The Role of Radiation Therapy in the Management of Pharyngeal Cancer

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WHA CONSULTING

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Objectives

- Describe and explain how a linear accelerator (Linac) works, and list the various treatment modalities it can deliver,
- Distinguish between 3D-Conformal, IMRT, SBRT,
- Explore NCCN Guidelines for EBRT for H&N cancer,
- Apply the 2018 STORE Manual RT coding rules to clinical scenarios.

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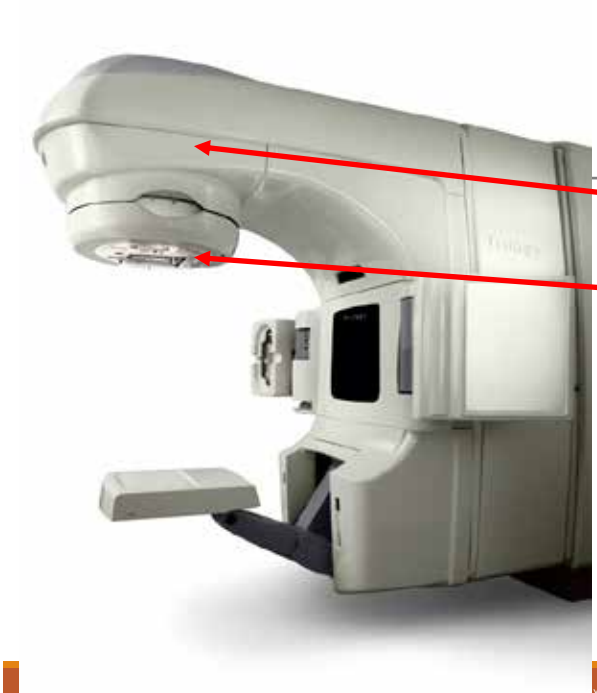
Linear Accelerator-Linac

The term **linear accelerator (Linac)** means that charged particles (electrons) travel in straight lines as they gain energy from an altering electromagnetic field.

Most Linacs have dual modalities: they can operate in photon mode(multiple energies) & electron mode (multiple energies as well).



Linear Accelerator-Linac

Gantry

Collimator

Linear Accelerators (LINACs) in Radiation Therapy

Linacs are the main component/tool used in the delivery of radiation therapy treatment to cancer patients.

Multiple ways of delivering dose via a linac, so it is important to have a basic understanding of this equipment and its fundamental operation.

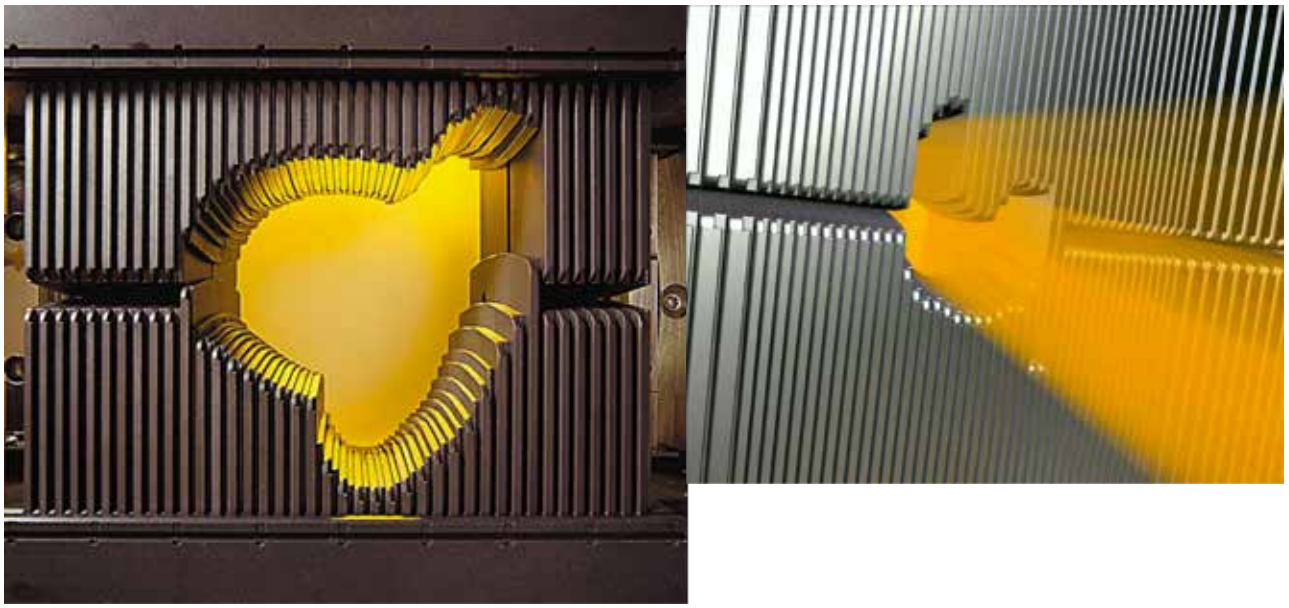
Important for a CTR to know the difference among the various forms of delivering the dose (i.e. 3D conformal, IMRT, IGRT, SIB-IMRT, DART, etc.).

Linacs

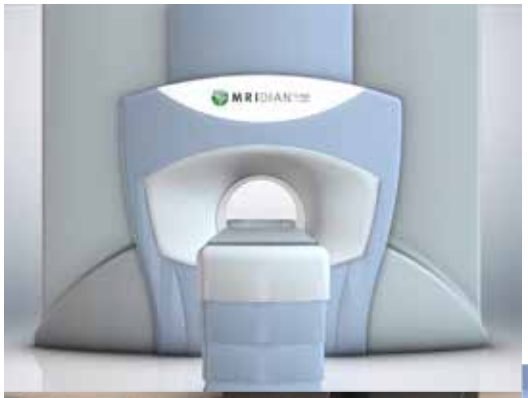
Most linear accelerators have beam energies of 6 MV through 20 MV as well as electron energies of 4-20 MeV.

