Radiotherapy in Head-Neck Cancer

Dr Jyotirup Goswami
Consultant Radiation Oncologist
Narayana Cancer Institute
Narayana Superspeciality Hospital, Howrah

Head-Neck Cancer Sites

- Oral cavity-lip, tongue, gum, cheek
- Oropharynx-Tonsil, base tongue, vallecula, soft palate
- Hypopharynx-pyriform sinus, post-cricoid, posterior pharyngeal wall
- Nasopharynx
- Larynx-glottis, supraglottis,subglottis
- Paranasal sinuses-maxilla,ethmoid, sphenoid

- Head-neck cancers are the commonest cancers overall in Indian males

- Oral cavity cancers are the commonest head-neck cancers in Indian males

Head and Neck Cancer: Multi-Disciplinary Team

- Oncologist: Radiation/Surgical/Medical
- Plastic Surgeon
- Dental Surgeon
- Nutritionist
- Nursing
- Occupational/ Speech therapist

Oral Cavity

- Ant 2/3 Tongue
- Lip
- Floor of mouth
- Buccal mucosa
- Retromolar trigone
- Gum/ Alveolus

Staging

American Joint Committee on Cancer (AJCC)
TNM Staging Classification for the Lip and Oral Cavity
(7th ed., 2010)
(Nonepithelial tumors such as those of lymphoid tissue, soft tissue, bone, and cartilage are not included)

Primary Tumor (T)

TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma *in situ*
T1	Tumor 2 cm or less in greatest dimension
T2	Tumor more than 2 cm but not more than 4 cm in greatest dimension
T3	Tumor more than 4 cm in greatest dimension
T4a	Moderately advanced local disease* (lip) Tumor invades through cortical bone, inferior alveolar nerve, floor of mouth, or skin of face, that is, chin or nose (oral cavity) Tumor invades adjacent structures (eg, through cortical bone [mandible or maxilla] into deep [extrinsic] muscle of tongue [genioglossus, hyoglossus, palatoglossus, and styloglossus], maxillary sinus, skin of face)
T4b	Very advanced local disease Tumor invades masticator space, pterygoid plates, or skull base and/or encases internal carotid artery

*Note: Superficial erosion alone of bone/tooth socket by gingival primary is not sufficient to classify a tumor as T4.

Regional Lymph Nodes (N)

NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in a single ipsilateral lymph node, 3 cm or less in greatest dimension
N2	Metastasis in a single ipsilateral lymph node, more than 3 cm but not more than 6 cm in greatest dimension; or in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension; or in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N2a	Metastasis in single ipsilateral lymph node more than 3 cm but not more than 6 cm in greatest dimension
N2b	Metastasis in multiple ipsilateral lymph nodes, none more than 6 cm in greatest dimension
N2c	Metastasis in bilateral or contralateral lymph nodes, none more than 6 cm in greatest dimension
N3	Metastasis in a lymph node more than 6 cm in greatest dimension

