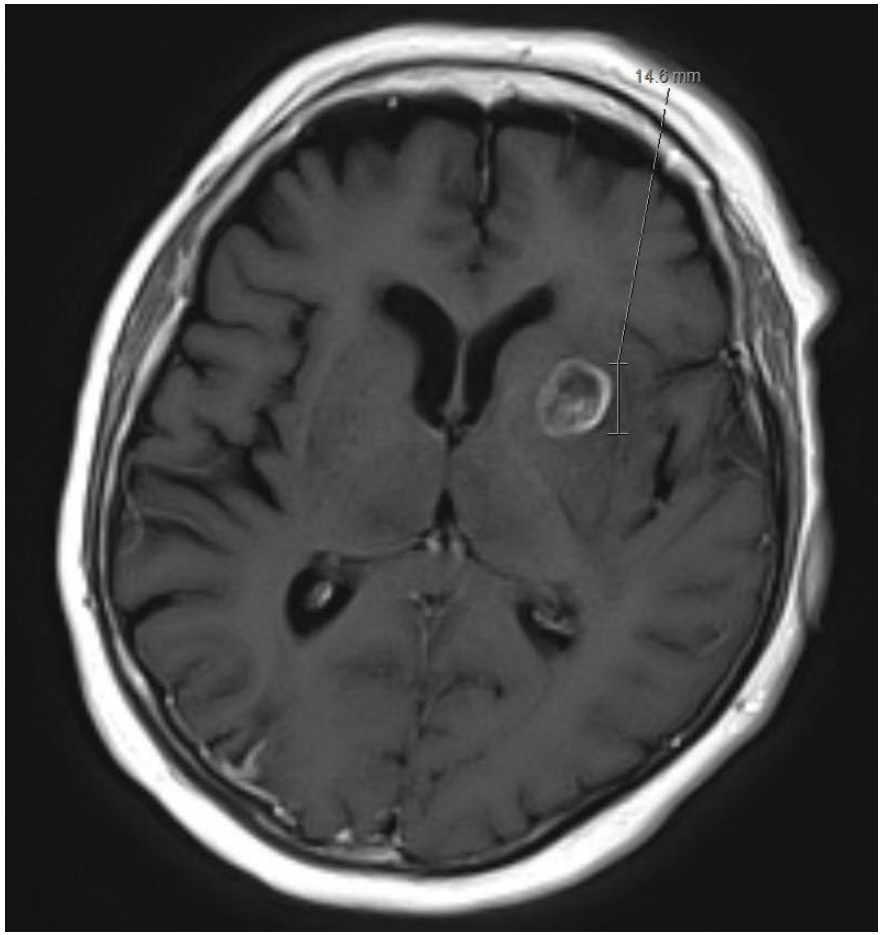
Side Effects: Thoracic Radiotherapy

Early (up to 3 months)

- fatigue
- dermatitis
- esophagitis
- cough
- pericarditis (rare)

