

# **Radiotherapy in scc of skin**

**Dr .negin farshchian**

- Radiotherapy is an organ- preserving modality & can be offered as a primary treatment for patients who are not surgical candidates or for whom surgery carries a high risk of functional or cosmetic compromise.
- 5-year Cure rate with R.T : > 90 %
- T1 : > 98%   T2 : 80%   T3 : 50%
- Cosmetic results : good or acceptable > 84 %
  - Is often used as an adjuvant modality for high risk SCC :( >2 CM , PNI+..)
  - Definitive
  - Palliative

# Indications for rt :

- **DEFINITIVE RT :**
- RT is generally reserved for patients over 45 y
- large superficial lesions : better cosmetic results with RT
- Multiple superficial lesions
- Patients who are unfit for surgery
- Selected tumor of eyelids , nose , ear ,canthi
- Recurrent after surgery

# Post op.rt :

- +/-close margins
- PNI + of named nerve
- > 3-2 cm primary
- T3,T4 (Extensive skeletal muscle invasion / bone , cartilage invasion )
- SCC of parotid

# Relative contraindications:

- Age < 50 -45
- in transplant patients , cd4 count < 400 , gorlin syn , Li-Fraumeni syn ,...
- Is not suitable for large tumors invading underlying cartilage
- Large lesions involving bone , tendons or joints
- Uncertainty over the histology
- Recurrence after radiotherapy
- Hair-bearing skin such as scalp, eyebrow ,..
- Lesion around the upper eyelid : lacrimal gland dryness & upper lid conjunctival keratinization

- Inner canthus lesions : nasolacrimal duct stenosis
- Lesions on lower leg , back & dorsum of hand : poor healing & squeal
- area prone to repeated trauma: belt line , lower leg( pretibial skin) ,feet , dorsum of hand, bony prominence,
- Poor blood supply : below knees , elbows
- High occupational sun exposure
- Impaired lymphatics
- Exposed cartilage or bone

- These relative contraindications need to be reviewed in each patient because alternative treatments may produce even more problems .

- Risk of local recurrence :
- High : mask area
- Med : cheek , forehead , scalp , neck , pretibial
- Low : trunk , extremities



# Methodes :

- Superficial/ orthovoltage X-ray
- Electron beams : most common method
- Electron + photon beams : in deep infiltration
- Brachytherapy : applicators /molds : 3-5 mm depth
- IMRT : for large skin targets , nerve tracts , of for nodal irradiation

# Superficial/ orthovoltage X-ray beams:

## Advantages :

- Less margins on skin surface
- less expensive than electrons
- Dmax at skin
- Skin collimation with lead cutout ( 0.95 mm pb for <150 kv beam . 1.9 mm pb for > 150 kv )
- Most common energies : 50 , 100 , 150 , 200 , 250 , 300 kv
- Select an energy to cover target in 90% isodose
- 50 kv : 0.7 (~1)mm - 100 kv : 4-7 (~5 ) - 150 kv :~1 cm

- Is not appropriate for  $> 1\text{cm}$  deep lesions .
- F factor ( Rontgen-rad conversion ) : increases dramatically below 300 kv
- Can lead to much higher dose to tissue with high atomic number(e.g. : bone )
- So , if bone invasion + : megavoltage beams give a more homogeneous distribution .
- RBE of orthovoltage is 10-15 % higher than megavoltage E/ PH .

# Electron beams :

- May be defined by an electron endplate cut-out inserted into the electron applicator or by shaped lead placed on the skin .
- 4mm of lead is adequate for electrons up to 10 mev .
- The lead shields for E needs to be lined with wax or plastic on the inner surface to absorb secondary electrons .
- internal eye contact lenses : 3-4 mm lead & 2-3 mm silicon



- **Beam sizes of less than 4 cm : beam flatness**
- **The energy of beam : deep surface of target is encompassed by the 90% isodose**
- **The effective treatment depth : 1/3 of beam energy**
- **Bolus : 100% to surface ...> reduces the depth of 90%**

# Simulation :

- Ct simulation recommended for most electron beams, IMRT .
- Clinical set up is appropriate for orthovoltage , brachytherapy , or palliative cases.
- Bolus : electron , IMRT
- Radio-opaque wire to outline the CTV
- IMRT :planning for named nerve involvement coverage to skull base .

# Target delineation :

- 1-1.5 cm for < 2cm primary tumors.
- 1.5 -2 cm for : > 2cm , high risk scc



# Dose – fraction:

- **Definitive RT : ASTRO :**
- **BED10 : conventional ( 180-200 cGy /Fx ) : 70-73.5**  
**hypofractionation ( 210-500 cGy/Fx) : 56-88**
- **For most lesions & optimal cosmetic : 66 Gy in 33 fx OR 55 Gy in 20 fx**
- **Lesions < 2 cm :** 50 Gy in 15 fx  
44 Gy in 10 fx / 4 times a week ,daily  
35 gy in 5 fx
- **Lesions > 2 cm :** (no cartilage involved ) 2.5 Gy /fx 50-55
- **Lesions > 2 cm :** ( cartilage involved ) 2 Gy /fx 66 gy / 33 f / 6 w

# Post operative R.T :

- ASTRO :
- BED 10 : Conventional : 59.5- 79.2  
hypofractionation : 56- 70.2
- Post .op : 50 gy / 20 f / 4 w  
60-64 gy / 30-32 f/ 6-7w
- Irradiation of a graft should not begin until after it is well-healed ( 6-8w ) & the entire graft should be included in the target volume.

- **HDR Brachytherapy :**
- 40 Gy in 8 fx or 45-44 Gy in 10 fx
- 2-3 times a week / at least 48 h apart
- ( more prolonged f : lower limb )

- **Palliative : 8gy / 1f**

20gy / 5 d / 1 w

36 gy / 6f / weekly / 6 w

# Regional Nodes R.T :

- **Poor diff / >3 cm / recurrence after surgery / large infiltrative, ulcerative lesions /**
- **After LND:** negative margins/ no ECE :50-60 Gy/ 2Gy/fx  
positive margins or ECE + : 60-66 Gy in 30-33 fx( 2 Gy/fx)
- **Elective :** clinically negative : 50 Gy / 25 f / 2 Gy /fx  
clinically positive : 60-70 Gy ( 2 Gy /fx )

# Nerves :

- Extensive PNI , clinically evident PNI , involvement of named nerve ( particularly in head & neck )
- Clinically at risk nerves : 50-60 Gy / 5-6 w



The image features a decorative border of small, dense flowers in shades of purple and white, arranged in a circular pattern around the central text. The background is a light pink surface with horizontal wooden plank lines. The text is centered and written in a bold, purple, sans-serif font.

**THANK YOU YERY MUCH**