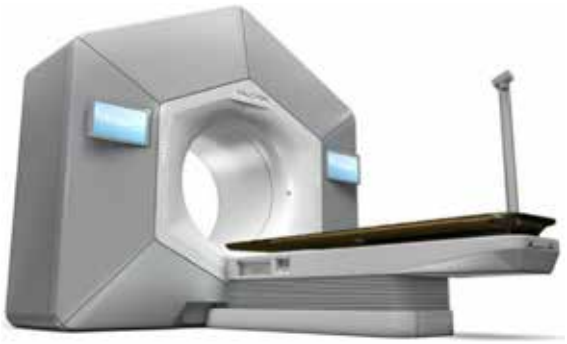
The linear accelerator can be used to treat deep seeded as well as superficial tumors due to these wide range of energies.

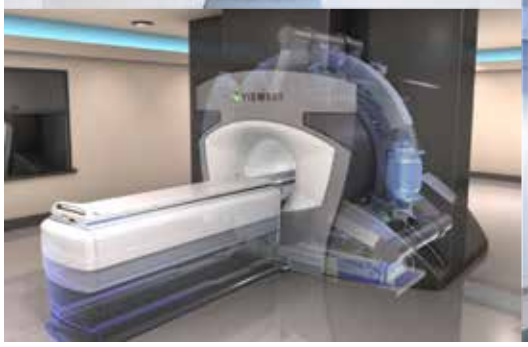
Keep in mind: Most modern linacs can treat with either photons or electrons.



DMCL Leaves





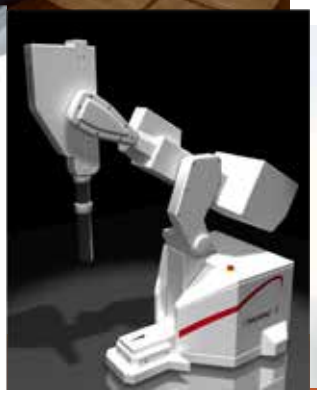


LINACS

Tomotherapy

Gammapod

Zeiss
Intrabeam

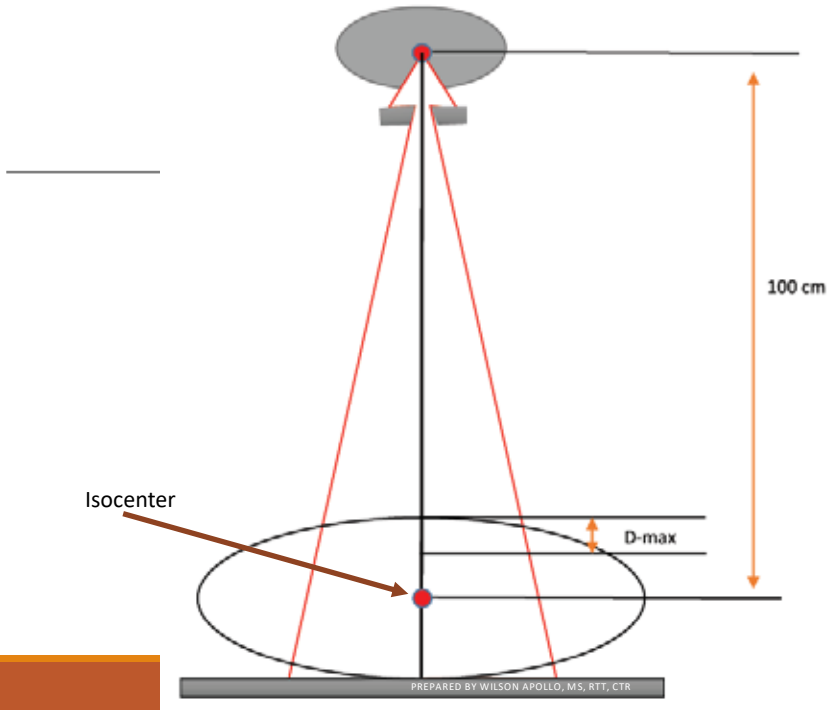


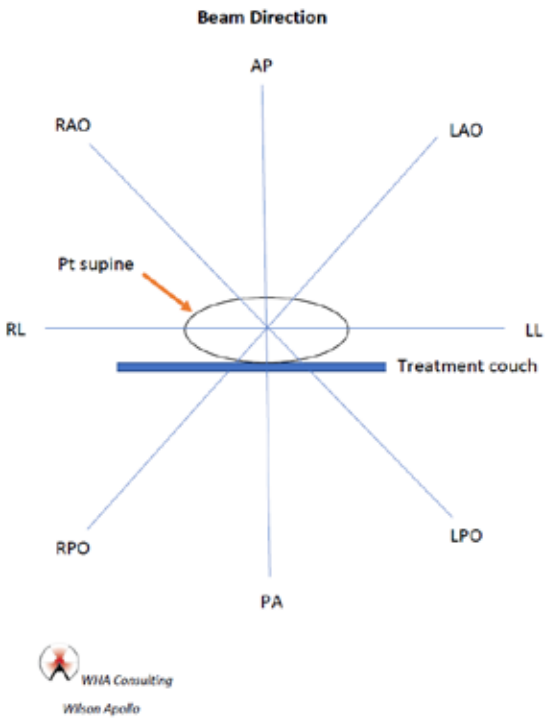
Gamma Knife

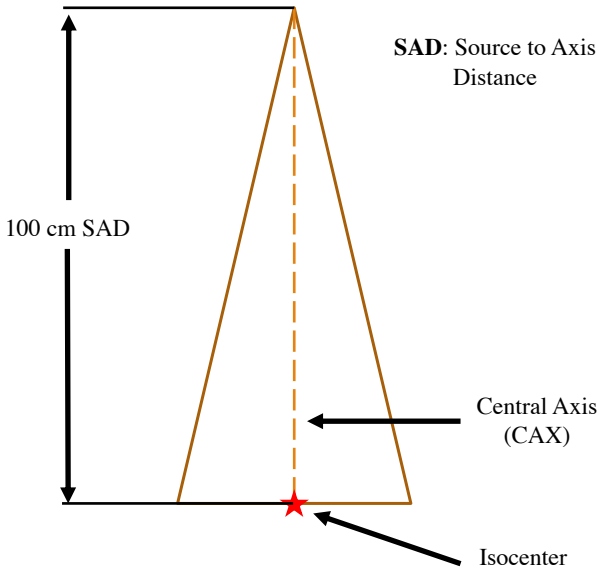
Canswer Forum Question
9/4/18

"How do we code the field External Beam Planning Technique if the radiation oncologist just calls it AP/PA?"