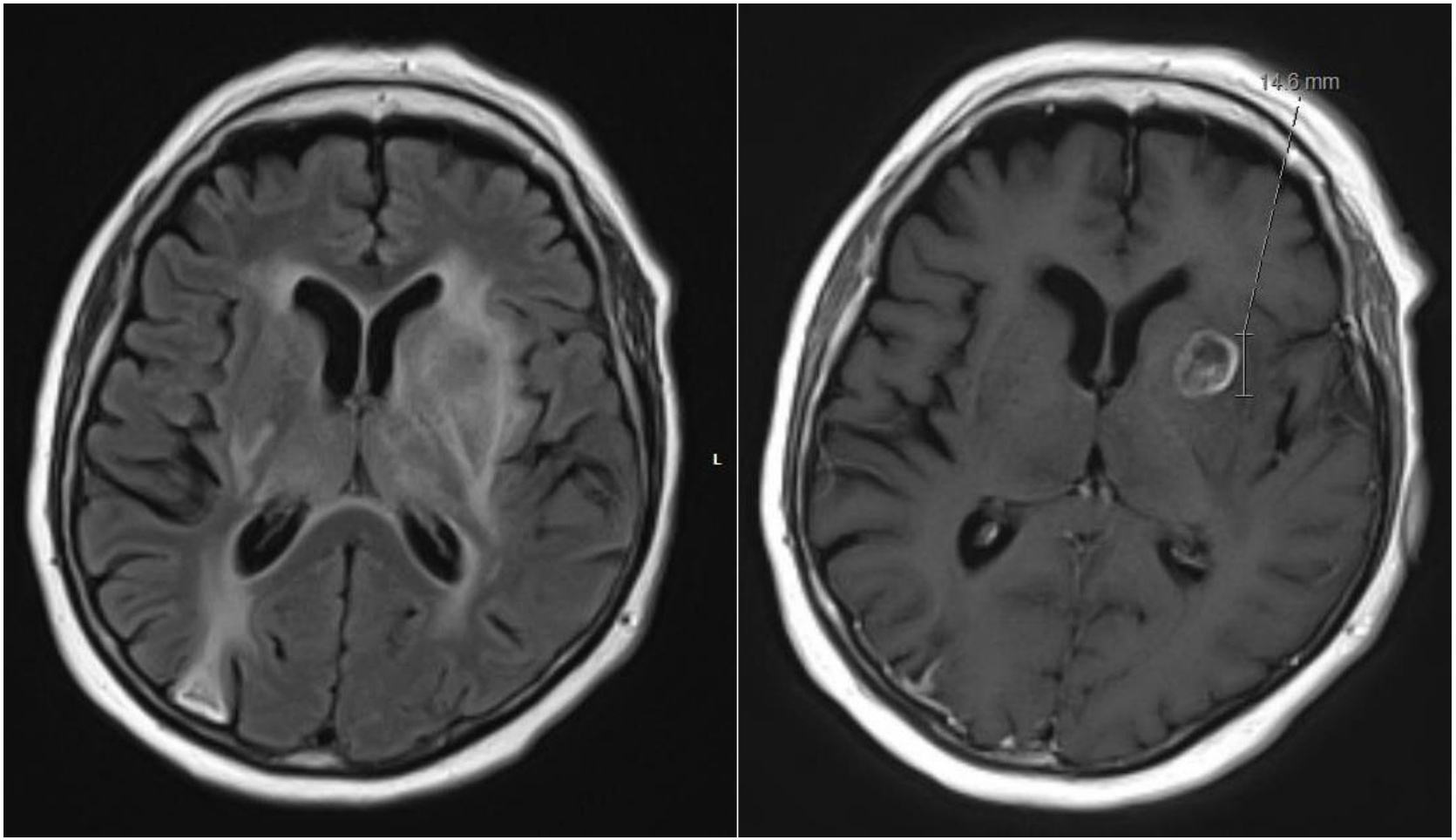
Late (3 months or more)

- radiation pneumonitis
- radiation fibrosis
- chest wall pain
- fracture
- coronary artery disease
  - 10-15 years post treatment
  - dose dependent (LAD)



Case 5

68 year female with small cell lung cancer with new confusion and seizure



Case 5

68 year female with small cell lung cancer with new confusion and seizure

Case 5: Cerebral Mass Effect

Not Emergent

- minimal symptoms

Management

- outpatient workup
- metastatic workup
- tissue diagnosis

Emergent

- severe symptoms

Management

- admission
- suspected tumour: emergent Radiation Oncology and Neurosurgery consultations
- emergent high dose steroid
  - dexamethasone 10 mg IV
- emergent surgery or radiotherapy

