

# Radiation Oncology Nursing



**Marco Gatti**

- Care of patients receiving radiation therapy
- Side effects & symptom management

# Goal of Radiation Therapy

- Curative
- Control:
  - Adjuvant
  - Pre/Post Operative
  - Intraoperative
- Palliation

# Types of Radiation Therapy



- **External Beam or Teletherapy**
- most common type of radiation therapy using machine (linear accelerator).
- patient is not radioactive.
- **Internal radiation or Brachytherapy**
- implant is placed inside patient temporary/permanent.
- patient is radioactive.

# Radiation Therapy: Injury

## Phases of Radiation Injury:

**Early (acute) Phase:** occurs within weeks and resolve 4-6 weeks post radiation. Usually temporary and affect tissues with rapidly dividing cells (skin, mucous membranes)

**Late Phase:** may occur months/years later and usually result from damage to the micro-circulation. Affect any/all tissues especially: lymph, thyroid, pituitary, breast, brain, bone, cartilage, pancreas and bile ducts.

# Radiation Therapy: Acute Toxicities Overview

- Mucositis (34–90%),
- Hematological changes (39–60%),
- Nausea and vomiting accompanied by under nutrition and dehydration (20–26%),
- Neuro- and ototoxicity (7–26%),
- Skin problems (16–34%),
- Pneumonia (0–25%),
- Functional disorders of the kidney (3–19%),
- Severe fever (0–18%),
- Weight loss of over 10% (0–17%)

# Side Effects of Radiation Therapy

Factors influencing degree & occurrence of side effects due to Radiotherapy

- **Body site irradiated**
- **Dosage**
- **Extent of body area treated**
- **Method of radiation delivery**
- **Age of client**
- **General health of client**
- **Previous surgeries & chemotherapy**
- **Radiosensitivity of tissue/organ treated.**

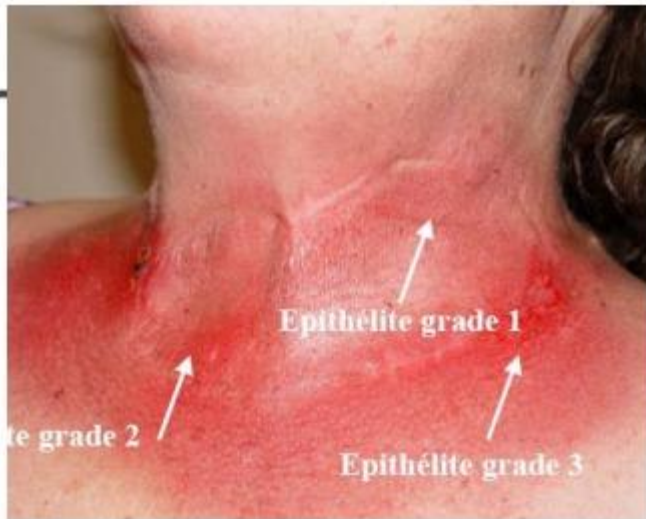


# Symptom Management in Radiation Oncology

- Nausea & vomiting
- Diarrhea
- Xerostomia
- Ocular symptoms ( edema, dryness, photophobia)
- Oral mucositis
- Alopecia
- Hyperthermia
- Headache
- Cystitis
- Esophagitis



# Radiation Therapy: Skin Toxicity



- Majority of patients undergoing radiation therapy
- 20–25% develop severe skin toxicity (especially with cetuximab)
- Total radiation therapy dose, the dose per fraction, the overall treatment time, the beam type and energy, concurrent therapies

# Radiation Therapy: Skin Reactions

- **Acute:** begin about 2 weeks after of treatment and resolve over next 3-4 weeks.

Reaction include erythema, dry desquamation, wet desquamation

- **Chronic:** may occur years later and include atrophy, fibrosis and telangiectasis

## General Skin Care

- Wash daily with water or mild scent-free soap
- Use hand to wash the area.
- Rinse soap well.
- Pat skin dry.
- Don't use powders, creams unless ordered by Oncologist.
- Wear soft clothing over radiation site (cotton).
- Avoid belts, straps & tight clothing.
- Avoid sun exposure.
- Shave with electric razor.
- Do not use tape over site.