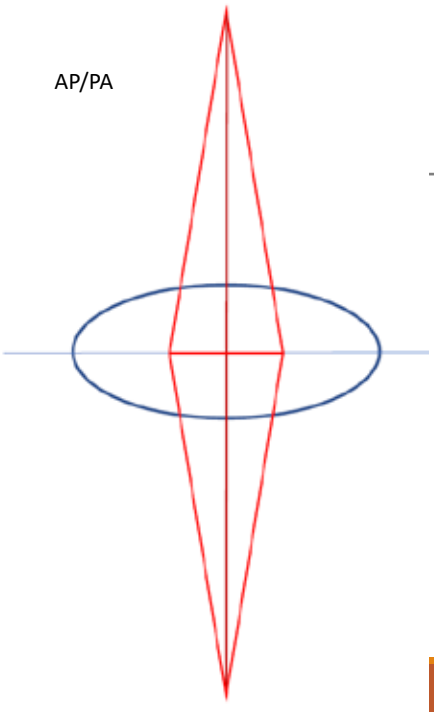
*The term AP/PA refers to the **direction** of the radiation beam only. It provides no information whatsoever on the planning technique code that should be used. AP/PA means that the pt was irradiated with the gantry @ 0 degrees and @ 180 degrees.*


100 cm
Isocenter
D-max


Beam Direction
AP
RAO
LAO
Pt supine
RL
LL
Treatment couch
RPO
LPO
PA

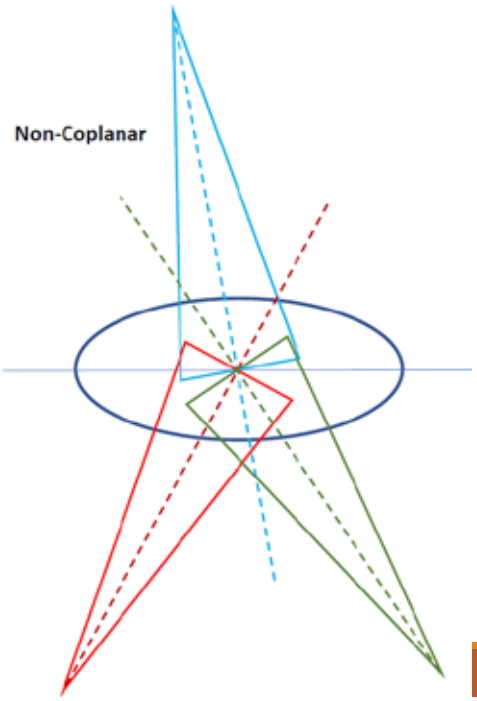

100 cm SAD
SAD: Source to Axis Distance
Central Axis (CAX)
Isocenter

AP/PA

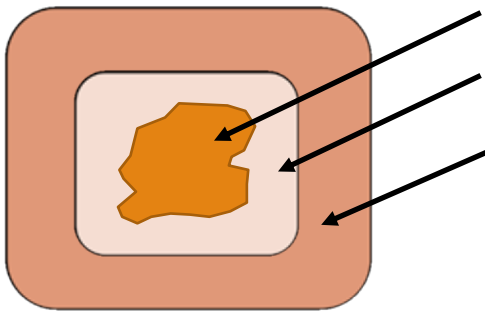


Coplanar beams: Central axes of pairs of radiation beams overlap, such as in AP/PA or RL/LL fields.

Non-coplanar beams: Central axes of multiple beams do not overlap; reduces dose to healthy tissues, thereby reducing the likelihood of short-term & long-term radiation-induced toxicities.



Tumor volumes



GTV: Gross tumor volume

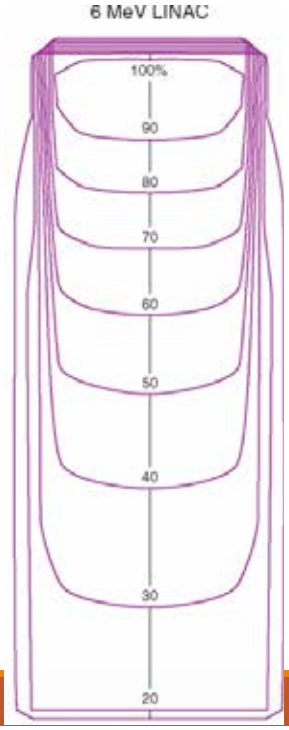
CTV: Clinical tumor volume

PTV: Planned tumor volume

OAR: Organ at risk

Depth Dose Characteristics for Clinical Radiotherapy Beams

Beam Energy	Depth of maximum dose (Dmax), cm	Skin Dose (%)
Cobalt-60 (1.25 MV)	0.5 cm	50 %
6 MV	1.5 cm	35 %
10 MV	2.5 cm	25 %
18 MV	3.0 cm	15 %



100% of the dose deposited @ Dmax depth (1.5 cm for 6 MV photons).
Beyond that depth, dose decreases as a result of attenuation and the inverse square law.
The higher the beam energy, the greater the skin-sparing effect.