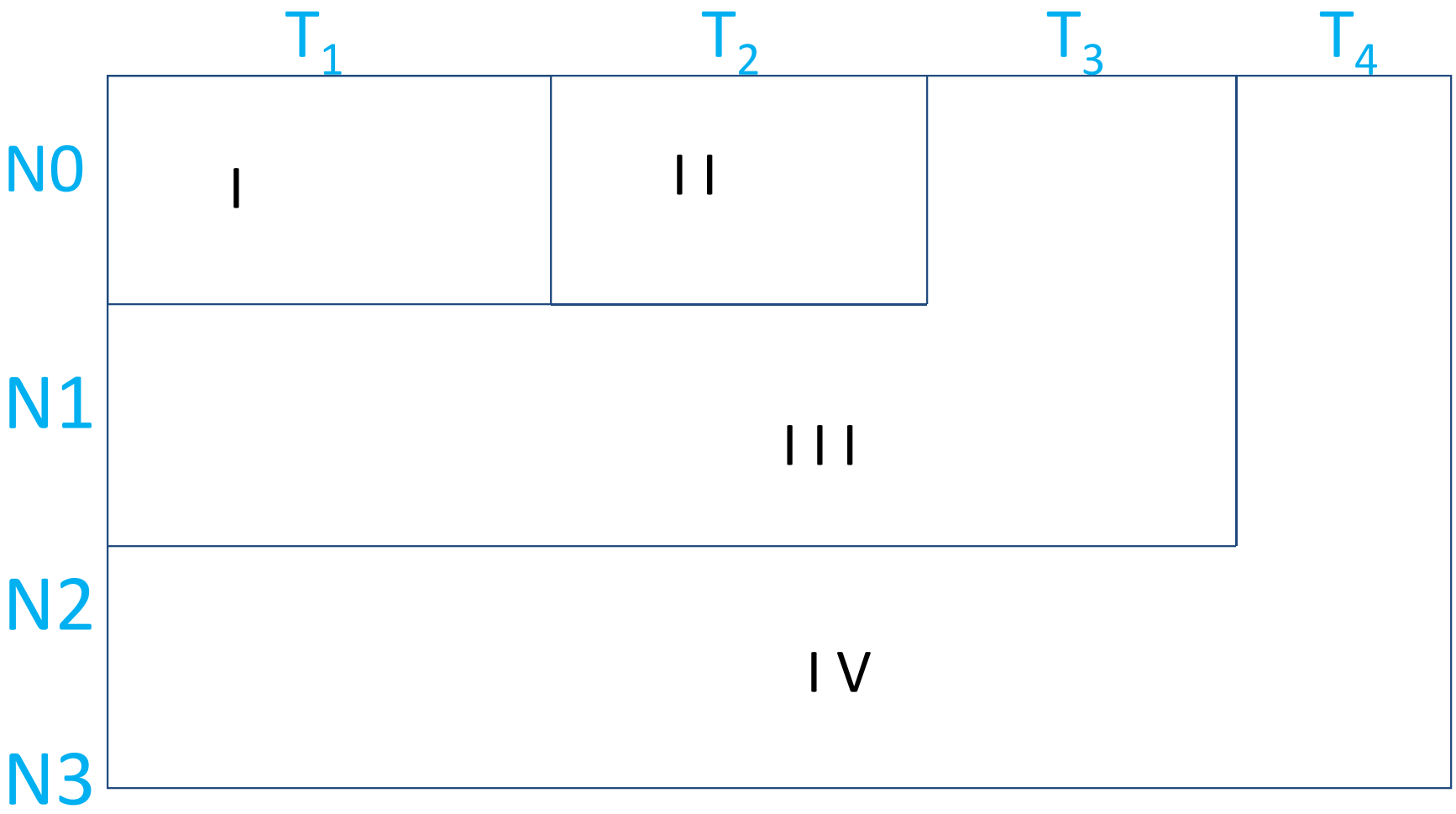
Distant Metastasis (M)

M0	No distant metastasis
M1	Distant metastasis

Histologic Grade (G)

GX	Grade cannot be assessed
G1	Well differentiated
G2	Moderately differentiated
G3	Poorly differentiated
G4	Undifferentiated

Stage Grouping



Oral Cavity: Treatment paradigm

- T1-T2,N0,M0: Radical surgery /Radical radiotherapy [EBRT/brachytherapy]
- T3,N+,M0: Radical surgery +post-operative radiotherapy/ concurrent chemoradiotherapy
- Surgery includes wide excision +/- plastic reconstruction + bilateral elective (N0) /therapeutic (N+) neck dissection

Control rates

- STAGE I 90%-95%
- STAGE II 60 – 70%
- STAGE III 30 – 40 %
- STAGE IV 20 – 30 %

Oropharynx, Nasopharynx, Hypopharynx: Treatment paradigm

- Very early stage (T1N0M0): Radical radiotherapy >LASER excision
- All others: Concurrent chemoradiotherapy

[EBRT 70Gy/35#/7 weeks + concurrent platinum-based chemotherapy (weekly/3-weekly)]

- Adjuvant/neoadjuvant chemotherapy (2-3 cycles) given in nasopharyngeal cancers.

Larynx: Treatment paradigm

- Early Glottic Cancer (T1-T2N0M0): Radical radiotherapy > LASER/ cordectomy
- Locally advanced disease: Concurrent chemoradiation
- T4a (laryngeal cartilage invaded): Total laryngectomy followed by post-operative RT.

