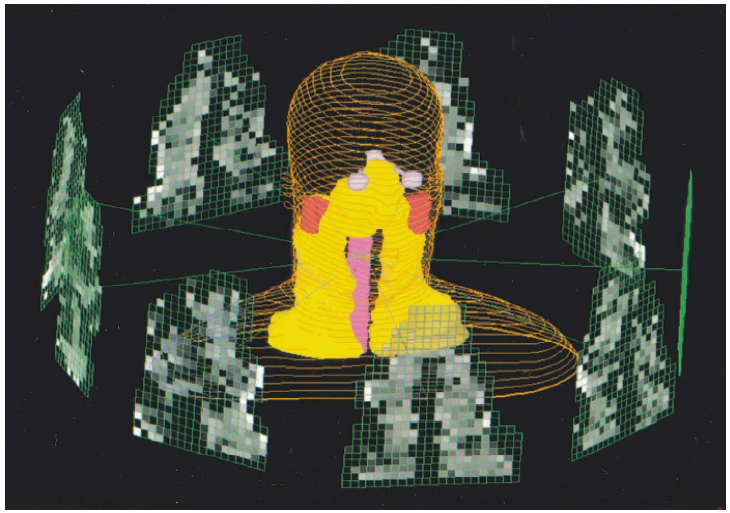
Managing the morbidity of multimodality therapy in head and neck cancers



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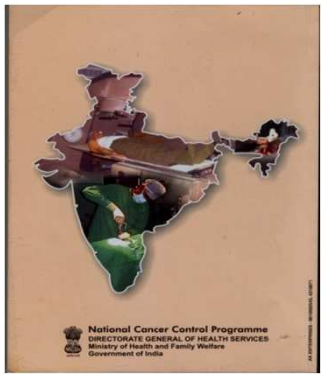


Indian Scenario

- India is one of the high incidence zones in head & neck cancer

- In India, the most common H&N cancers are those of oral cavity and pharynx

- Infact, mouth and pharynx cancers are 3rd most common cancer in males and 4th most common in females in the developing countries

HNSCC CANCER

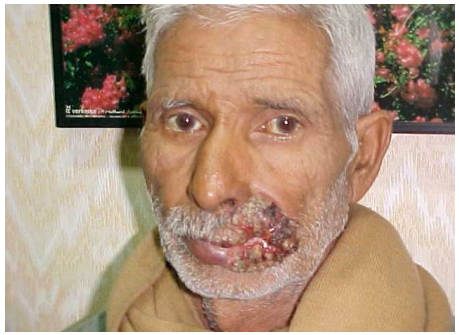
Patterns of failure

- Loco regional failure 75 - 90 %
- Distant Mets 05 -10 %
- Second Primary 10 - 20 %

General Management Guidelines: HNSCC Cancers

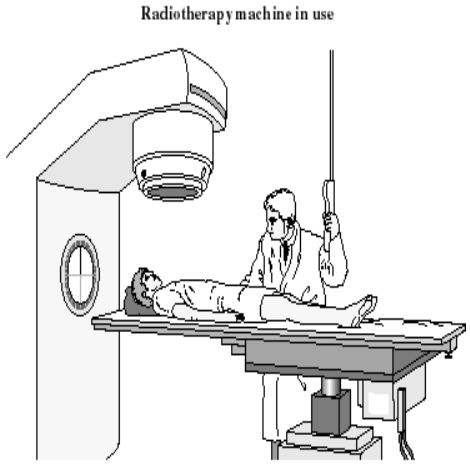
- **Highest loco-regional control**
- **Anatomical with functional Preservation**
- **Stage I / II** disease - Single modality (Surgery or RT)
- **Stage III / IV** disease – Combined modality

*Surgery + RT (in most patients)
*Chemotherapy + RT in selected patients



Why is combined treatment necessary?

- Advanced lesions (85% are stage III and IV cancers)
- Single modality of treatment gives unsatisfactory results
- Failure to control disease above clavicle (loco regional)



Combined Modality Treatment: Possible regimes

- RT -----→ Surgery (Pre-op RT)
- Surgery + RT (Intra-operative RT)
- **Surgery -----→ RT (Post-op RT)±CT**
- Radical RT±CT -----→ Salvage Surgery

HNSCC CANCER

Multidisciplinary Team

Radiation Oncologist
Surgical Oncologist
Medical Oncologist
Radiologist
Medical Physicists
Radiotherapy Technologist
Dentistry / Prosthodontics
Speech and Swallowing therapy
Physical Medicine & Rehabilitation
Social Services

Paradigm Shift in Cancer Mx

Surgery	Chemotherapy	Radiotherapy
Radical	Nil	Wide Field
Conservative	H Dose	Involved F
NIL ?	Targeted	Conformal

ERA OF RADICAL SURGERY GONE

CLINICAL IMPLICATIONS

- Increasing incidence: intensification of therapy due to combined modality approach with overlapping toxicities.
- Most debilitating acute complication.
- Major drawbacks to patient (discomfort) and physician (challenging to manage).
  - Frequent treatment interruptions: inferior control rates.
  - Hospitalizations for alimentation support.
  - Pain control requiring potent narcotic cover.
  - Predisposition to neutropenic sepsis and life threatening complications.
  - Increased use of feeding tube replacement.
  - Increased cost: higher utilization of hospital resources.
  - Significantly impairs quality of life during treatment (difficulty in speaking, swallowing, maintaining oral hygiene).
  - Increased mortality rates.

GCRI

THE GUJARAT CANCER & RESEARCH INSTITUTE • 1972 •

A Challenge for The Radiation Oncologist!!!

Tumor

- Very Close proximity Of Tumor and Critical structures
- Total Dose Delivery Limited by Tolerance of Normal structures
- Dosimetric Challenges Due to Varying Contour/Tissue Heterogeneity

Patient

- Compromised Tolerance To Treatment
- Poor Nutritional Status and Weight Loss
- Inadequate oral Intake
- Treatment Induced Complications/side effects

Critical Structures

- Spinal Cord
- Brain Stem (and Cranial Nerves)
- Optic Chiasm and Nerves
- Brain (Temporal Lobes)
- Mandible (+TMJ)
- Eyes (Lens and Retina)
- Ear (Middle Ear, Inner Ear)
- Salivary Glands (Parotid, Submandibular, Sublingual)
- Tongue/Oral Cavity/Lips
- Larynx
- Pharynx/Esophagus
- **Anterior Pharyngeal Constrictor muscle**

Side Effects

- Early reactions
  - **Mucositis**
    - Dermatitis
    - Increasing hoarseness
    - Dysphagia
    - Laryngeal edema
- Late reactions
  - **Xerostomia**
    - Laryngeal edema
    - Subcutaneous fibrosis
    - Pharyngeal stricture
    - ORN

MUCOSITIS

Oral mucositis

- Oral mucositis (OM) is defined as "inflammation of oral mucosa resulting from cancer therapy typically manifesting as atrophy, swelling, erythema and ulceration" *(Raber-Durlacher et al, 2010).*

- Symptoms of mucositis vary from pain and discomfort to an inability to tolerate food or fluids

- Mucositis may also limit the patient's inability to tolerate either chemotherapy or radiation therapy, resulting in dose-limiting toxicity and hence drastically affecting cancer treatment and outcome

Neoplasia 2004; 6, 423–431

Oral mucositis- an unmet medical need

- Estimated that about 40% of patients treated with standard chemotherapy develop mucositis

- Almost all patients (97%) receiving radiation therapy to the head and neck areas develop oral mucositis*

Neoplasia 2004; 6, 423–431

*Clinical Medicine and Diagnostics 2013; 3(4): 82-87

SITE &TIME OF OCCURRENCE OF MUCOSITIS

Chemotherapy induced:

- 7-14 days after initiation.
- Non-keratinized mucosal sites (SP, FOM, ventral tongue) affected.
- Granulocytopenia aggravates risk of infection.
- Resolution by 2-3 weeks.
- Mirrored by the recovery of neutrophil count.
- Generalized, affects entire alimentary tract.

Radiotherapy induced:

- Conventional: begins at 1-2 weeks, ulcerative mucositis develops after 30 Gy.
- Accelerated: peaks within 3 weeks.
- Interstitial implant: begins 7-10 days, peaks after 2 weeks.
- Limited to the field of radiation.
- Resolves 3-6 weeks after completion of RT.

CT V/S RT INDUCED OM

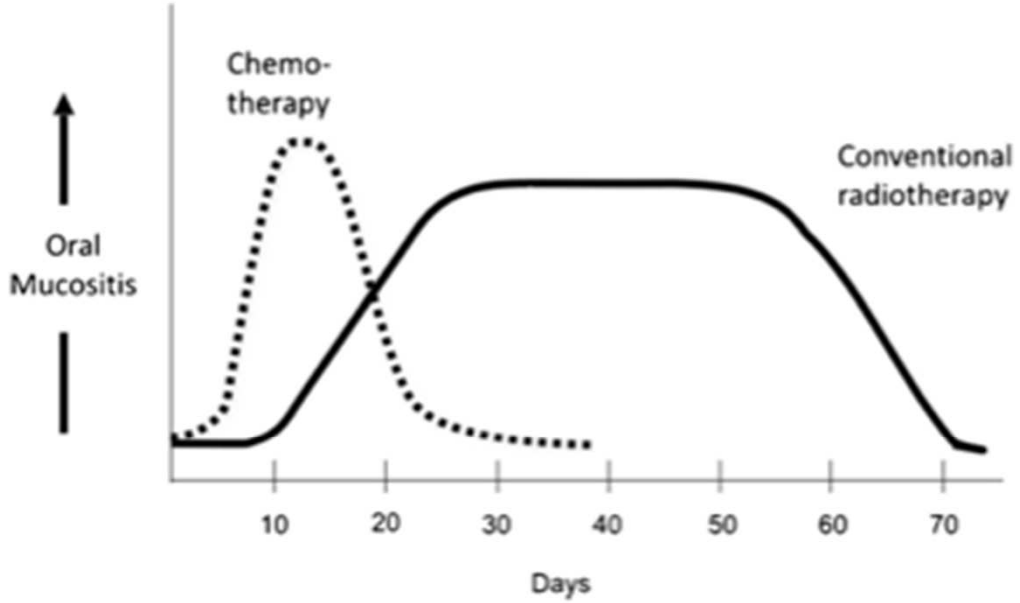


Fig. 1 Clinical differences in onset, severity, and resolution of chemotherapy- and radiation-induced oral mucositis. In some patients treated with radiotherapy, oral mucositis may last for longer periods and may become chronic. Hyperfractionated radiotherapy, combined chemoradiation regimens, or radiotherapy combined with a targeted agent may lead to increased mucositis severity (not depicted)

RISK FACTORS- CT RELATED

1. Increasing number of cycles.
2. Previous episodes of CT induced mucositis.
3. Bolus & continuous infusions.
4. S-phase specific agents: 5FU, MTX, Cytarabine.
5. High dose CT & BM transplant.
6. Other concurrent therapy: RT, biologic therapy.
7. Focused (regional) delivery: intra-arterial, liposomal conjugates, intraperitoneal.
8. Prophylactic/therapeutic growth factors.

RISK FACTORS- RT RELATED

1. Total cumulative dose.
2. Dose per fraction.
3. Volume of irradiation.
4. Overall treatment time.
5. Technique of RT (conformal vs. non-conformal. external vs. brachytherapy)
6. Quality of radiation (photons, electrons, protons).
7. Radio-protectants.
8. ***Counseling and reassurance.***

Effect Of Radiotherapy And Chemotherapy On The Risk Of Mucositis During Intensity-modulated Radiation Therapy For Oropharyngeal Cancer.

- Radiotherapy and chemotherapy act independently in determining acute mucosal toxicity; cCHT increases the risk of mucosal **Grade 3 toxicity ≈4 times over radiation** therapy alone, and it is equivalent to an extra ≈6.2 Gy to 21 cc of OM over a 7-week course.