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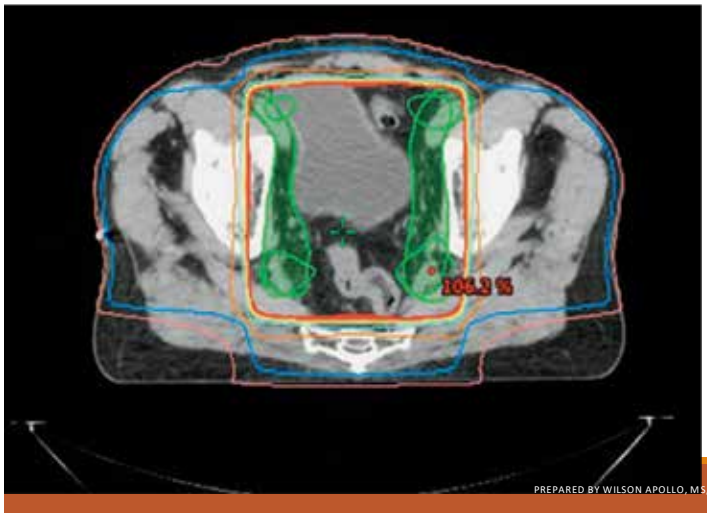
In the beginning…

3D-Conformal

3D-Conformal RT is essentially the predecessor to IMRT. Using MLC leaves, treatment planners can sculpt the shape of the beam to conform to the shape of the target volume.

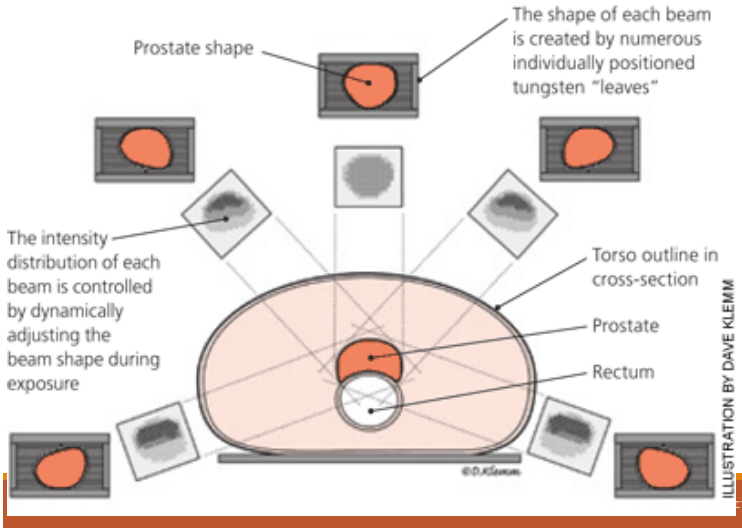
The main difference between IMRT and 3D-Conformal plans is that when the latter is used, the ***MLC leaves remain stationary***. It still uses multiple fields as with IMRT, and each field conforms to the shape of the target as seen from various angles, but the collimator leaves are static through the duration of treatment.

Target Delineation-3D



- **Treatment Modality Code**: 02, External beam photons.
- **Planning Technique**: 04, Conformal or 3D Conformal.

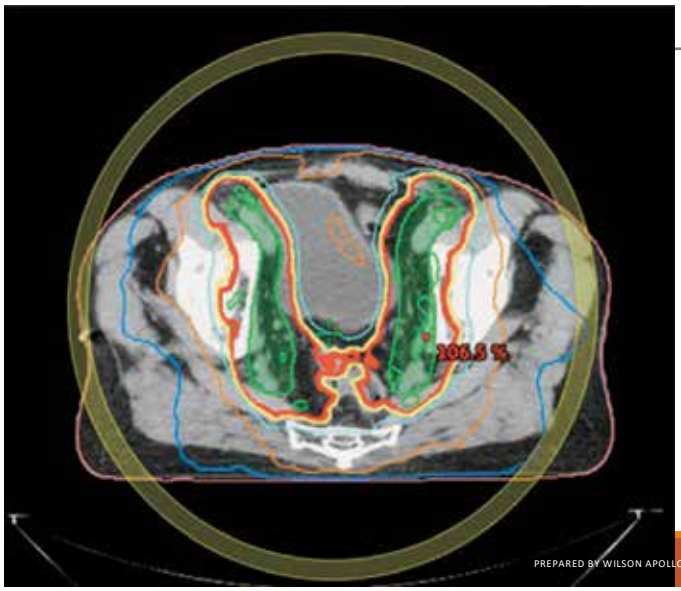
IMRT



Technology made possible by DMLC,

IMRT not always mentioned in RT Treatment Summary. Important to look in Treatment Plan.

Target Delineation-VMAT-IMRT



- **Treatment Modality Code**: 02, External beam photons.
- **Planning Technique**: 05, Intensity Modulated Radiation Therapy (IMRT), *when standard fx size used.*

Volumetric-modulated arc therapy: **VMAT**

Commercial name used by Eleckta for the RT technique. It is similar to Varian's **RapidArc** and Siemen's Cone-Beam Therapy (**CBT**).

Introduced in 2008. Dose can be delivered faster than conventional fixed IMRT or Tomotherapy tx.

Modality Code: 02, External beam photons.

It is a form of **IMRT** and should be coded as such, **code 05** *(When standard fractionation is used)*. Arc therapy also used for SBRT. Review RT prescription.

Fraction size

Standard fraction size = 180-200 cGy/fx, typically seen when prescription calls for multiple fractions (anywhere from 10 to 40+).

Hypofractionation = > 200 cGy/fx, ex: 500 cGy x 5 fx, often used for SBRT treatments, which calls for large fraction size and only a few fractions (1-6 max).

Hyperfractionation = < standard fractionation. Ex: 125 cGy/fx. Sometimes used for H&N treatments.

SBRT?

Example 1: *Pt received 200 cGy in 30 fractions for a total prescribed dose of 60 Gy five times a week, for six weeks, using a 6 MV beam and IMRT.*

Example 2: *Pt received 800 cGy in 5 fractions over two weeks, for a total prescribed dose of 40 Gy, using a 6 MV beam and IMRT*

1. *What is the modality code and treatment planning code for each example?*

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RTOG Phase II Trial 0225

J Clin Oncol 27: 3684-3690, 2009

1. Feasibility of IMRT in multi-institutional setting,
2. Rates of late xerostomia,
3. Locoregional (LR) control,
4. Distant metastasis (DM),
5. Progression-free survival (PFS),
6. Overall survival (OS)

Total of 68 pts enrolled from 17 centers nationwide.