Score	Observation
<i>Radiation Therapy Oncology Group</i>	
0	No change over baseline
1	Erythema; dry desquamation; epilation
2	Bright erythema; moist desquamation; edema
3	Confluent moist desquamation; pitting edema
4	Ulceration, hemorrhage, necrosis
<i>NIH CTCAE</i>	
0	None
1	Faint erythema or dry desquamation
2	Moderate to brisk erythema
3	Confluent moist desquamation
4	Skin necrosis or ulceration
<i>Oncology Nursing Society</i>	
0	No change
1.0	Faint or dull erythema
1.5	Bright erythema
2.0	Dry desquamation with or without erythema
2.5	Small to moderate amount of moist desquamation
3.0	Confluent moist desquamation
3.5	Ulceration, hemorrhage, or necrosis



# Radiation Therapy: Skin Reactions



**Grade 1**



**Grade 2**



# Mucositis

- Inflammation of the mucosal lining of the G.I. tract
- If oral cavity - stomatitis
- If esophagus – esophagitis
- Common in patients receiving RT to head & neck
- Severity depends on dose, size of field, and fractionation schedule of RT



# Mucositis Interventions

## Instruct patient/caregiver to:

- Gently brush all surfaces of teeth, gums, and tongue with a soft nylon brush.
- Brush with a nonirritating dentifrice such as baking soda.
- Remove and brush dentures thoroughly during and after meals and as needed.
- Rinse the mouth thoroughly during and after brushing
- Avoid alcohol-containing mouthwashes.
- Use recommended mouth rinses:
  - Hydrogen peroxide and saline or water (1:2 or 1:4).
  - Baking soda and water (1 tsp in 500 ml).
  - Salt (.5 tsp), baking soda (1 tsp), and water (100 ml).
- Keep lips moist.
- Avoid use of tobacco and alcohol.

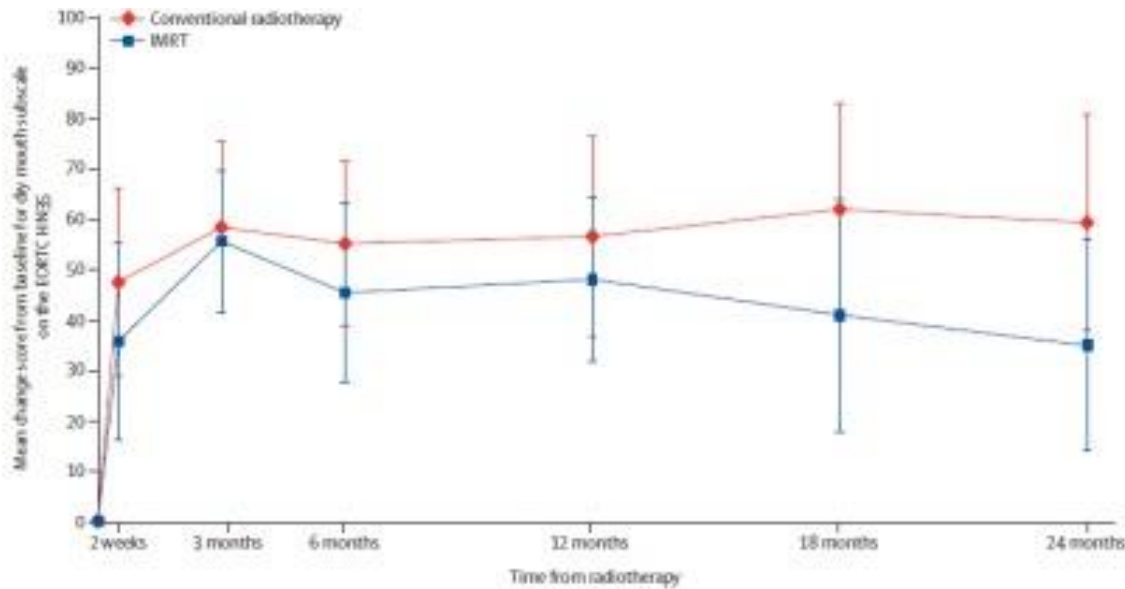


# Xerostomia

- Dryness in the mouth caused by lack of normal secretion of saliva
- Salivary glands very sensitive to RT
- Severity related to dose
- May be permanent with higher doses
- Lack of moisture to mucosa causes irritation to the mucosa, fissures may develop on the corners of the mouth
- Xerostomia promotes accumulation of bacteria and plaque increasing susceptibility to infection, dental caries, and periodontal disease