Indications for RT

- Radical
- Post-operative
- Palliative

Radical RT doses

Radiotherapy Doses

- Primary Tumor and Enlarged Nodes → 66-70 Gy/33-35#/7 weeks
- Microscopic Disease → 50 Gy/25#/5 weeks

- Postoperative → 60 Gy/30#/6 weeks

Post-operative RT Indications

Postoperative Radiotherapy

- T3,T4 primary
- High grade
- Infiltration of soft tissues/ muscle/ bone
- Perineural invasion
- Lymphovascular emboli
- Cut margin positive/ close
- Thickness/ depth
- Recurrent disease
- Multiple nodes

Perinodal extension ⇒ Indication for post-op CT-RT

Palliative radiotherapy

Symptoms:

Bleeding

Fungation

Pain

Volume:

Gross disease with min margins

Dose:

30 Gy /10 #/ 2 weeks

Pre-Radiotherapy preparations

Pre-treatment assessment

- Single most important step in any planned brachytherapy procedure.
- Preferably EUA by multidisciplinary team in case of oral cavity cancer.
- CT and/or MRI scans accurately assess the primary tumor volume & integrity of adjacent structures like bone & cartilage.

Dental prophylaxis

- Evaluation of oral hygiene & dental status mandatory.
- OPG as and when required.
- Teeth with deep caries & poor peridontal support must be removed & healing allowed .