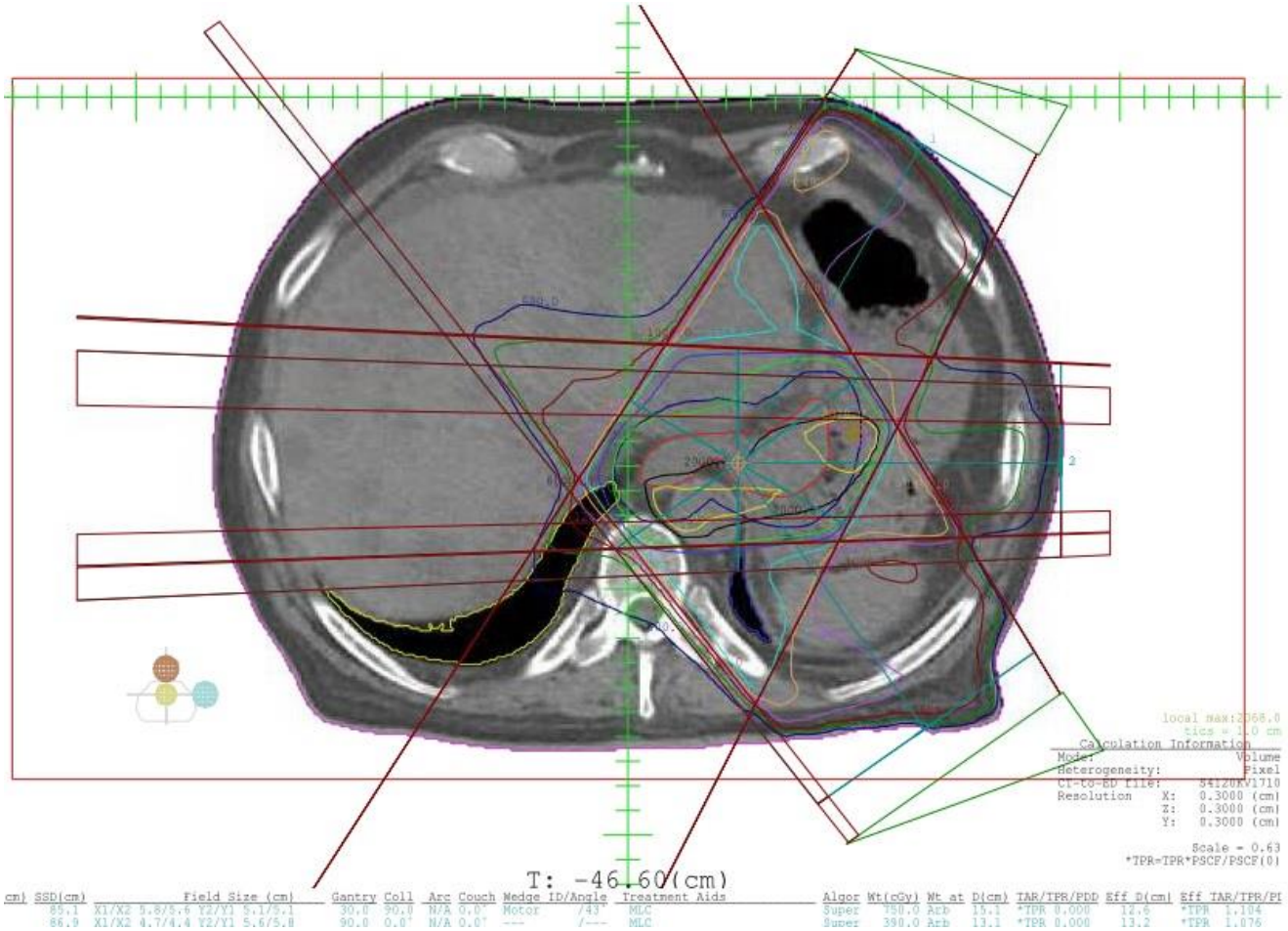
Side Effects: Brain Radiotherapy

Early (up to 3 months)

- tiredness
- headache
- nausea and vomiting
- dermatitis with alopecia
- somnolence syndrome
- seizure (rare)

Late (3 months or more)

- Neurocognitive (immediate recall, delayed recall, verbal fluency, learning)
- necrosis
- endocrine abnormalities
- hearing loss
- cataracts



Case 6

70 year male with 10 transfusions over past month, EGD finding fungating mass at GEJ

Case 6: Bleeding (GI/GU)

Not Emergent

- reasonable expectation for hemostasis
- low volume bleeding
- hemodynamically stable
- low clinical concern