Int J Radiat Oncol Biol Phys. 2012 May 1;83(1):235-42

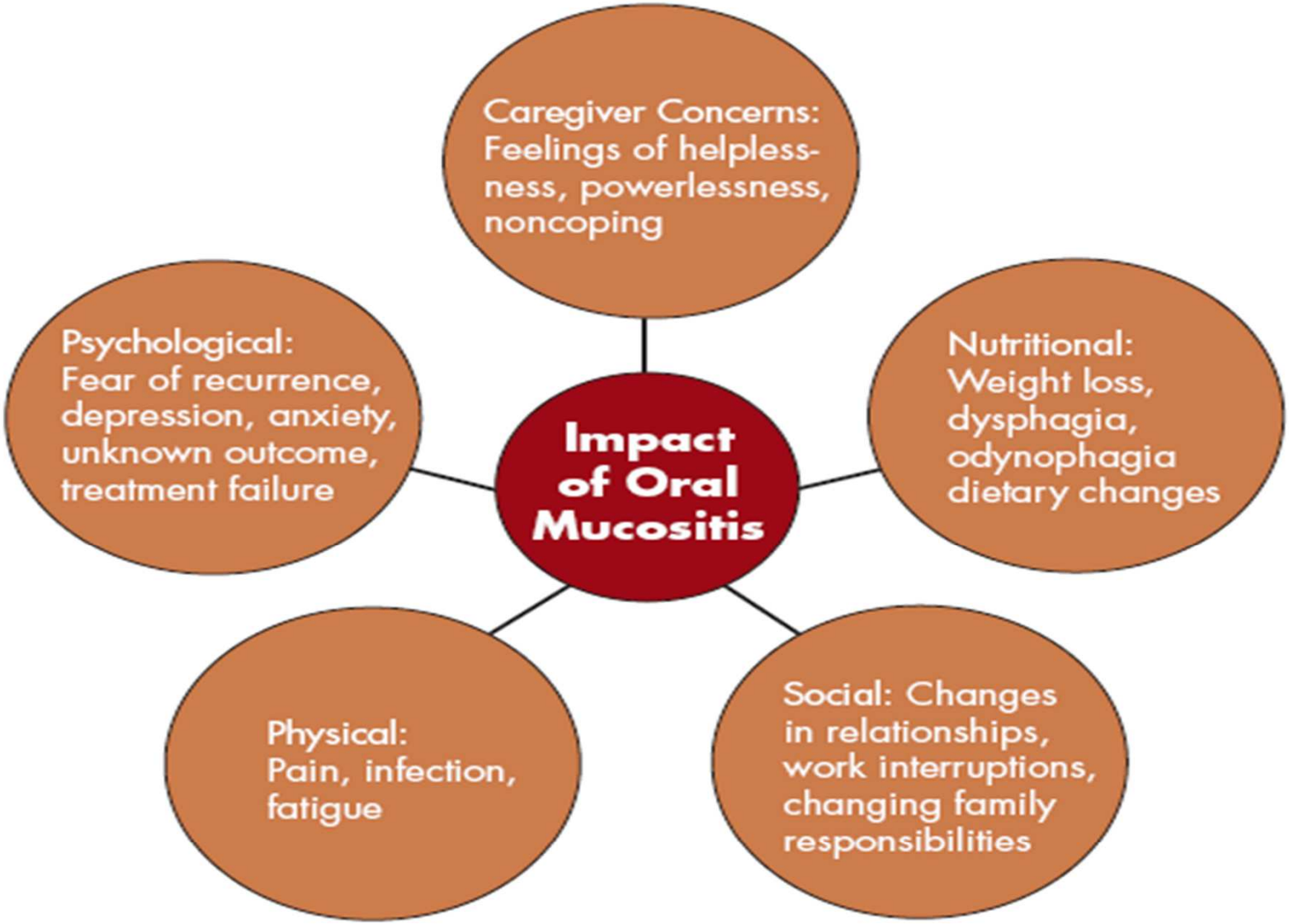


Figure 3: Impact of Oral Mucositis—OM induced by chemotherapy and/or radiotherapy can have a negative impact on patients physically, nutritionally, psychologically, and socially, and caregivers may need support also.

Table 3: Scales Used to Assess OM

	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
WHO	None	Soreness with erythema	Erythema, ulcers, can eat solids	Ulcers, liquid diet only	Alimentation not possible
RTOG	None	Erythema of mucosa	Patchy reaction <1.5 cm, noncontiguous	Confluent reaction >1.5 cm, contiguous	Necrosis or deep ulceration, ± bleeding
NCI CTC	None	Painless ulcers, erythema, or mild soreness in absence of lesions	Painful erythema, edema, or ulcers, but can eat/swallow	Painful erythema, edema, or ulcers requiring IV hydration	Severe ulcerations or requires parenteral/enteral nutritional support or prophylactic intubation
OMAS Ulceration/ erythema	Normal Normal	Not severe <1 sq cm	Severe 1-3 sq cm	NA >3 sq cm	NA NA

OM: oral mucositis; WHO: World Health Organization; RTOG: Radiation Therapy Oncology Group; ±: with or without; NCI CTC: National Cancer Institute Common Toxicity Criteria; NA: not applicable.
Source: References 8-10, 12.

Oral mucositis stages

- Thick, sticky saliva (mucus)
- Mucus – thicker, stringy and sticky like mucus
- Spit frequently because of mucus build up, irritating especially at night
- Mouth rinse – half a teaspoon of salt and baking soda each in 1 L of water
- Nebulizer before bedtime

STORY OF SALIVA

Functions of Saliva in Healthy Mouths

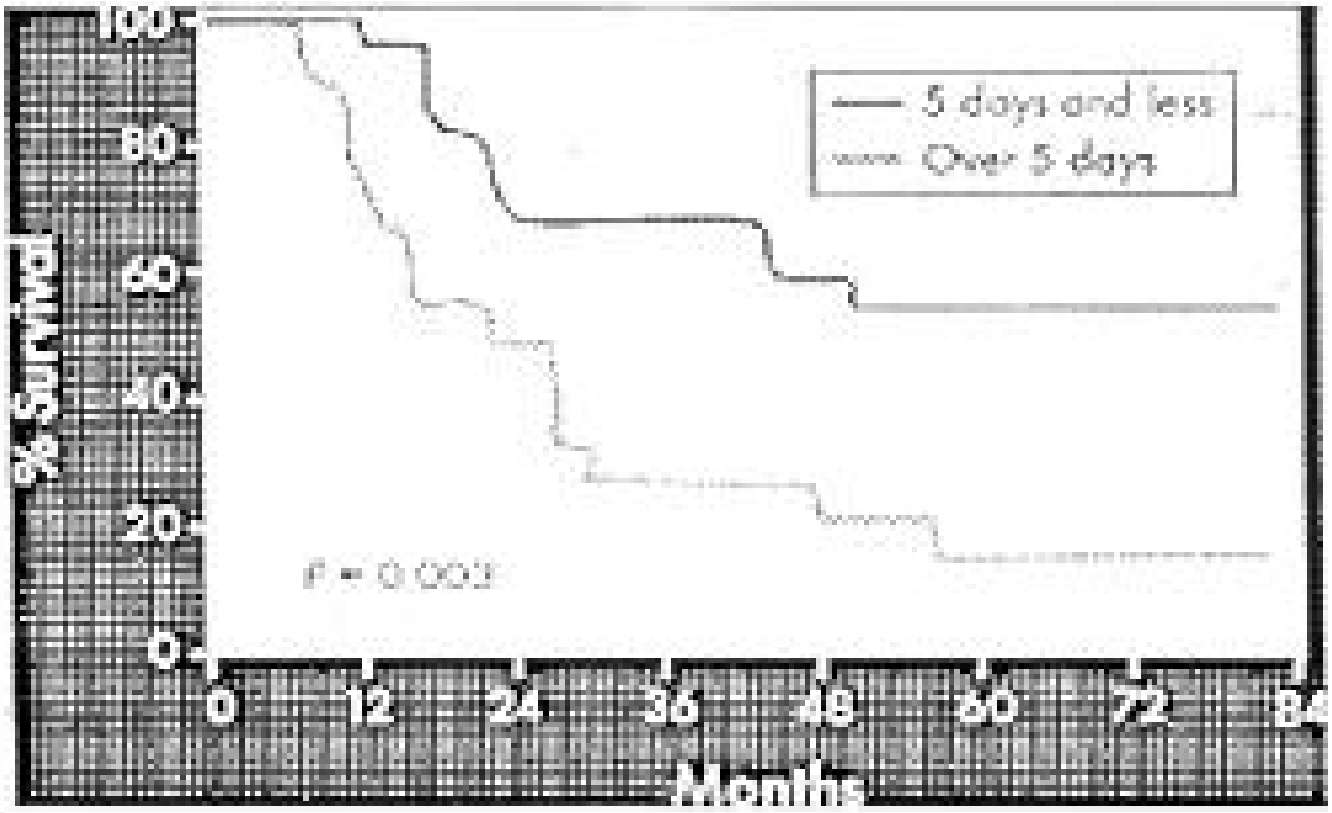
- Protects teeth from acids and dilutes sugars.
- Washes your teeth and protects them from decay.
- Protects the oral mucosa from injury and infection.
- Enables cheeks and tongue to slide easily over teeth in smiling, talking, chewing and swallowing.
- Moistens food, making it easier to move around in the mouth.
- Fights oral infections with antibiotics and antimicrobials.

With Reduced, Thickened or No Saliva

- Rampant tooth decay
- Mucosa more easily injured
- Oral and systemic infections more common
- Increased difficulty in chewing, swallowing, speaking and smiling

General Management of stomatitis

- Gargles and hygiene
- Analgesics and antiinflammatory
- Local anesthetics
- Local application gels
- Nasogastric feeding
- Gaps in treatment till stomatitis decreases
- Parenteral feeding

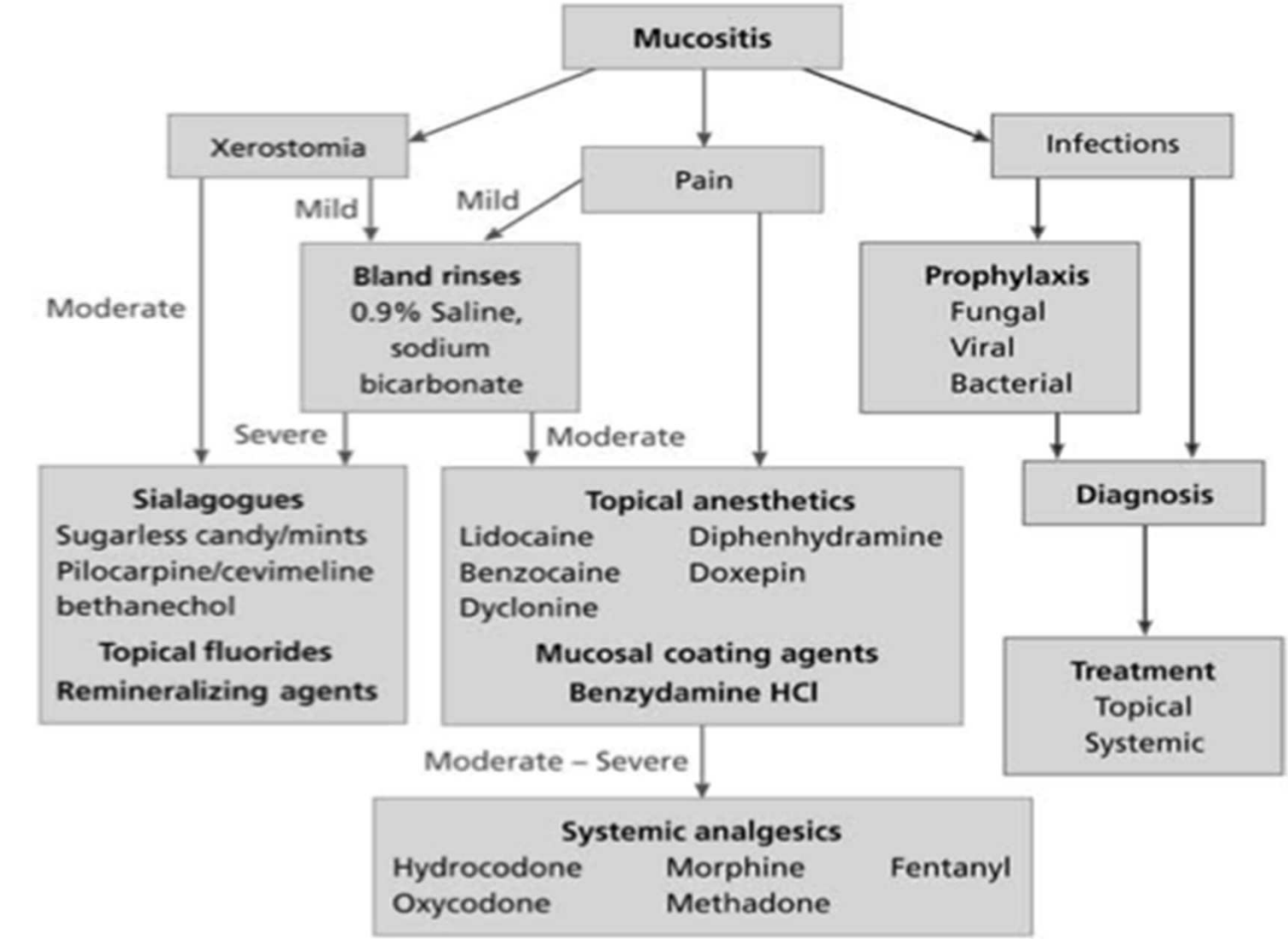


Gaps in the treatment lead to increase in the overall treatment time and this leads to poor results.