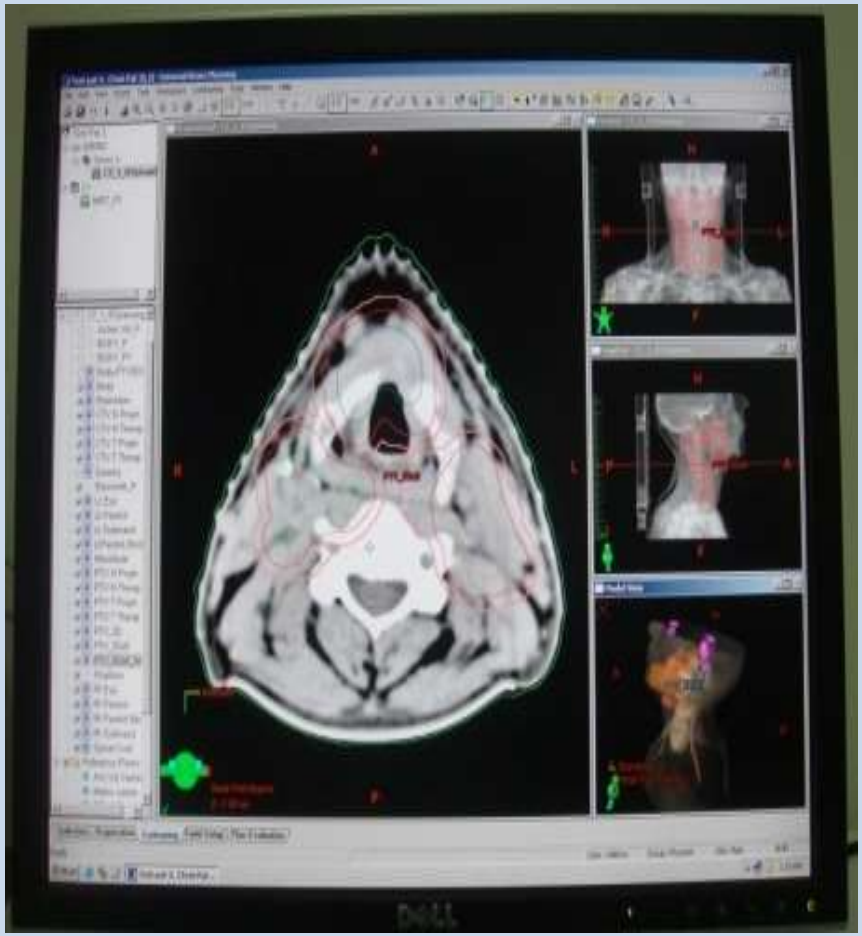
Steps of RT planning

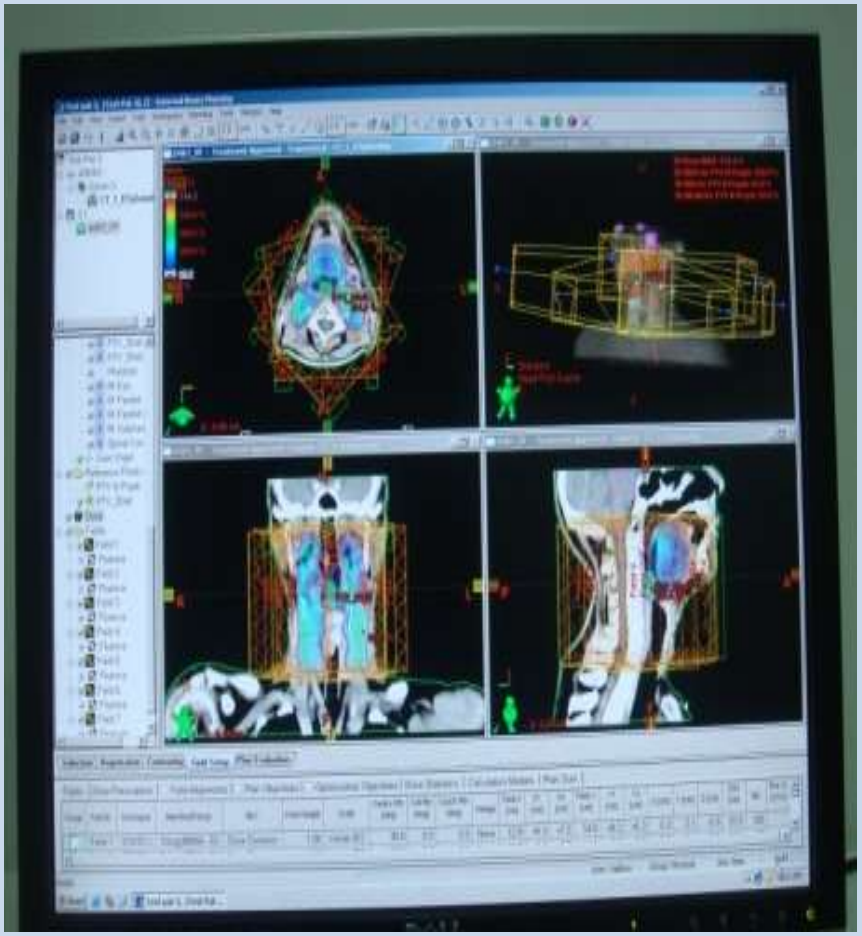
- Immobilization
- Planning CT scan
- Contouring of volumes
- Treatment planning
- Plan implementation
- Treatment execution