RTOG Phase II Trial 0225

J Clin Oncol 27: 3684-3690, 2009

RT prescription included:

1. SIB-IMRT (Simultaneous Integrated Boost-IMRT),
2. CTV_{70}(GTV + 5 mm margin)= 70 Gy in 2.12 Gy/fx
3. $CTV_{59.4}$(CTV_{70} + 5 mm margin + areas @ risk for microscopic involvement, including entire nasopharynx, retropharyngeal nodal region, skull base, clivus, pterygoid fossae, parapharyngeal space, sphenoid sinus, levels I-V nodal regions) = 59.4 Gy in 1.8 Gy/fx over 33 days.

RTOG Phase II Trial 0225

J Clin Oncol 27: 3684-3690, 2009

Pts w/ stage T2b or greater and/or N+ received chemotherapy, Cisplatin & Fluorouracil (FU) x 3 cycles.

- 57 pts received chemo (stage IIB to IVB),
- 89.7% of pts received prescribed 70 Gy.
- Median follow-up: 2.6 yrs
- 7 pts w/ locoregional(LR) failure,
- 10 pts w/ distant mets (liver, bone, lung, spine, trachea)

RTOG Phase II Trial 0225-Results

J Clin Oncol 27: 3684-3690, 2009

Local Progression-Free (PF)	92.6%
Regional PF	90.8%
Locoregional PF	89.3%
Distant mets-free rate	84.7%
Overall survival (OS)	80.2%
Grade 2 xerostomia (1 yr)	13.5%

NCCN Guidelines for EBRT for Oropharynx Cancer

When RT alone is prescribed:

High risk with lymph node involvement,

- 66 Gy (2.2 Gy/fx) to 70 Gy (2.0 Gy/fx), daily over 6-7 wks,

Concomitant boost accelerated RT:

- 72 Gy/6 wks (1.8 Gy/fx, large field: 1.5 Gy boost as 2nd daily fx during last 12 txt days),
- 66-70 Gy (2.0 Gy/fx, 6 fx/wk accelerated)

Hyperfractionation: 81.6 Gy/7 wks (1.2 Gy/fx, BID)

- 69.96 Gy (2.12 Gy/fx) daily M-F in 6-7 wks.

NCCN Guidelines for EBRT for Oropharynx Cancer

Low to intermediate risk:

- 44-50 Gy (2.0 Gy/fx) to 54-63 Gy (1.6-1.8 Gy/fx).

Concurrent Chemoradiation:

- High Risk: 70 Gy (2.0 Gy/fx)
- Low to intermediate risk: 44-50 Gy (2.0 Gy/fx) to 54-63 Gy (1.6-1.8 Gy/fx).

- **Either IMRT (preferred) or 3D Conformal RT recommended.**

NCCN Guidelines for EBRT for Glottic Larynx Cancer-v*2.2018*

When RT alone and *no nodal involvement*:

- 60.75 Gy (2.25 Gx/fx) to 66 Gy (2.0 Gy/fx), for Tis, N0
- 63 Gy (2.25 Gy/fx) to 66 Gy (2.0 Gy/fx), for T1, N0
- 65.25 (2.25 Gy/fx) to 70 Gy (2.0 Gy/fx) for T2, N0

RT alone for $\geq T2, N1$ *disease*:

High Risk:

- 66-70 Gy (2.2-2.0 Gy/fx)
- 72 Gy/6 wks (1.8 Gy/fx, large field; 1.5 Gy/fx boost X 12 wks)

- **Either IMRT or 3D Conformal RT recommended.**

NCCN Guidelines for EBRT for Cancer of Nasopharynx-*v2.2018*

RT alone for T1, N0 or pts not eligible for chemotherapy:

High Risk, primary tumor & involved lymph nodes;

- 66 Gy-70-70.2 Gy (2.2 Gy/fx to 2.0 Gy/fx), daily M-F, 6-7 wks,
- 69.96 Gy (2.12 Gy/fx)

Low to Intermediate Risk (sites of suspected subclinical spread):

- 44-50 Gy (2.0 Gy/fx) to 53-54 Gy(1.6-1.8 Gy/fx)

NCCN Guidelines for EBRT for Cancer of Nasopharynx-*v2.2018*

Concurrent ChemoRT (preferred):

High Risk;

- 70-70.2 Gy (1.8-2.0 Gy/fx)

Low to Intermediate Risk:

- 44-50 Gy (2.0 Gy/fx) to 53-54 Gy(1.6-1.8 Gy/fx)

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RADIATION TREATMENT MODALITY CODES

- 00 = No Radiation Treatment
- 01 = External beam, NOS
- 02 = External beam, photons
- 03 = External beam, protons
- 04 = External beam, electrons
- 05 = External beam, neutrons
- 06 = External beam, carbon ions
- 07 = Brachytherapy, NOS
- 08 = Brachytherapy, intracavitary, LDR
- 09 = Brachytherapy, intracavitary, HDR
- 10 = Brachytherapy, Interstitial, LDR
- 11 = Brachytherapy, Interstitial, HDR
- 12 = Brachytherapy, electronic
- 13 = Radioisotopes, NOS
- 14 = Radioisotopes, Radium-232
- 15 = Radioisotopes, Strontium-89
- 16 = Radioisotopes, Strontium-90
- 99 = Treatment radiation modality unknown; Unknown if radiation treatment administered

EXTERNAL BEAM RADIATION PLANNING TECHNIQUE CODES

Code	Label	Definition
00	No tx	Not given
01	External beam, NOS	Known to be external beam, but there is insufficient information to determine the specific modality.
02	Low energy x-ray/photon therapy	External beam therapy administered using equipment with a maximum energy of less than one (1) million volts (MV). Energies are typically expressed in units of kilovolts (kV). These types of treatments are sometimes referred to as electronic brachytherapy or orthovoltage or superficial therapy. Clinical notes may refer to the brand names of low energy x-ray delivery devices, e.g. Axxent®, INTRABEAM®, or Esteya®.
03	2-D therapy	An external beam planning technique using 2-D imaging, such as plain film x-rays or fluoroscopic images, to define the location and size of the treatment beams. Should be clearly described as 2-D therapy. This planning modality is typically used only for palliative treatments.
04	Conformal or 3-D conformal therapy	An external beam planning technique using multiple, fixed beams shaped to conform to a defined target volume. Should be clearly described as conformal or 3-D therapy in patient record.
05	Intensity modulated therapy	An external beam planning technique where the shape or energy of beams is optimized using software algorithms. Any external beam modality can be modulated but these generally refer to photon or proton beams. Intensity modulated therapy can be described as intensity modulated radiation therapy (IMRT), intensity modulated x-ray or proton therapy (IMXT/IMPT), volumetric arc therapy (VMAT) and other ways. If a treatment is described as IMRT with online re-optimization/re-planning, then it should be categorized as online re-optimization or re-planning.