GCP-DIETICIAN'S ADVICE

Table 6. Diet in oral mucositis.

Diet that is typically acceptable	Things to avoid	Habits to avoid
Liquids	Rough food (potato chips, crisps, toast)	Smoking
Purees	Spices	Alcohol
Ice	Salt	
Custards	Acidic fruit (grapefruit, lemon, orange)	
Nonacidic fruits (banana, mango, melon, peach)		
Soft cheeses		
Eggs		


Mucositis
Xerostomia
Pain
Infections
Mild
Mild
Moderate
Bland rinses
0.9% Saline,
sodium
bicarbonate
Prophylaxis
Fungal
Viral
Bacterial
Severe
Moderate
Sialagogues
Sugarless candy/mints
Pilocarpine/cevimeline
bethanechol
Topical fluorides
Remineralizing agents
Topical anesthetics
Lidocaine
Benzocaine
Dyclonine
Diphenhydramine
Doxepin
Mucosal coating agents
Benzydamine HCl
Diagnosis
Treatment
Topical
Systemic
Moderate – Severe
Systemic analgesics
Hydrocodone
Oxycodone
Morphine
Methadone
Fentanyl

The effectiveness of commonly used mouthwashes for the prevention of chemotherapy-induced oral mucositis: a systematic review.

Daily chlorhexidine mouthwash is often recommended for preventing chemotherapy-induced OM.

Povidone-iodine, NaCl 0.9%, water salt soda solution mouthwash are also recommended.

Based on study quality, 3/5 RCTS were included in a meta-analysis.

The results failed to detect any beneficial effects of chlorhexidine as compared with sterile water, or NaCl 0.9%.

Patients complained about negative side-effects of chlorhexidine, including teeth discoloration and alteration of taste in 2/5 on chlorhexidine.

The severity of OM was shown to be reduced by 30% using a povidone-iodine mouthwash as compared with sterile water in a single RCT.

These results do not support the use of chlorhexidine mouthwash to prevent oral mucositis.

Eur J Cancer Care (Engl). 2006 Dec;15(5):431-9.

Randomized Trial Of A Chlorhexidine Mouthwash For Alleviation Of Radiation-induced Mucositis.

CONCLUSION In contrast to the prestudy hypothesis that a chlorhexidine mouthwash might provide benefit for patients receiving radiation therapy to the oral mucosa, this study provides strong evidence suggesting that ***a chlorhexidine mouthwash is detrimental in this clinical situation***.

Care of the Mouth During Cancer Treatment

- Rinse two-six times daily with half a teaspoon of baking soda dissolved in one quart water.
- If thrush becomes a problem, ask for sugar-free anti-fungal medications, rinses or lozenges.
- Dentures – either at end or proper care

Care of the Mouth During Cancer Treatment

- **Benzydamine oral rinse:** 15ml 4-8 times a day reduces frequency and severity of ulcerative oral lesions and decreases pain in oral induced mucositis
- Relieves pain when eating.
- Swish 10 minutes before meals.
- In extreme cases of pain, morphine may be prescribed.

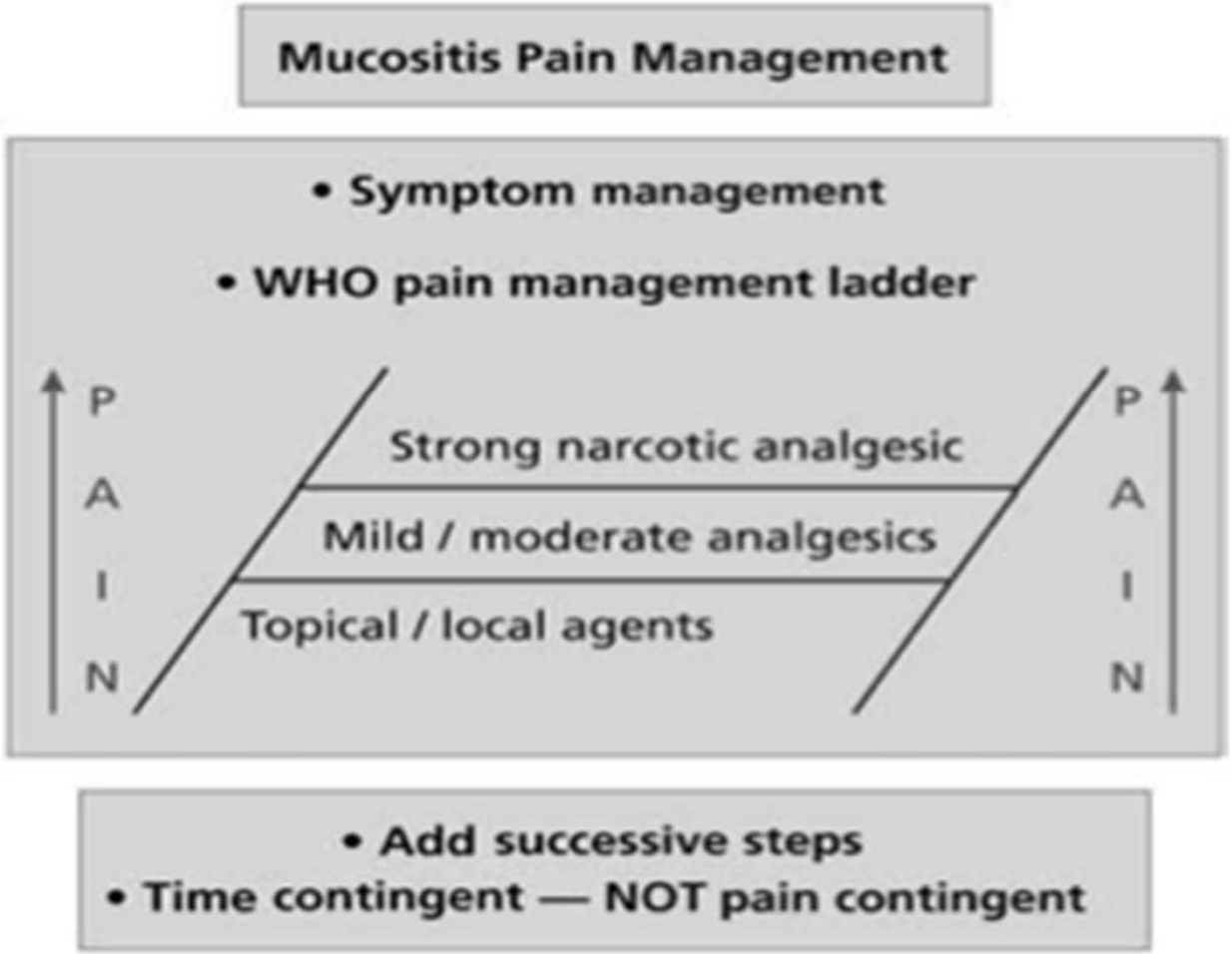


Figure 2 Step therapy for pain management in mucositis
Courtesy of Mark Schubert, DDS, MSD.
Abbreviation: WHO, World Health Organization.

Interventions For Preventing Oral Mucositis For Patients With Cancer Receiving Treatment.

Ten interventions, showed some statistically significant evidence of a benefit (albeit sometimes weak) for either **preventing or reducing** the severity of mucositis, compared to either a placebo or no treatment.

– aloe vera, amifostine, cryotherapy, granulocyte-colony stimulating factor (G-CSF), intravenous glutamine, honey, **keratinocyte growth factor**, polymixin/tobramycin/amphotericin (PTA) antibiotic pastille/paste and sucralfate.

Cochrane Database of Systematic Reviews 2011, Issue 4
Art. No.: CD000978. DOI: 10.1002/14651858.CD000978.pub5.

GCRI

Comparison of granulocyte-macrophage colony-stimulating factor and sucralfate mouthwashes in the prevention of radiation-induced mucositis: a double-blind prospective randomized phase III study

- GM-CSF mouthwashes may be moderately more effective than sucralfate mouthwashes in preventing radiation-induced mucositis and mucositis-related pain, and their use may lead to less frequent RT course interruptions from mucositis. The present findings need to be confirmed before adopting GM-CSF mouthwashes in routine clinical use.

International Journal of Radiation Oncology*Biology*Physics
Volume 54, Issue 2, 1 October 2002, Pages 479–485

Supersaturated Calcium Phosphate

- Mouth rinse that is rich in both calcium and phosphate ions
- Designed to moisten, lubricate and clean the oral cavity including the mouth, tongue and oropharynx
- Making food easier to swallow
- Helps maintain the integrity of the oral cavity
- Mouth rinse that is scientifically proven to help prevent, reduce the duration and the pain of oral mucositis

GCRI

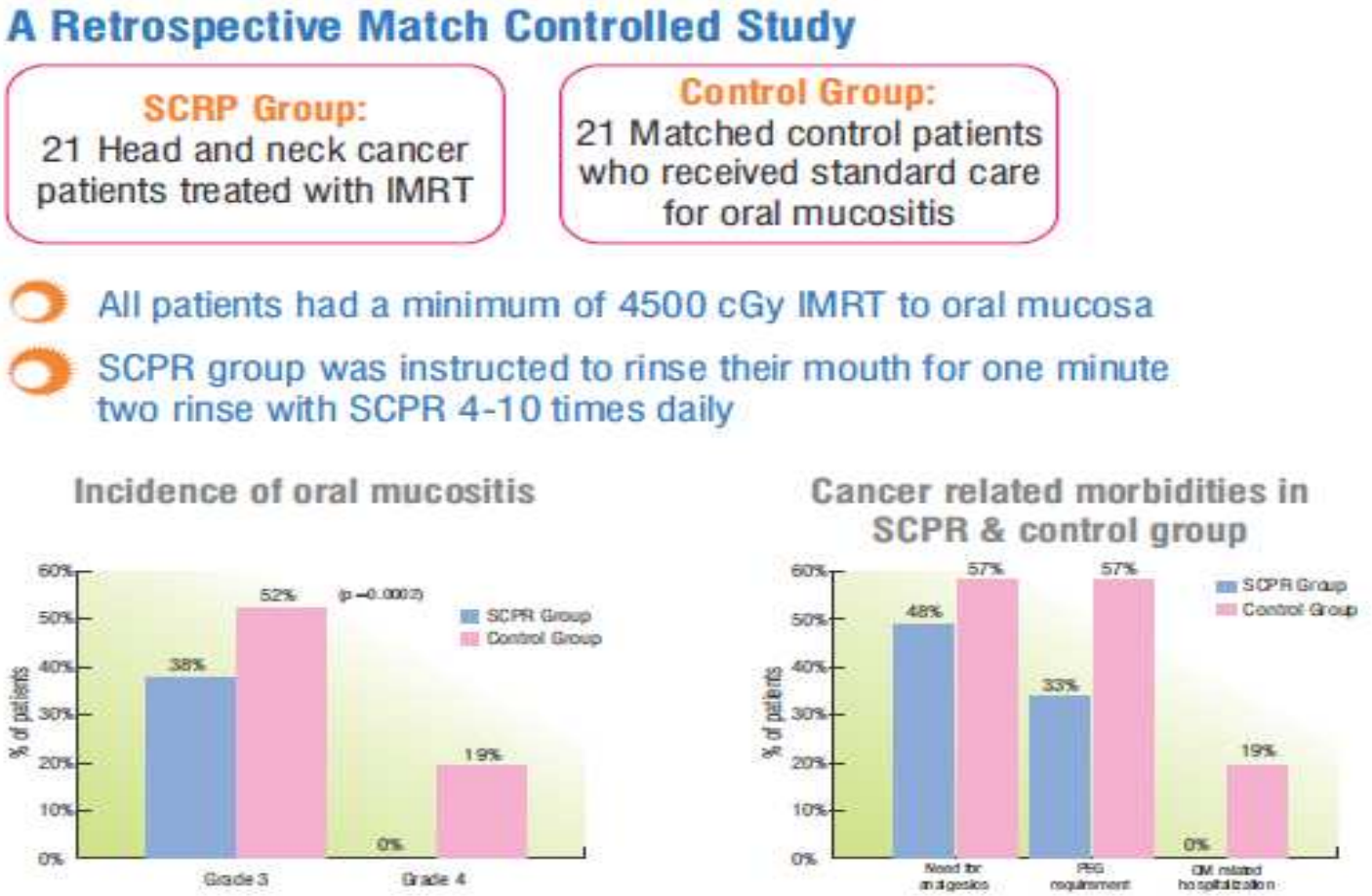
Supersaturated Calcium Phosphate

- **Reduction of painful oral mucositis by supersaturated calcium phosphate oral rinse in head and neck cancer patients receiving chemotherapy and radiation**