# Xerostomia



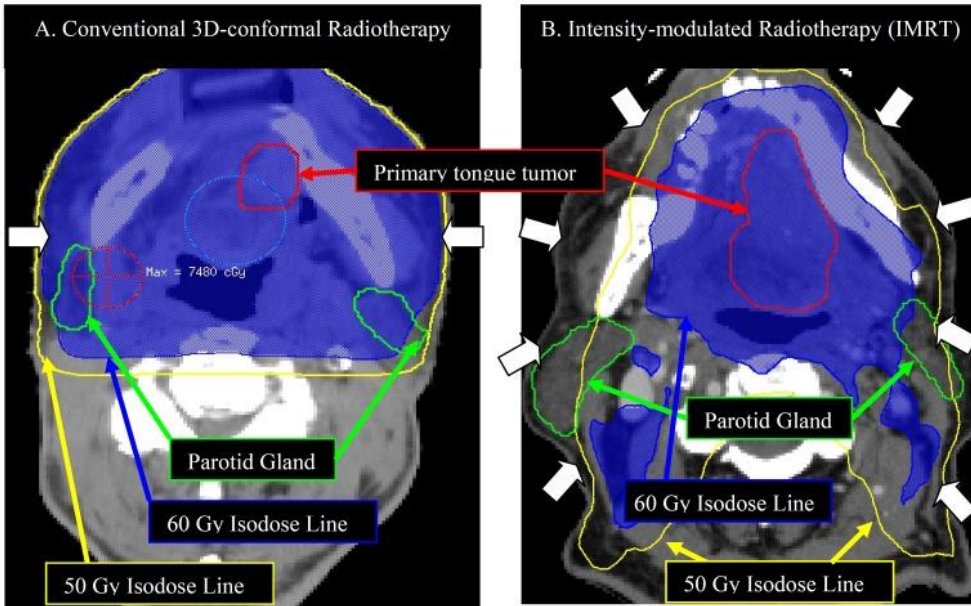
Conventional radiotherapy	26	24	23	23	21	18
IMRT	28	30	25	25	22	22
Difference in mean	11.7	7.8	9.7	8.5	21.0	24.4
(99% CI)	(-14.4 to 37.8)	(-18.4 to 24.0)	(-13.5 to 32.9)	(-15.9 to 33.0)	(-8.9 to 50.9)	(-4.3 to 53.2)

Phase III Randomized trial 3D Vs IMRT 94 patients with T1-4 N0-3 oropharynx or hypopharynx SCC

Incidence of grade 2 xerostomia at 12 months was 74 versus 40% (P=0.005, LENT-SOMA) No differences in terms of PFS, OS or other late toxicities rates

Function often gradually recovers within ≈2 years after EBRT

# Adaptive IMRT and Xerostomia more is better?



Weekly replanning decreased 30% dose to the parotid. This study was only planning study

30% decrease of the volume, resulting in decreasing gland sparing

*Robar IJROBP 2007*  
*Wu IJROBP 2009*

# Xerostomia Interventions

- Good oral hygiene
- Frequent sips water, sugarless gum, avoid dry foods, liquids with meals
- Avoid alcohol and smoking
- Humidifier
- Artificial saliva i.e. Moistir ac meals, hs, & prn
- Pilocarpine for radiation induced Xerostomia



# Dysgeusia

- Dysgeusia occurs within several days after the beginning of radiation therapy.
- 90% of patients who receive radiation therapy at 60 Gy complain of significant dysgeusia
- Normal dysgeusia generally gradually recovers within 6–24 months
  
- Zinc substitution failed to prevent taste alterations in a randomized study

*Ruo Redda Cancer Treat Rev. 2006  
Epstein Support Care Cancer. 2010*

# Diarrhea

- Passage of frequent (more than 3/24hrs), loose, watery stool
- Can lead to dehydration, malabsorption, fatigue, hemorrhoids, and perianal skin breakdown
- Caused by irritation/inflammation of the bowel lining
- **Risk for Diarrhea**
- Higher in patients undergoing chemo or RT to abdomen or pelvis
- With XRT usually develops 10-15 days in treatment
- Lasts 2-3 weeks after treatment



## Assessment of Diarrhea

- History - onset, pattern, number of B.M.'s/24 hrs.
- Physical – vital signs, assess hydration status
- Psychological – anxiety, stress
- Investigations – serum electrolytes, creatinine & urea, stool cultures & stool for c. difficile



## Interventions

- Radiation induced diarrhea usually managed initially with dietary changes
  - Small freq. meals
  - Drink 8-10 glasses of fluids
  - Low fat, low fiber diet
  - Avoid gas producing foods
  - Avoid caffeinated beverages
- Loperamide – if patient has more than 3 watery B.M.'s per day
- Protect peri-anal area from skin breakdown
  - Keep area clean and dry
  - Sitz bathes several times a day can ease discomfort

# Other complications Radiation Treatment

- Cystitis (usually occurs 1-2 weeks post XRT and subsides 2 weeks after XRT complete)
- Lhermitte's syndrome – after spinal cord radiation
- Vaginal stenosis – after XRT to pelvis
- Radiation pneumonitis – after XRT to lungs