EXTERNAL BEAM RADIATION PLANNING TECHNIQUE CODES

Code	Label	Definition
06	Stereotactic radiotherapy or radiosurgery, NOS	Treatment planning using stereotactic radiotherapy/radiosurgery techniques, but the treatment is not described as Cyberknife® or Gamma Knife. These approaches are sometimes described as SBRT (stereotactic body radiation), SABR (stereotactic ablative radiation), SRS (stereotactic radiosurgery), or SRT (stereotactic radiotherapy). If the treatment is described as robotic radiotherapy (e.g. Cyberknife®) or Gamma Knife®, use stereotactic radiotherapy subcodes below. If a treatment is described as stereotactic radiotherapy or radiosurgery with online re-optimization/re-planning, then it should be categorized as online re-optimization or re-planning.
07	Stereotactic radiotherapy or radiosurgery, robotic.	Treatment planning using stereotactic radiotherapy/radiosurgery techniques which is specifically described as robotic (e.g. Cyberknife®).
08	Stereotactic radiotherapy or radiosurgery, Gamma Knife®	Treatment planning using stereotactic radiotherapy/radiosurgery techniques which uses a Cobalt-60 gamma ray source and is specifically described as Gamma Knife®. This is most commonly used for treatments in the brain.
09	CT-guided online adaptive therapy	An external beam technique in which the treatment plan is adapted over the course of radiation to reflect changes in the patient's tumor or normal anatomy using a CT scan obtained at the treatment machine (online). These approaches are sometimes described as CT-guided online re-optimization or online re-planning. If a treatment technique is described as both CT-guided online adaptive therapy as well as another external beam technique (IMRT, SBRT, etc.), then it should be categorized as CT-guided online adaptive therapy. If a treatment is described as "adaptive" but does not include the descriptor "online", this code should not be used.

EXTERNAL BEAM RADIATION PLANNING TECHNIQUE CODES

Code	Label	Definition
10	MR-guided online adaptive therapy	An external beam technique in which the treatment plan is adapted over the course of radiation to reflect changes in the patient's tumor or normal anatomy using an MRI scan obtained at the treatment machine (online). These approaches are sometimes described as MR-guided online re-optimization or online re-planning. If a treatment technique is described as both MR-guided online adaptive therapy as well as another external beam technique (IMRT, SBRT, etc.), then it should be categorized as MR-guided online adaptive therapy. If a treatment is described as "adaptive" but does not include the descriptor "online", this code should not be used.
88	Not Applicable	Treatment not by external beam
98	Other, NOS	Other radiation, NOS; Radiation therapy administered, but the treatment modality is not specified or is unknown.
99	Unknown	Unknown whether radiation administered.

Phase I Radiation	
Phase I Primary Treatment Volume (1504)	
Phase I to Draining Lymph Nodes (1505)	
Phase I Treatment Modality (1506)	
Phase I External Beam Planning Technique (1502)	
Phase I Dose Per Fraction (cGy) (1501)	
Phase I Number of Fractions (1503)	
Phase I Total Dose (cGy) (1507)	
Phase II Radiation	
Phase I Primary Treatment Volume (1514)	
Phase I to Draining Lymph Nodes (1515)	
Phase I Treatment Modality (1516)	
Phase I External Beam Planning Technique (1512)	
Phase I Dose Per Fraction (cGy) (1511)	
Phase I Number of Fractions (1513)	
Phase I Total Dose (cGy) (1517)	

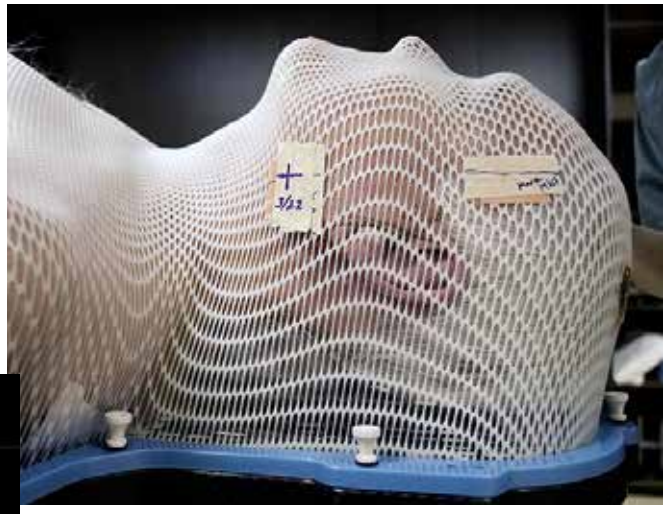
Phase III Radiation	
Phase II Primary Treatment Volume (1524)	
Phase II to Draining Lymph Nodes (1525)	
Phase II Treatment Modality (1527)	
Phase II External Beam Planning Technique (1522)	
Phase II Dose Per Fraction (cGy) (1521)	
Phase II Number of Fractions (1523)	
Phase II Total Dose (cGy) (1527)	
Course Summary	
Total Dose in Radiation Course (cGy) (1533)	
Date Radiation Started (1210)	
Date Radiation Ended (3220)	
Number of Phases (1532)	
Radiation Treatment Discontinued Early? (1531)	
Radiation/Surgery Sequence (1380)	
Reason for No Radiation (1430)	