- *Haas M et al. 50th ASTRO congress 2008; abstract 2530*

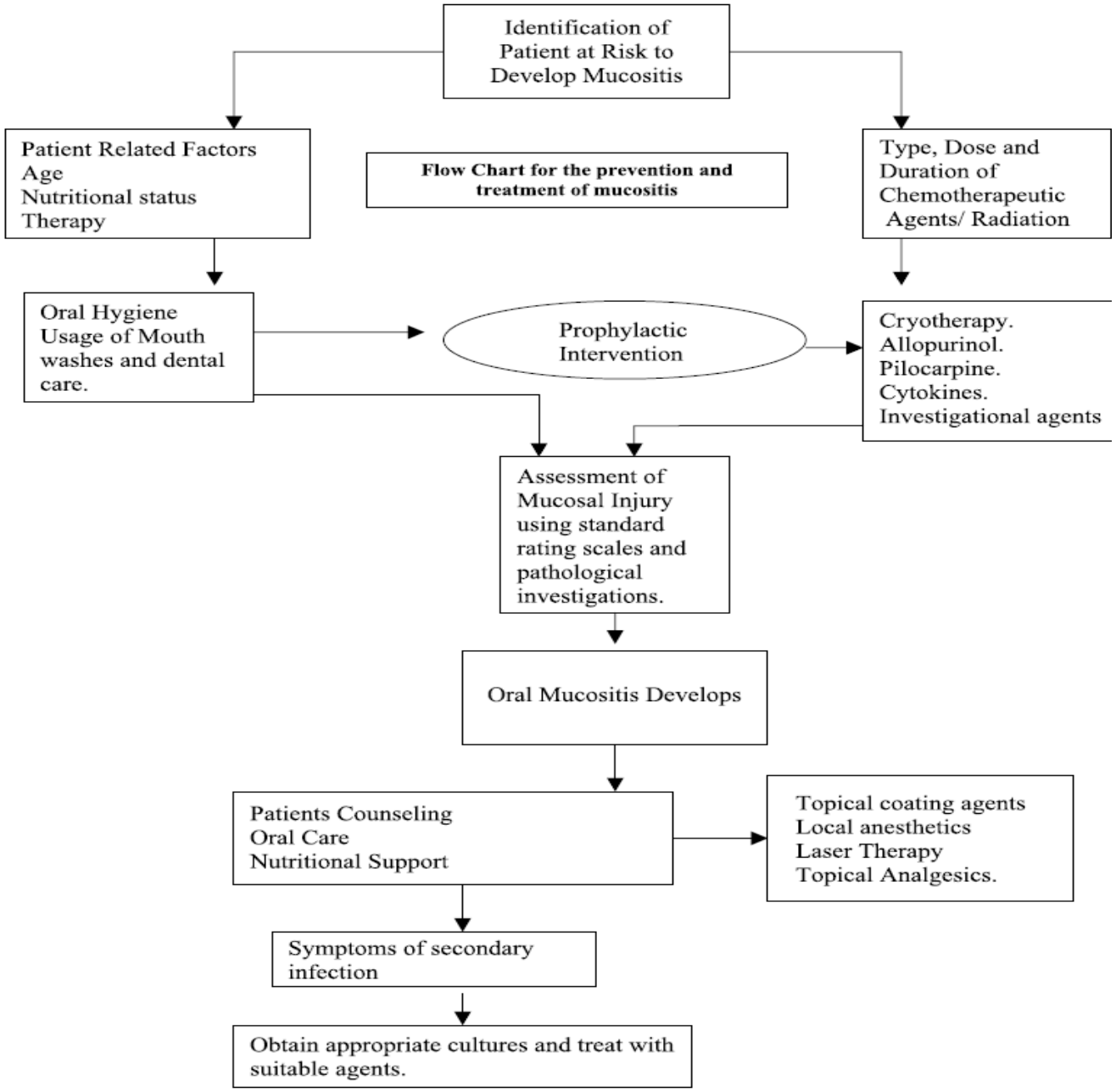
Supersaturated Calcium Phosphate

- **A Retrospective Match Controlled study of Supersturated Calcium Phosphate Rinse vs. Supportive Care for Radiation Induced Mucositis**
  Curtis et al. Journal of cancer therapy; 2012, 3, 630-636



- **Conclusion:** The reduction in the occurrence of OM has been proven to be statistically significant in SCPR treated group of patients

Flow chart : Management



Conclusions for Mucositis

No clear guidelines for prevention of oral mucositis with CT+RT as on today

Constant Oral rinsing &salivary substitutes, proper nutrition and supportive care, taking care of infection and good use of opoid analgesics and steroids specially in last two weeks specially is the key to phase off the menace from so called and mostly ignored symptom - mucositis.

Mucositis affects outcomes in many ways and increases workload and requires adaptation requiring replanning, admissions, treatment delays with incomplete treatments, increasing costs directly or indirectly & affecting outcomes.

Multidisciplinary team approach by physiotherapist ,occupational therapist, dietician, Pscychologist, pain management team with oral care specialists is the need.

Oral Care Protocols should be strictly implemented with the institutional guidelines and changed as per the needs

Grading of Early skin reactions

- Grade 0 — No change
- Grade I — Follicular, faint/dull erythema, Epilation, Dry desquamation, Decreased sweating
- Grade II — Tender or bright erythema Patchy Moist desquamation Moderate edema
- Grade III — Confluent moist desquamation
- Grade IV — Ulceration, hemorrhage, Necrosis

Care to be taken during RT

- Gentle washing
- Avoidance of friction
- Loose cotton clothing
- Avoid wet shaving
- Protect from sun, irritants and extremes of temperature
- Abstain from smoking (damage caused by cutaneous vasoconstriction)

Management Of Skin reactions

- Keep part open in air if possible
- Use of gentian violet or povidone iodine solution or spray
- Aqueous creams like hydro-gels and hydrocolloids
- Steroid and antibiotic combination creams
- Homeopathic creams (e.g. Calamine) have been used for treatment of acute skin reactions in many centers

Dysgeusia

- abnormal or impaired sense of taste, an unpleasant alteration of taste sensation, or a distortion or perversion of the sense of taste.
- Zinc gluconate and amifostine not routinely recommended
- Dietary and educational counseling

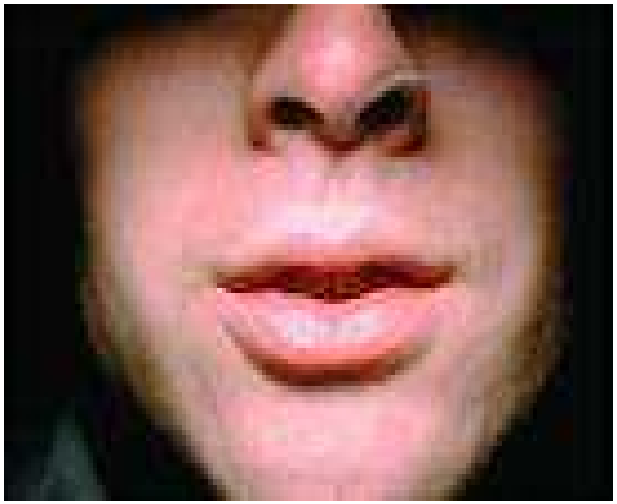
Fungal and Viral infections

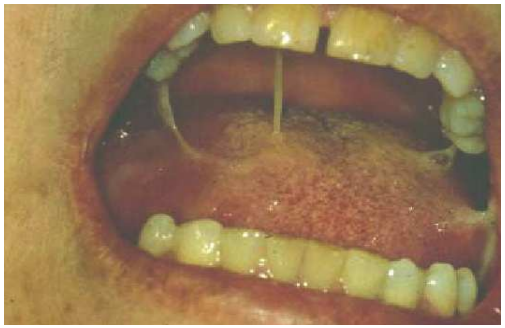
Hoarseness

Dysphagia – nutritional deficiences

Malaise, Nausea, Bad breath (changes in saliva, improper hygiene, infection)

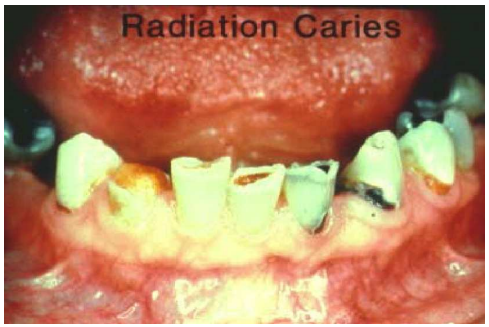
DRY MOUTH





Xerostomia can take form of thick saliva

Or total lack of salivation



Radiation Caries

History & Symptoms of Dry Mouth

History: the subjective complaint of dry mouth

1. **Feel dry mouth while eating**
2. **Need Frequent Sips of Liquids While Eating**
3. **Difficulties in Swallowing Food**

Symptoms

- **Thirst**
- **Difficulty eating, speaking, wearing denture**
- **Need sips of water while eating**
- **Burning sensation of mouth**
- **Abnormal taste**
- **Cracked Lips & Soreness of Corners of Mouth**

Definition: Salivary gland hypofunction is a decrease in salivary secretion, with pathological low saliva secretion as ≤ 0.1 ml/min for unstimulated whole salivary flow and ≤ 0.5 ml/min for stimulated whole salivary flow.

-

Dry Mouth or Xerostomia Can Affect

- Ability to eat, swallow, speak and smile
- Nourishment/food choices
- Ulcerations of oral tissues
- Tooth decay

Tips to Alleviate Dry Mouth

- Drink frequent sips of water
- Suck ice chips
- Use sugar-free gum, mints and hard candies
- Avoid alcoholic drinks
- Moisturize lips
- Humidifier in home

Tips to Alleviate Dry Mouth

- Rinse at least twice daily with a half teaspoon baking soda dissolved in one cup of warm water.
- Ask for salivary substitutes
- Try mouthwash, toothpaste and chewing gum, found in the dental aisle, made especially for Dry Mouth.