Immobilization

Simulation for EBRT

Contouring & Planning



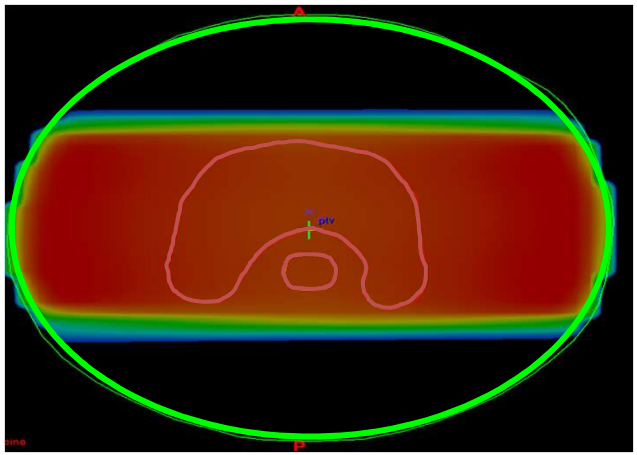


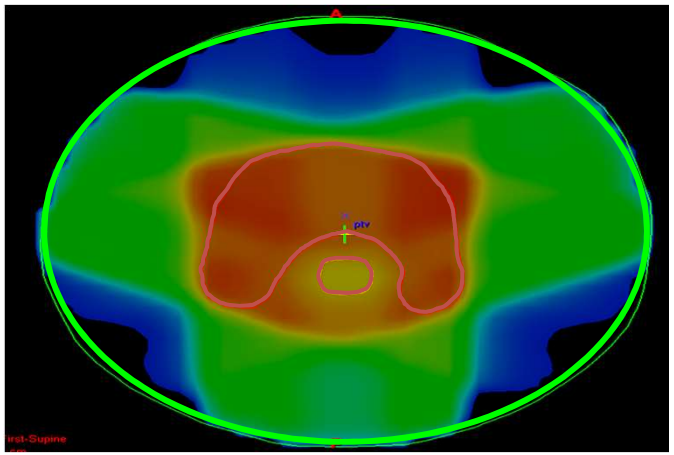
Treatment

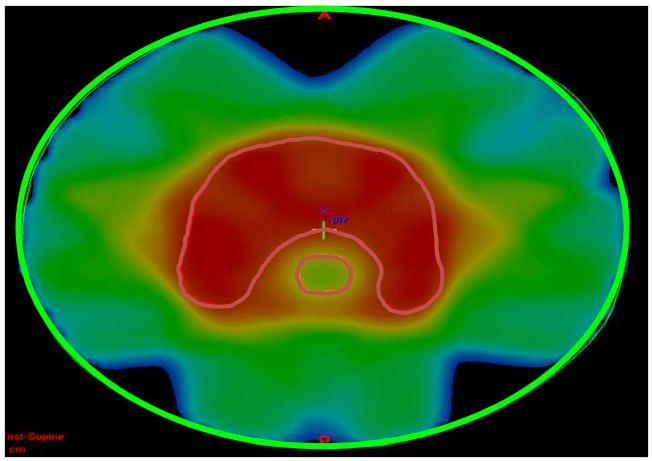
Toxicities

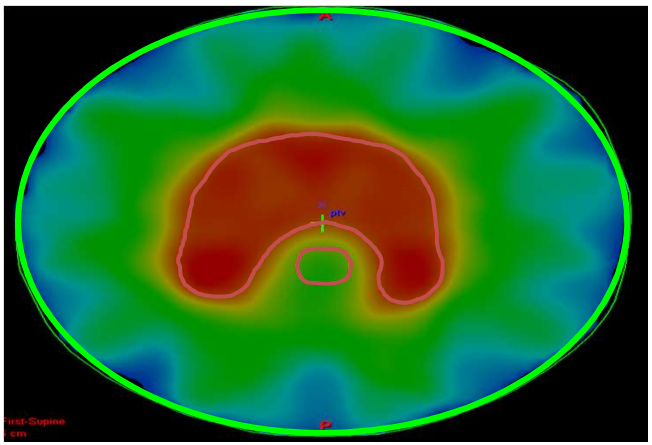
- Mucositis
- Odynophagia
- Dysphagia
- Xerostomia
- Taste alteration
- Dermatitis
- Hematological toxicities
- Ototoxicity

The Search for Conformality









- Modern radiotherapy techniques enable us to better spare the normal tissues

- Complete recovery from post-RT xerostomia is possible if parotid gland doses are kept below 25Gy (if both glands are spared) or 20Gy (if only one can be spared)

- Trials show that in pharyngeal cancers, parotid-sparing IMRT is superior to conventional RT in terms of toxicity, especially xerostomia

Parotid-sparing intensity modulated versus conventional radiotherapy in head and neck cancer (PARSPORT): a phase 3 multicentre randomised controlled trial

Christopher M Nutting[a,b,*], James P Morden[b], Kevin J Harrington[a,b], Teresa Guerrero Urbano[c], Shreerang A Bhide[a], Catharine Clark[d], Elizabeth A Miles[e], Aisha B Miah[a], Kate Newbold[a], MaryAnne Tanay[a], Fawzi Adab[f], Sarah J Jefferies[g], Christopher Scrase[h], Beng K Yap[i], Roger P A'Hern[b], Mark A Sydenham[b], Marie Emson[b], Emma Hall[b], and on behalf of the PARSPORT trial management group[†]

- For oral cancers, the jury is still out:
- RT usually given post-operatively→ lower dose required
- Oral cavity itself is the target→ salivary glands inevitably receive some dose
- Most lesions can be treated by unilateral RT→ at least one parotid gland is spared quite easily

Take Home Messages

- Head-neck cancers are very common in India & oral cavity cancers are the commonest subsite

- Many are caused by addiction to tobacco, both smoking & smokeless (khaini, zarda,etc)

- Many are first identified by dental surgeons

- Most oral cancers are treated by primary surgery
- Advanced cases will require post-operative RT
- Medically inoperable patients can be treated by curative RT
- Dental prophylaxis is of invaluable help in the pre-RT preparation

- Most pharyngeal and laryngeal cancers can be curatively managed by radical radiotherapy (early cases) or concurrent chemoradiation (more advanced cases)

- Lesions eroding laryngeal cartilage are treated by surgery & post-operative radiotherapy

Thank you