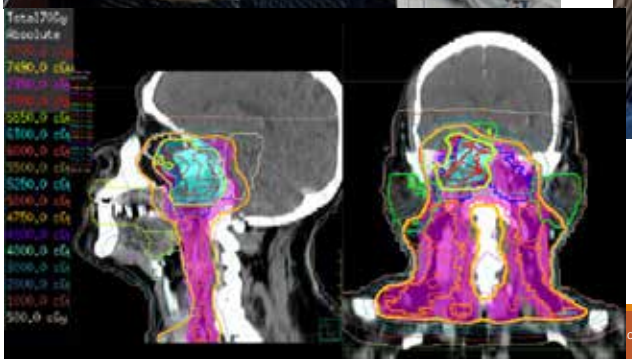
Clinical Scenario 1

- 70-y/o male presents w/ dysphagia; smoker, social etoh. HPV (p16) negative.
- FNA of enlarged LNs, Level III: metastatic SCC,
- LT Pyriform Sinus bx= invasive SCC,
- PET/CT: FDG-avid lesion in LT pyriform sinus & mid-cervical LNs.
- Managed w/ ChemoRT

Key principles in RT

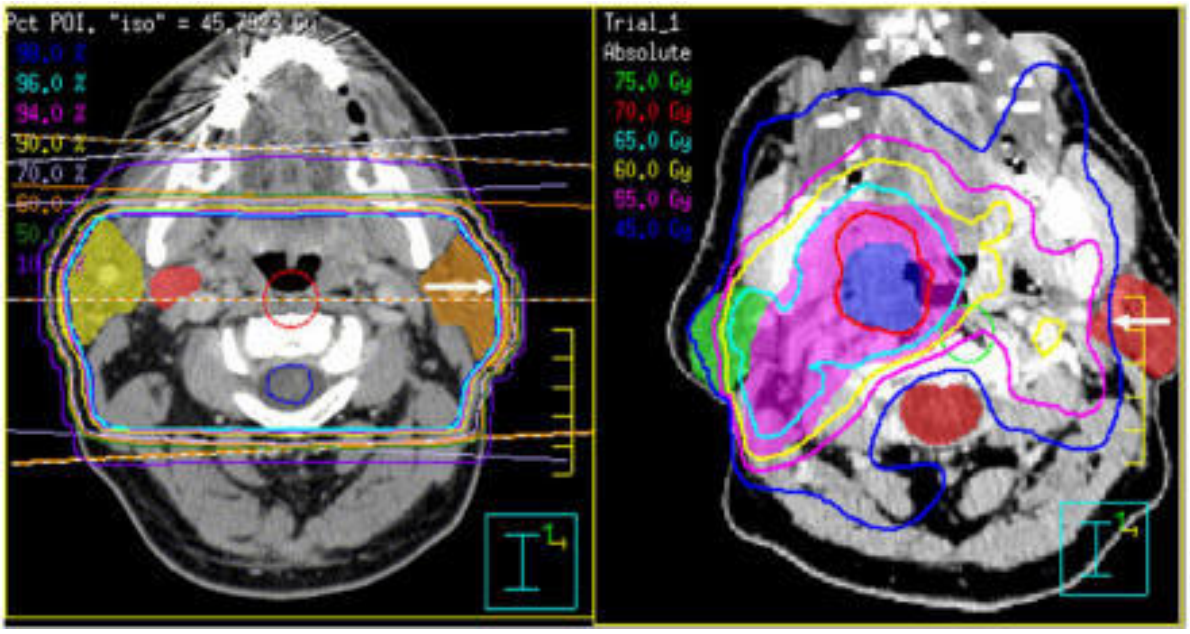
- The larger the target volume, the lower the tolerance to radiation. *In general, the largest volumes are prescribed the lowest radiation dose*.
- The smaller the volume, the greater the tissue tolerance to radiation. *Boost doses typically target a much smaller volume than that of the regional dose*.
- Case in point, $Lethal\ Dose_{50} (LD_{50})$





ON APOLLO, MS, RTT, CTR

3D-Conformal vs. IMRT Comparison



Clinical Scenario 1: Summary of RT treatment

The Planning Target Volume (PTV) includes the left pyriform sinus, left retropharyngeal and left level II/III lymph node. This area received 66 Gy in 30 treatments utilizing RapidArc SIB-IMRT and 6 MV photons.

Planned Target PTV	Energy	Fractions	Dose/fraction (cGy)	Total Dose (cGy)
LT Pyriform sinus/LT retropharyngeal, LT Level II-III LNs	6X	30/30	220	6,600

Clinical Scenario 1: RT treatment

	Initial	Boost 1	Boost 2
Target Volume	LT Pyriform sinus/LT retropharyngeal, LT Level II-III LNs	LT pyriform sinus & LT upper neck	LT pyriform sinus
Treatment Planning		Simultaneous	Simultaneous
Modality	EBRT-Photons	EBRT-Photons	EBRT-Photons
Planning	IMRT	IMRT	IMRT
Fields	Per plan	Per plan	Per plan
Energy/Source	6MV	6MV	6MV
Prescribed	Volume PTV	Volume PTV2	Volume PTV3
Fraction & Dosing			
Fraction Dose	1.7 Gy	2 Gy	2.2 Gy
Fraction Number	30	30	30
Fractions/week	1 fx daily	1 fx daily	1 fx daily
Total Dose	51 Gy	60 Gy	66 Gy
Cumulative EBRT Dose	51 Gy	60 Gy	66 Gy

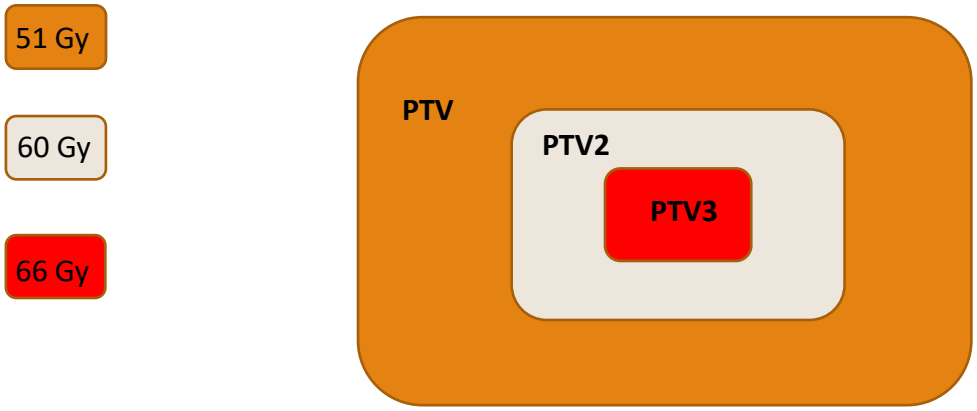
Clinical scenario 1- H&N w/ **SIB-IMRT**…

When Simultaneous Integrated Boost (**SIB**) is used, the regional dose along with the boost doses are delivered *at the same time every day*.