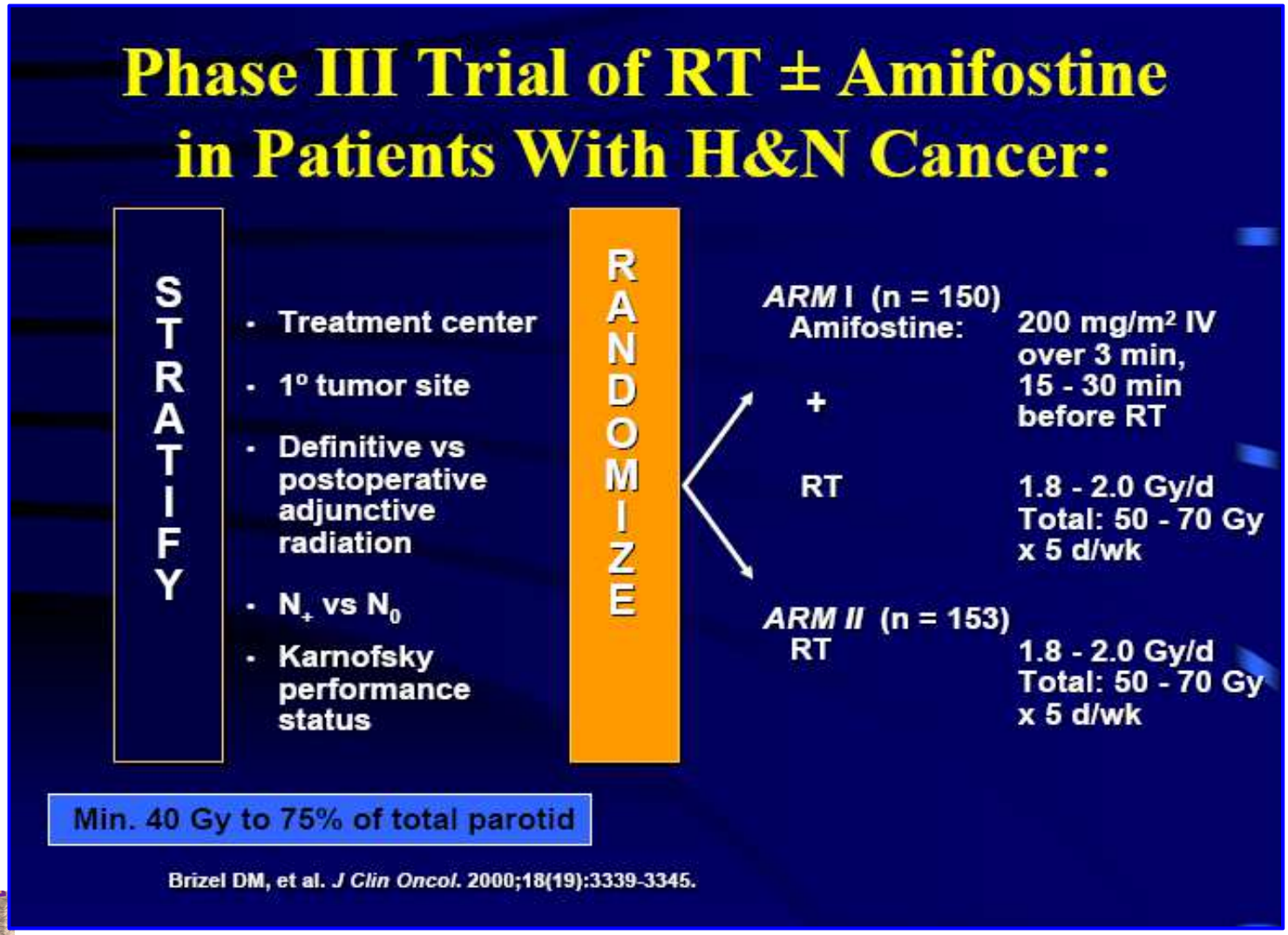
Tips to Alleviate Dry Mouth

- Take small bites, moist foods with gravy
- Chew slowly
- Sip liquids while eating

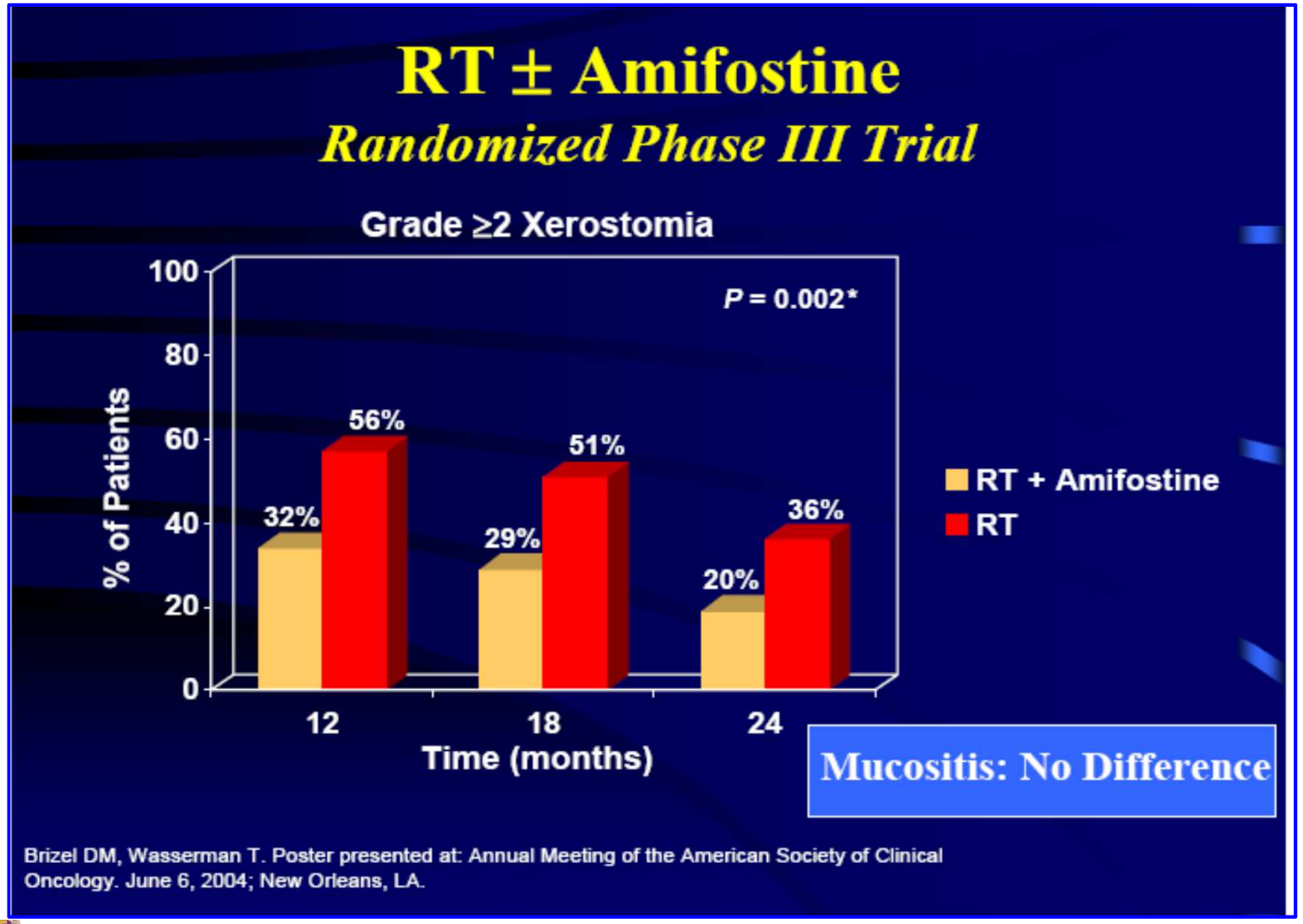
Tips to Combat Rampant Caries

- After eating, brush teeth with soft brush and small dab of fluoride toothpaste.
- Floss gently, yet thoroughly, between teeth once daily.
- Chew gum sweetened with xylitol 3-5 times a day for 3-5 minutes.
- Consider alternate anti-fungal regimens.

AMIFOSTINE-FREE RADICAL SCAVENGER



AMIFOSTINE



Brizel DM, Wasserman T. Poster presented at: Annual Meeting of the American Society of Clinical Oncology. June 6, 2004; New Orleans, LA.

MASCC & ISOO 2006

Table 1 Summary of recommendations for the development of guidelines related to the use of amifostine

Site of mucositis	Cancer treatment	References	Guideline
Oral Mucositis (stomatitis)	Head and neck (radiation)	[12]	No benefit: no guideline possible
	Head and neck (chemoradiation)	[2, 13, 24, 37, 41, 42]	Inconsistent benefit: no guideline possible
	Transplant	[7, 15, 16, 34, 35, 38]	Inconsistent benefit: no guideline possible
Esophagitis	Lung cancer (chemoradiation)	[1, 3, 4, 17, 22, 31, 43]	Amifostine should be recommended for the prevention of esophagitis (level of evidence III, grade of recommendation C)
Proctitis	Rectal carcinoma (radiation)	[5, 21, 26, 27]	Amifostine in a dose of at least 340 mg/m^2 should prevent proctitis in patients receiving standard dose radiotherapy (level of evidence III, grade of recommendation B)
	Colorectal carcinoma (chemotherapy)	[40]	Inconsistent benefit: no guideline possible
	Other pelvic cancers	[5, 23]	Inconsistent benefit: no guideline possible
	Intrarectal route	[8, 9]	Pilot studies: no guideline possible

ETHYOL-CONCLUDING REMARKS

- US FDA approved indication for ethyol use: ***Xerostomia*** prevention in the setting of ***RT alone.***
- Only small studies indicate effectiveness of ethyol in prevention of mucositis in concurrent chemoradiation setting.
- Ethyol use along with IMRT not yet adequately studied.

Pilocarpine: * A Muscarinic Receptor Agonist Available as 5 mg tab.

- Shown to improve symptoms of RT induced xerostomia

* A Maximum Dose of 30 mg/day in divided doses.

- Effects of Pilocarpine are usually immediate;

* In RT-induced Xerostomia, Pilocarpine can take up to 12 weeks to Produce Effects
* Increase in Saliva Production Generally Lasts 4 hrs

- Undesirable Side Effects of Pilocarpine: Perspiration, Flushing, Lacrimation, Urinary Frequency and GI Disturbances.

http://www.medscape.com/viewarticle/716205_print

Pilocarpine

- Pilocarpine Pills Useful in Increasing Saliva Flow & Providing Relief of Dry Mouth.

- Since Pilocarpine May Cause Fluctuations in the Blood Pressure or Heart Rate, the Patient Needs to be Closely Supervised

Xylitol Strengths & Limitations

When Salivary Function is Preserved,
Stimulation of Salivary Glands with Xylitol is Aimed to increase the Salivary output.

Naturally Xylitol/SST Would Work Only in Patients Whose (at least) Partial Salivary Function has been Conserved.

Saliva Substitute suitable Option for Patients With Damaged Salivary Function Due to Radiation Therapy

Sugar Vs Xylitol

- Sugars, when in mouth, stimulate Saliva Flow to flush the content
- Sugars Get Converted in Lactic Acid
- The Bacterial Colony Shifts to Acidophilic Bacteria
- Result: Erosion, Caries Formation

- Xylitol is Anti-Cariogenic
- It does not get degraded in Mouth by the Acidophilic Bacteria
- Being Sweeter, it Stimulates Salivation

What is Xylitol?

- Xylitol is a White Crystalline powder
- Synthesized in Germany, Known Since 1891
- Xylitol is a Sugar Alcohol Sweeter than Sucrose
- Xylitol Chemical Formula is $C_5H_{12}O_5$ (not 2:1)
- Glucose Chemical Formula is $C_6H_{12}O_6$ (2:1)
- In Classical Sense Xylitol is Not a Sugar