Management

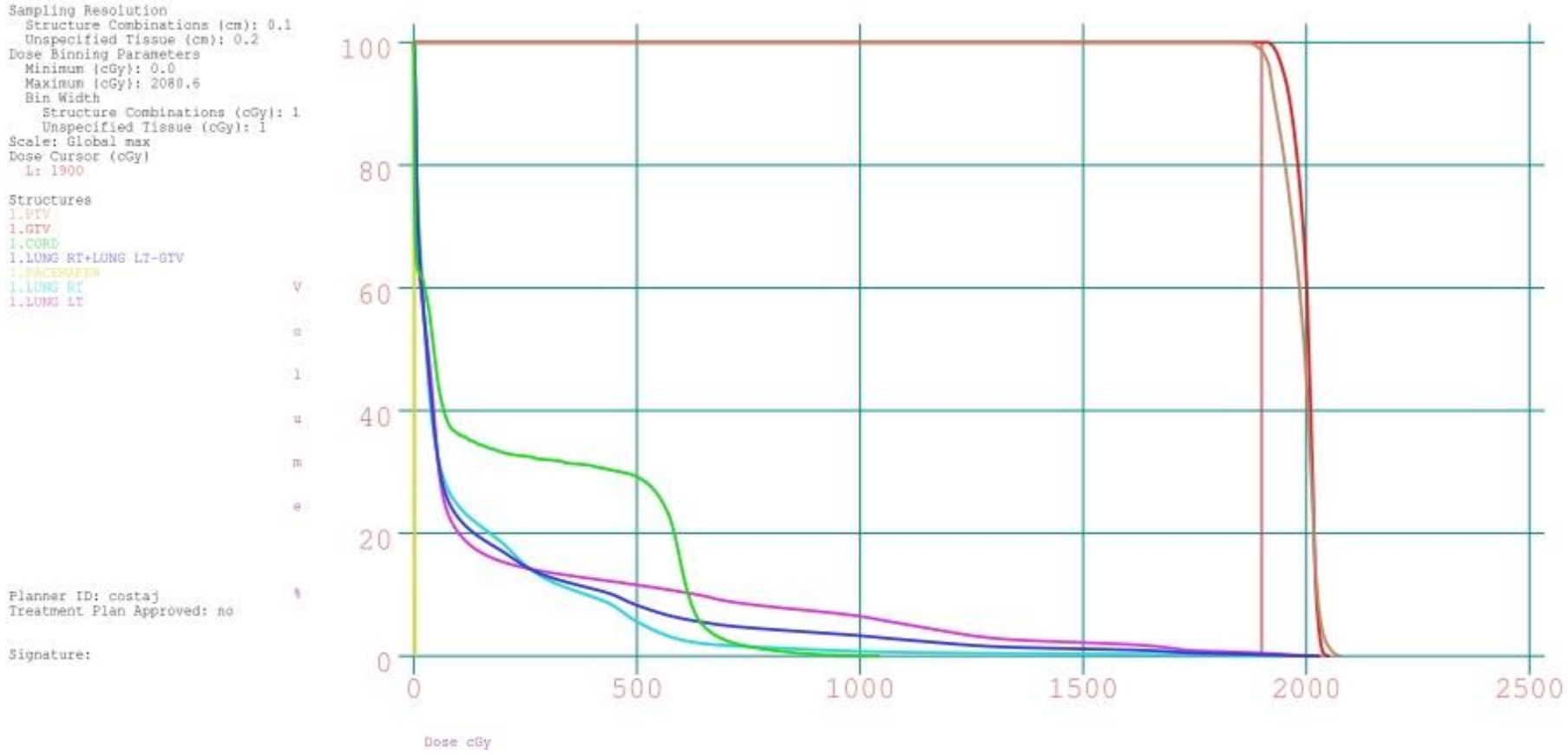
- Workup
  - identify source
  - transfuse as required
  - biopsy as required
  - refer to cancer centre with tissue diagnosis

Emergent

- hemodynamically unstable
- transfusion dependent
- difficulty achieving hemostasis
- high risk for major bleed

Management

- identify bleeding source (biopsy if needed)
- suspected tumour
  - emergent consultation (consider Radiation Oncology)
- urgent/emergent radiotherapy



Dose Volume Histogram (DVH)

Demonstrates radiotherapy coverage of target volume (TVs) and organs at risk (OARs)

Review: Emergent Radiotherapy

- considered on a case by cases basis
- saves lives and mitigates serious morbidity
- target volume needs to be defined prior to treatment
- radiotherapy is often considered safe
- side effects depend on many factors