- Hence it is Not Metabolized like Sugars

This has Relevance to Sugars Versus Xylitol in Xerostomia & Overall Dental Care

Outcome versus Toxicity

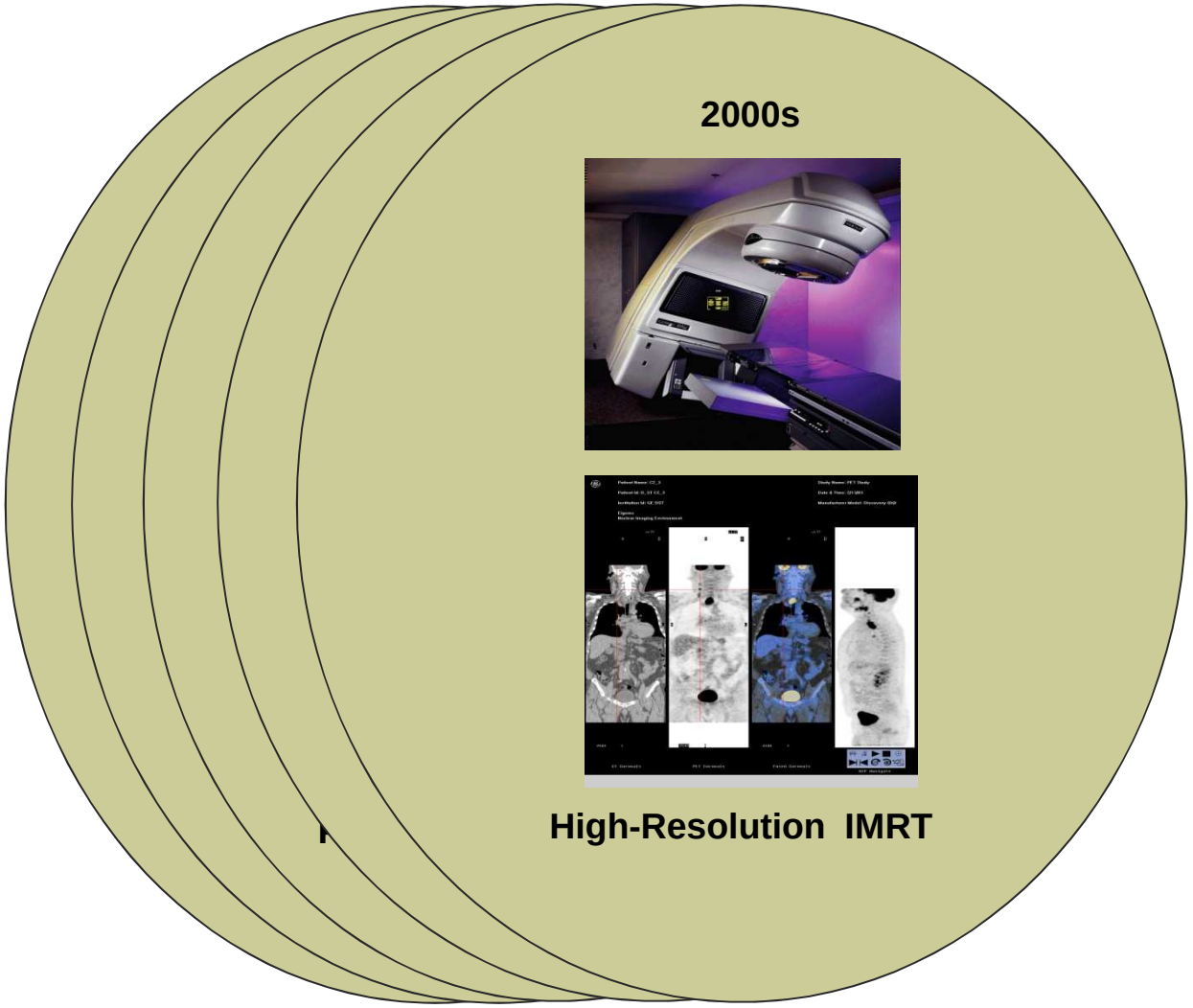
Toxicity

Local Control

Survival

What can improve the outcome
Without increase in complications

The Evolution of Radiation Therapy



I M R T - Target volume

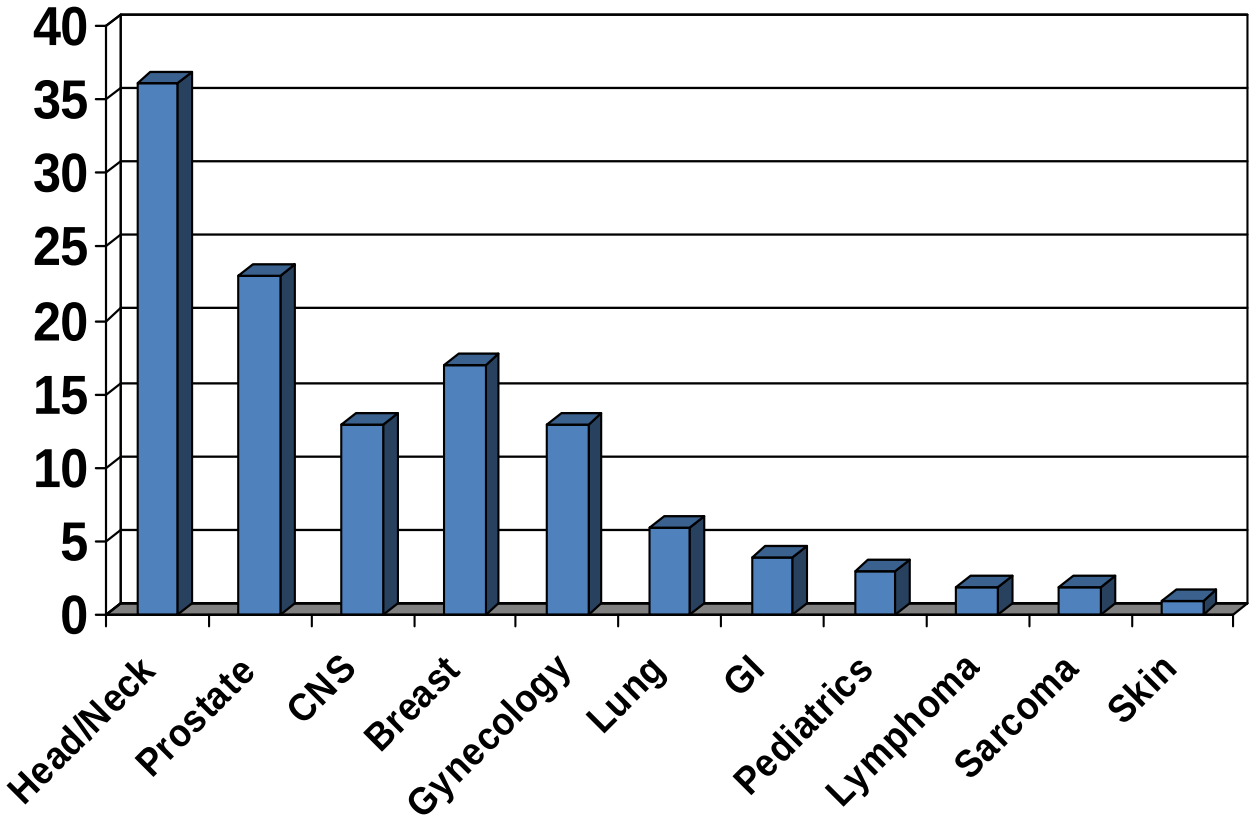
- IMRT requires a thorough understanding of target delineation in the complex H&N

- IMRT is a process
  - Planning
  - Information Transfer
  - Delivery
  - Verification

- IMRT allows you to customize your treatment delivery based on a specific planning objective

GCRI

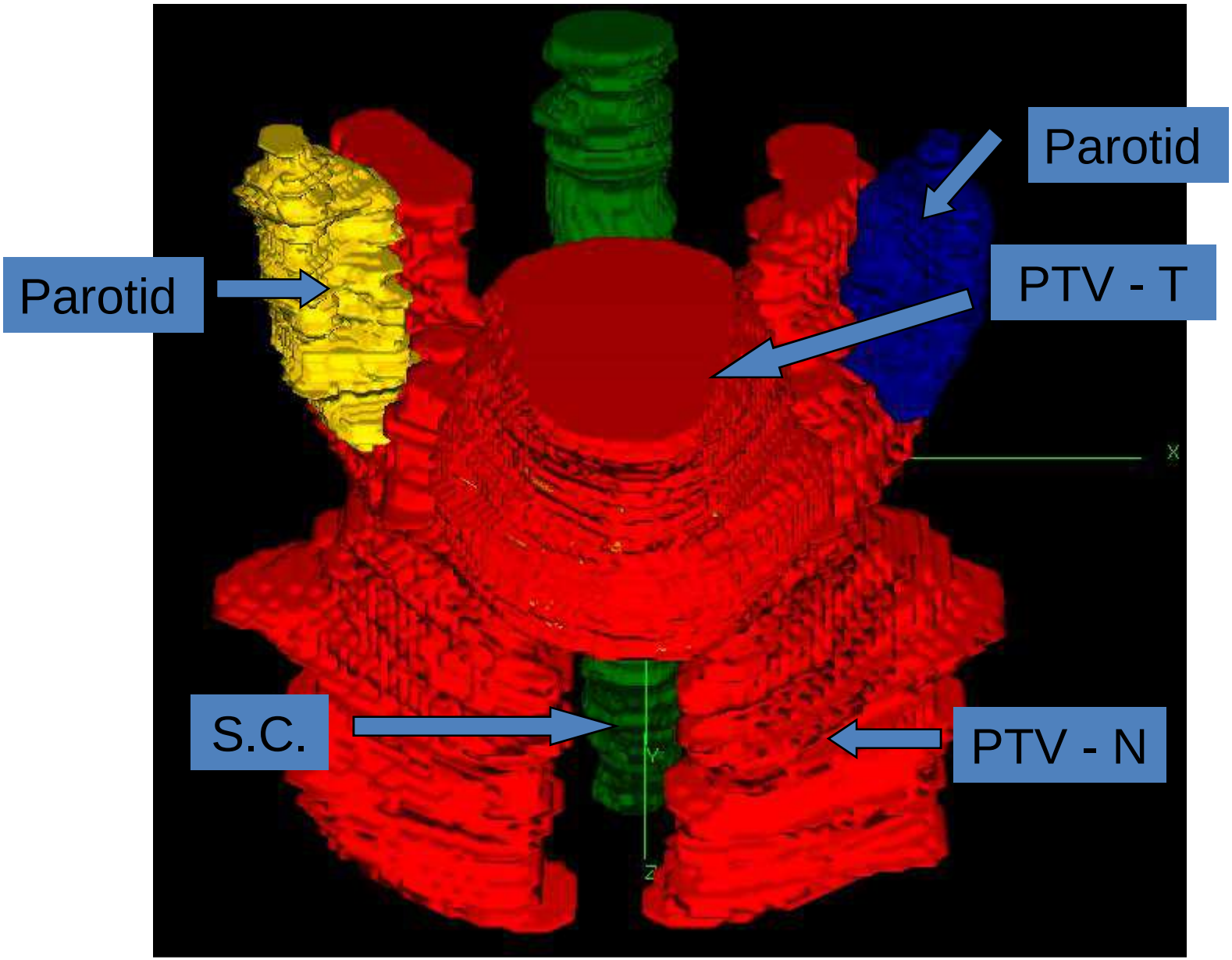
IMRT Clinical Studies



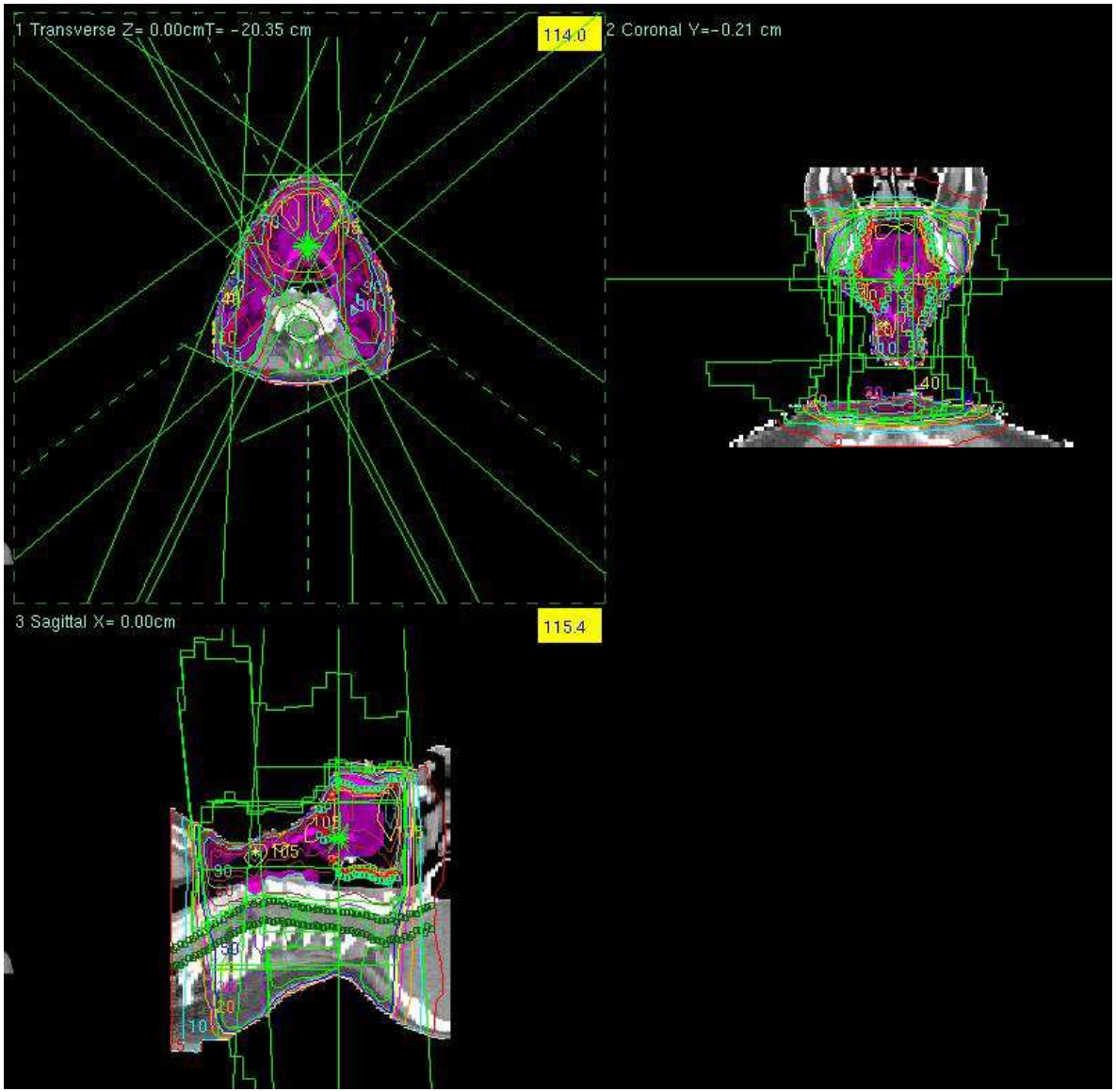
August 2002 Review of the Literature

Arno Mundt MD, University of Chicago

Ca Tongue



Isodose – Ca Tongue

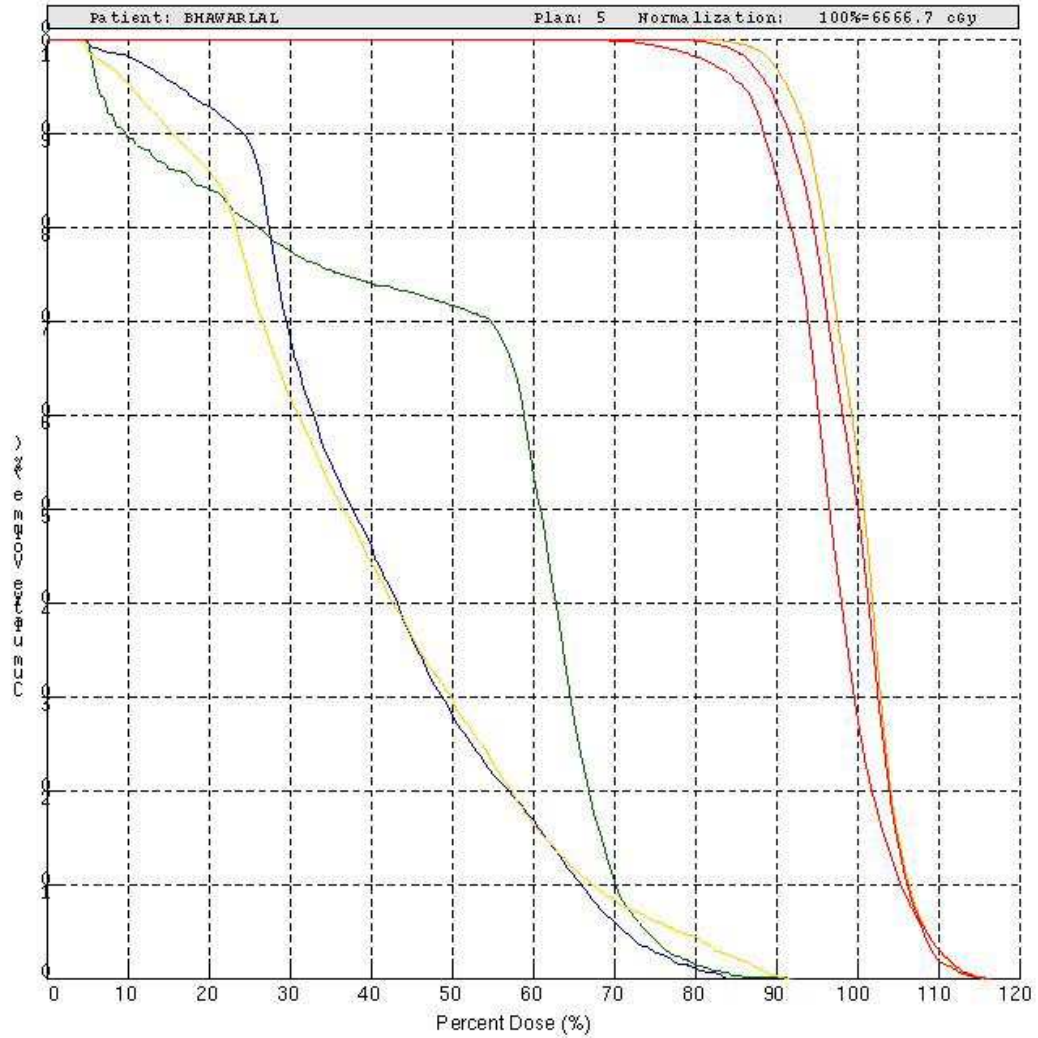


DVH

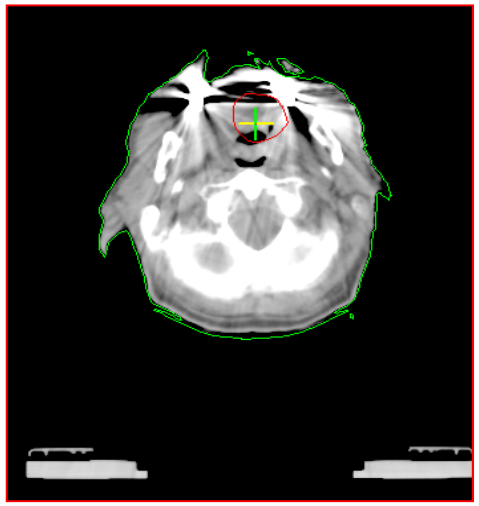
PrecisePLAN Release 2.11 - 476.01 Page 1 of 1 CPU ID: 1762690814

Patient ID	*b-23394*	Print Date	*11-DEC-2006 13:19*
Patient Name	*BHAWARLAL M/39 YRS*	Image Dataset	*BHAWARLAL*
Plan: 5	*5 beams, alligned coll, Np 2 cm ant.*	Plan Date	*12-OCT-2006 09:34*
Signature			

Key	Structure	Plan	Min Dose(%)	Max Dose(%)	Mean Dose(%)	Total Vol (cc)
	Spinal Cord	BHAWARLAL(05)	5	91	51	56.8
	Lt. Parotid	BHAWARLAL(05)	5	84	41	20.6
	Rt. Parotid	BHAWARLAL(05)	4	91	40	25.2
	CTV T	BHAWARLAL(05)	80	115	100	125.3
	PTV N	BHAWARLAL(05)	60	116	97	381.1
	PTV T	BHAWARLAL(05)	79	116	99	158.8

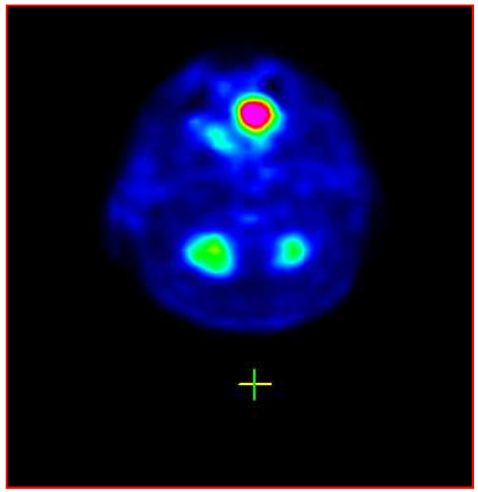


PET Scores over others!



CT, MRI

Anatomical imaging



PET is functional imaging

Active viable tumor

Newer Techniques in Radiation Therapy

IGRT

- Image Guided Radiation Therapy

- WHY ??
  - Set up error
  - Intra & Inter fraction organ movement
  - Daily verification
  - Accurate Treatment Delivery

Types of IGRT

- Portal Imaging
- EPID – Electronic Portal Imaging Device
- USG guided RT
- In room CT
- KV Cone beam CT
- MRI guided RT
- Tomotherapy

Tomotherapy

Cyber Knife

Trismus

- 2º to fibrosis of muscles, exacerbated by pre-XRT trauma (ie. Sx) TM joint
- impaired nutrition if severe
- very limited access for dental treatment

Physiotherapy for trismus

Edema

- 2º to decreased lymphatic drainage from fibrosis
- not usually a functional problem but cosmetic

Speech and language therapist

Radiation Caries

Craniofunctional disturbances

Osteoradionecrosis

- Inci- 5%, hypoxic injury, 0%- 3 weeks for healing after extraction
- ORN is characterized by a nonhealing area of exposed mandibular and maxillary bone of at least 6 months duration in a patient who has been treated with radiation therapy (RT) for cancer.
- Mandibular molar area most affected precipitated by dental extraction
- Higher doses of RT and concurrent CT increases risk
- Management depends on severity and range from local irrigation, antibiotic treatment, local sequestrectomy or wide segmental excision with or without reconstruction.
- Controversial role of HBOT - helps to promote vascularity, growth of new blood vessels, aiding healing process

HN SCC.. Are we ready to tame the bull?

The philosophy

- The success of HNC treatment only partly lies in improving the 5yrs survival.
- The true challenge lies in restoring function and anatomy.
- There cannot be any fixed protocol as all cases need tailormade treatment.
- While planning treatment …..

Combined modality treatment for Head and Neck Cancers: Acute Toxicities

- Acute Grade 3/4 toxicity can be as high as 90% with CT+RT
- Such high toxicities leads to treatment breaks offsetting benefit from aggressive Rx
- Many agents have seen to be promising: ice chips, benzydamine
- Many agents have seen to be disappointing: Sucralfate
- Efforts still needed to decrease acute mucosal reactions

Combined modality treatment for Head and Neck Cancers: Late Toxicities

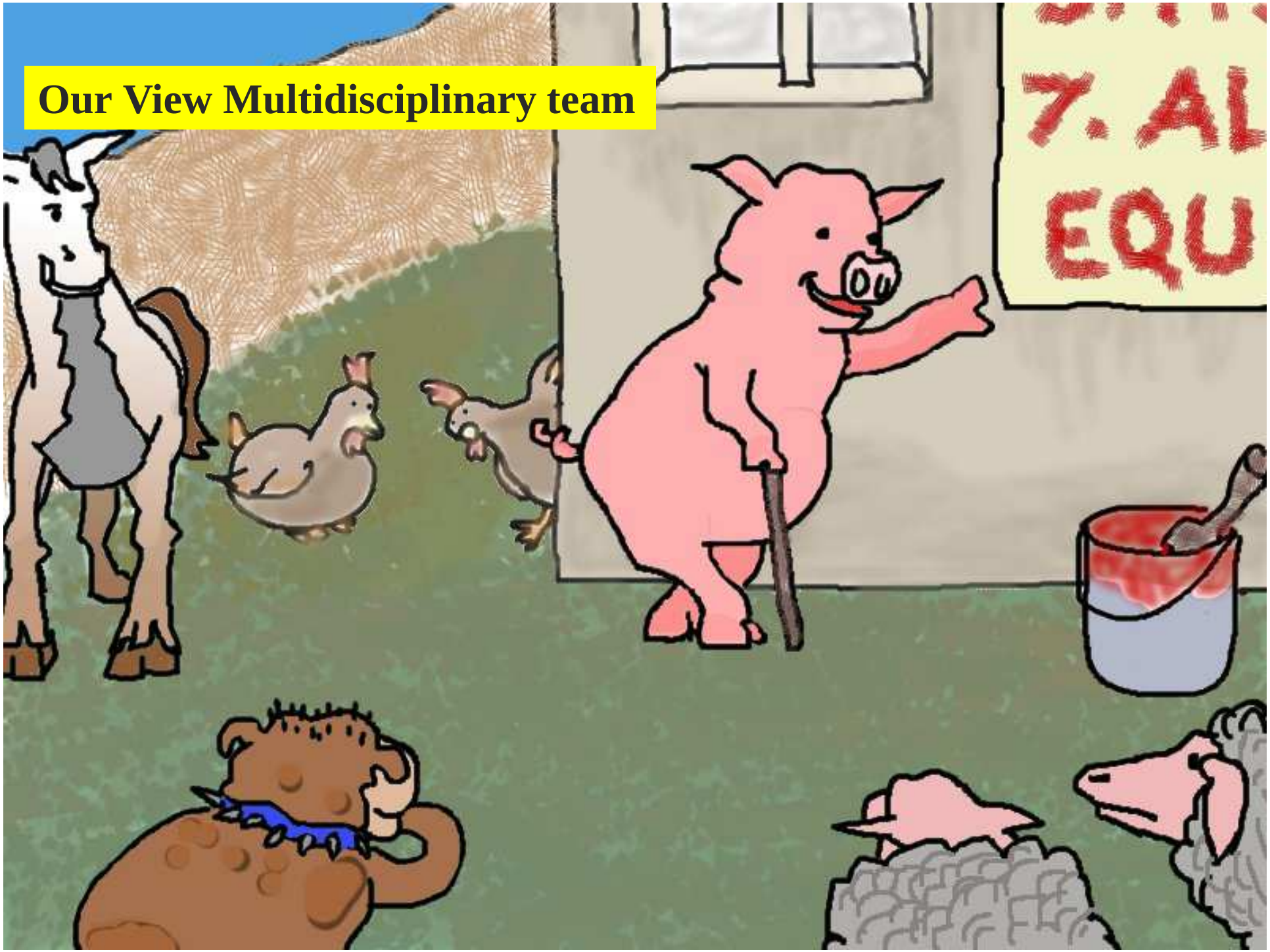
- Patients complaint of xerostomia
- Patients can be on long term feeding tube because of stricture formation
- Conformal techniques to reduce toxicity
- Dental care even after treatment –non invasive 3 and invasive 6 months

BASIC GUIDELINES

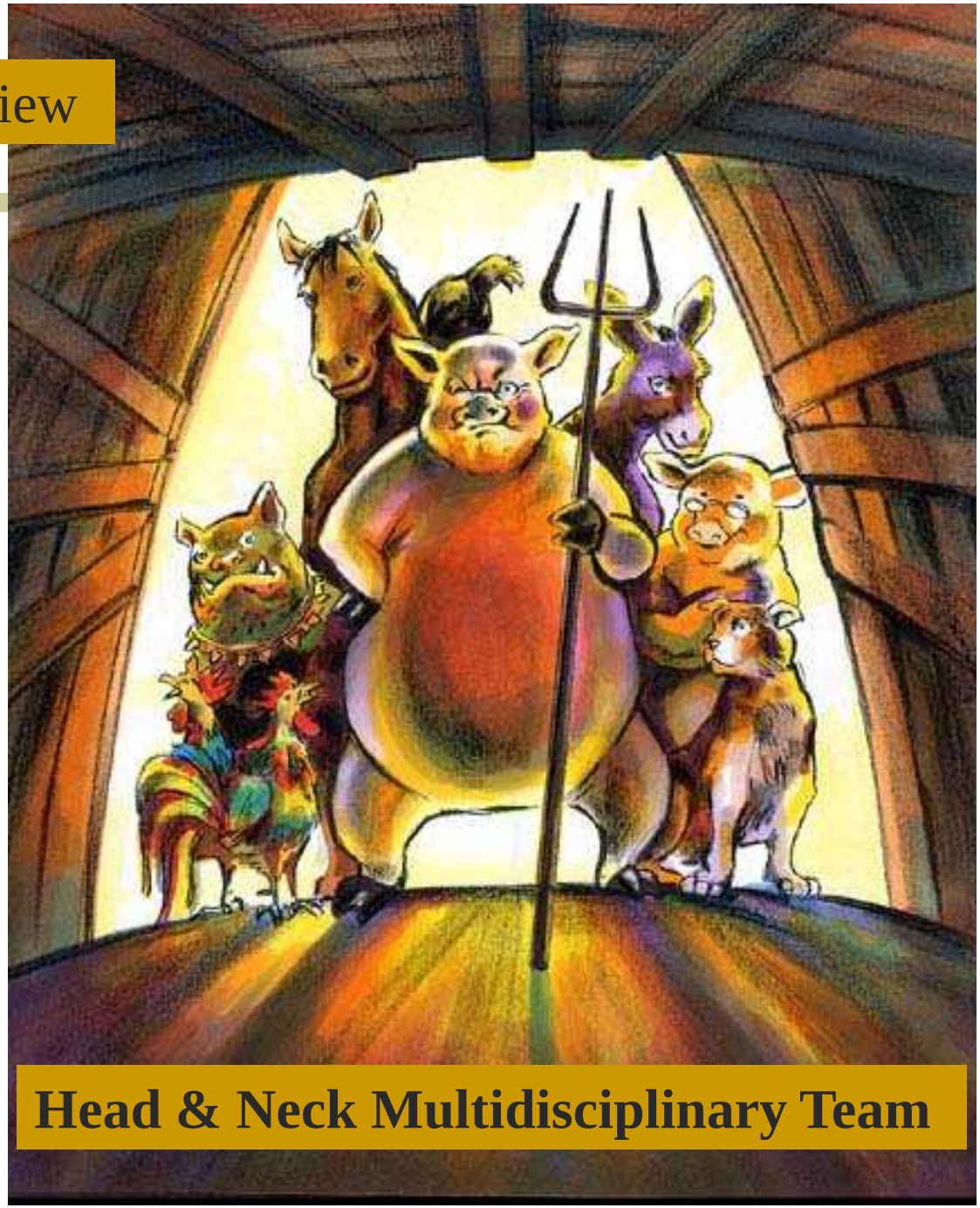
- ***PSYCHOEDUCATION:*** comprehensive patient education to prepare them for the expected course of events and methods to cope with them.
- Family and staff education.
- Regular & timely evaluation of these protocols.
- Quality improvement.

GOOD CLINICAL PRACTICE

- Use of validated tools to ***regularly assess*** oral pain & hygiene.
- ***Interdisciplinary approach*** (nurse, dentist, dietician, physician, dental hygienist).
- **Tumor board meetings**
- ***Dental professionals:*** vital before initiation of therapy as well as throughout treatment & follow up.
- Technique of RT
- **Benzydamine:** anti-inflammatory with analgesic, anesthetic & anti-microbial properties reduces frequency & severity of ulcerative lesions.
- Amifostine, Pilocarpine….
- Occupational Speech Therapist
- ***Palliation of acute oral pain:*** most important component of patient care.


Our View Multidisciplinary team
7. AL
EQU

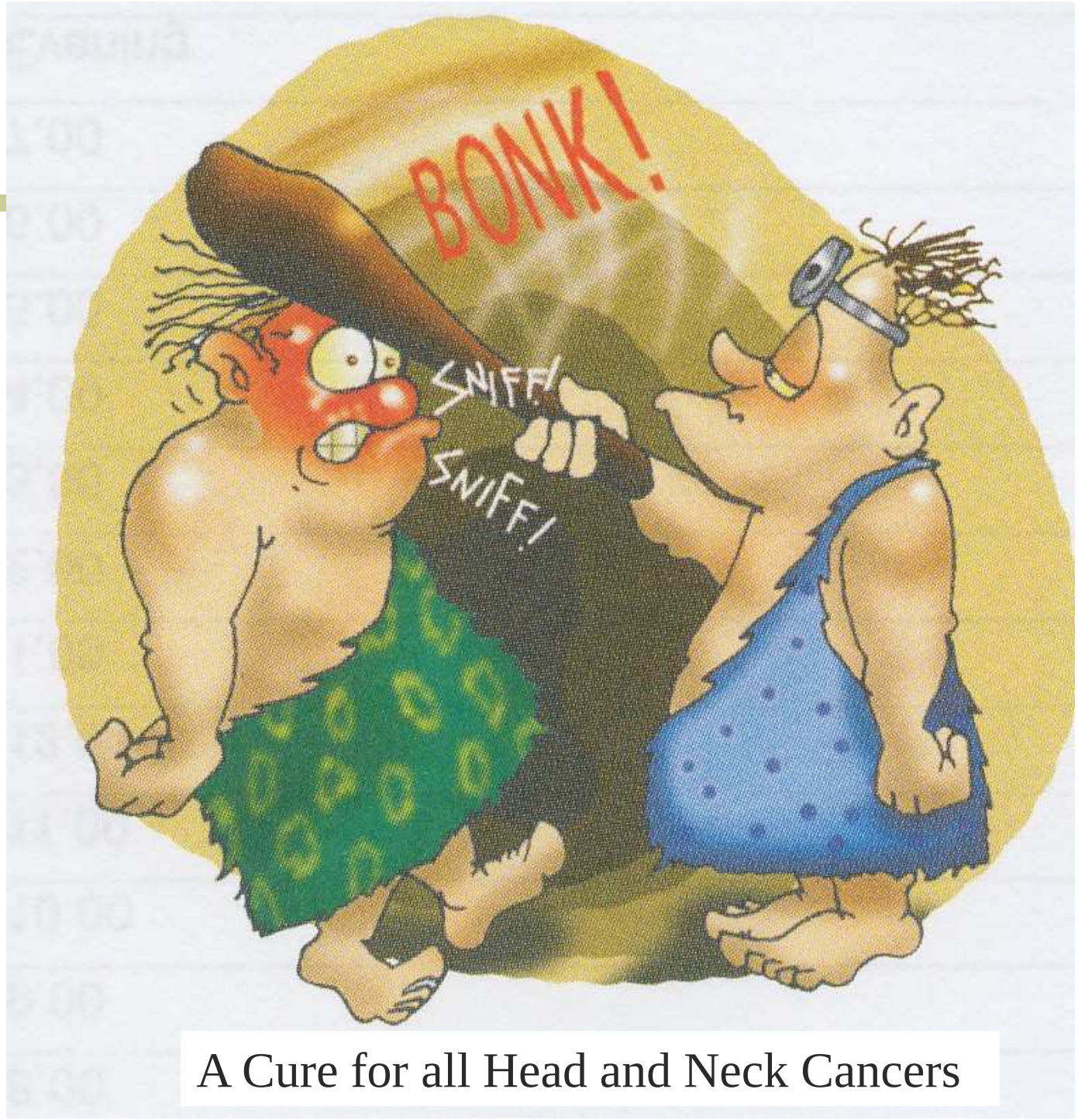
Patient's View



Head & Neck Multidisciplinary Team

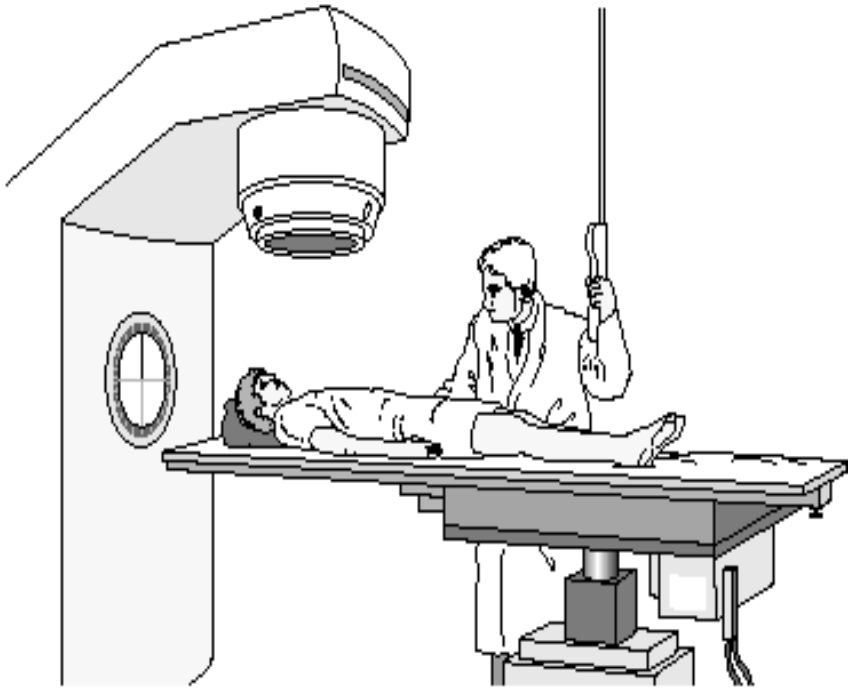
Table 1. Mucositis prevention therapies

1. Oral Hygiene
2. Infection Prevention
    a. Antimicrobial Lozenges
    b. Chlorhexidine
    c. Clindamicin
    d. Acyclovir, Valacyclovir, Famcyclovir
    e. Fluconazole, Clotrimazole, Nystatin
3. Anti-Inflammatory Agents
    a. Dinoprostone
    b. Misoprostol
    c. Prednisone
    d. Pentoxifylline
    e. Benzydamine
4. Reactive Oxygen Species Inhibitors
    a. Amifostine
    b. N-acetylcysteine
    c. Manganese Superoxide Dismutase
5. Salivary Function Modifiers
    a. Propantheline
    b. Pilocarpine
6. Azelastine
7. Cryotherapy
8. Glutamine
9. Coating Agents
    a. Sucralfate
    b. Hydroxypropylcellulose Gel
    c. Polyvinylpyrrolidone and Sodium Hyaluronate
10. Laser Therapy
11. Growth Factors
    a. Epidermal Growth Factor (EGF)
    b. Granulocyte Colony Stimulating Factor (GCSF)
    c. Granulocyte Macrophage Colony Stimulating Factor (GMCSF)
    d. Transforming Growth Factor Beta 3 (TGFb3)
    e. Interleukin 11 (IL-11)
    f. Fibroblast Growth Factors (FGFs)
        i. Keratinocyte Growth Factor 1 (KGF1, FGF7)
        ii. Fibroblast Growth Factor 10 (FGF10)
        iii. Fibroblast Growth Factor 20 (FGF20)



A Cure for all Head and Neck Cancers

Radiotherapy machine in use



"What matters is just not the machine, but also the man behind the machine."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