This is why each phase consists of 30 fractions.

The field size is gradually reduced to deliver the boost on a daily basis.

Simultaneous Integrated Boost(SIB)
Total Dose= 66 Gy.



The <u>smallest</u> volume typically received the <u>largest</u> prescribed dose!

Phase I Radiation	
Phase I Primary Treatment Volume	23: Larynx (glottis) or hypopharynx
Phase I to Draining Lymph Nodes	01: Neck lymph node regions
Phase I Treatment Modality	02: External beam, photons
Phase I External Beam Planning Technique	05: IMRT
Phase I Dose Per Fraction (cGy)	00170
Phase I Number of Fractions	030
Phase I Total Dose (cGy)	005100
Phase II Radiation	
Phase II Primary Treatment Volume	23: Larynx (glottis) or hypopharynx
Phase II to Draining Lymph Nodes	01: Neck lymph node regions
Phase II Treatment Modality	02: External beam, photons
Phase II External Beam Planning Technique	05: IMRT
Phase II Dose Per Fraction (cGy)	00200
Phase II Number of Fractions	030
Phase II Total Dose (cGy)	000900
Phase III Radiation	
Phase III Primary Treatment Volume	23: Larynx (glottis) or hypopharynx
Phase III to Draining Lymph Nodes	00: No RT to draining lymph nodes
Phase III Treatment Modality	02: External beam, photons
Phase III External Beam Planning Technique	05: IMRT
Phase II Dose Per Fraction (cGy)	00220
Phase II Number of Fractions	030
Phase II Total Dose (cGy)	000600

Take away point:

Simultaneous Integrated Boost (SIB) is rarely described in the treatment summary. You need to review actual prescription to get details in order to code it correctly. Predominantly used in management of H&N cancers.

Clinical Scenario 1

Course Summary	
Total Dose in Radiation Course (cGy)	**006600**
Date Radiation Started	
Date Radiation Ended	
Number of Phases	03
Radiation Treatment Discontinued Early?	01: RT Completed as prescribed
Radiation/Surgery Sequence	0: No RT and/or surgical procedures
Reason for No Radiation	0: RT was administered

In this clinical scenario, the total dose in the Course Summary should equal the sum of the total dose received in all phases combined!!

CLINICAL SCENARIO 2

Treatment Summary:
Patient completed his concurrent chemo/radiotherapy. He received 70 Gy in 35 sessions to initial neck lymph node region utilizing 6 MV photons, VMAT radiotherapy.

CLINICAL SCENARIO 2

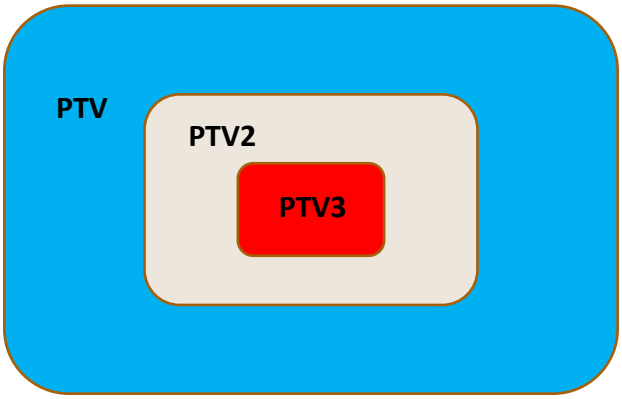
	Initial	Boost 1	Boost 2
Target Volume	RT oropharynx & RT neck	RT oropharynx/RT neck	RT oropharynx
Treatment Planning		Simultaneous	Simultaneous
Modality	EBRT-Photons	EBRT-Photons	EBRT-Photons
Planning	IMRT	IMRT	IMRT
Fields	Per plan	Per plan	Per plan
Energy/Source	6MV	6MV	6MV
Prescribed	Volume PTV	Volume PTV2	Volume PTV3
Fraction & Dosing			
Fraction Dose	1.6 Gy	1.71 Gy	2.0 Gy
Fraction Number	35	35	35
Fractions/week	1 fx daily	1 fx daily	1 fx daily
Total Dose	56 Gy	60 Gy	70 Gy
Cumulative EBRT Dose	56 Gy	60 Gy	70 Gy

Simultaneous Integrated Boost(SIB)
Total Dose= 70 Gy.

56 Gy

60 Gy

70 Gy



Phase I Radiation: RT Oropharynx/RT Neck	
Phase I Primary Treatment Volume (1504)	22: Oropharynx
Phase I to Draining Lymph Nodes (1505)	01: Neck lymph node regions
Phase I Treatment Modality (1506)	02: External beam, photons
Phase I External Beam Planning Technique (1502)	05: IMRT
Phase I Dose Per Fraction (cGy) (1501)	00160
Phase I Number of Fractions (1503)	035
Phase I Total Dose (cGy) (1507)	005600
Phase II Radiation: RT Oropharynx/RT Neck	
Phase II Primary Treatment Volume (1514)	22: Oropharynx
Phase II to Draining Lymph Nodes (1515)	01: Neck lymph node regions
Phase II Treatment Modality (1516)	02: External beam, photons
Phase II External Beam Planning Technique (1512)	05: IMRT
Phase II Dose Per Fraction (cGy) (1511)	00171
Phase II Number of Fractions (1513)	035
Phase II Total Dose (cGy) (1517)	000400
Phase III Radiation: RT Oropharynx	
Phase III Primary Treatment Volume (1524)	22: Oropharynx
Phase III to Draining Lymph Nodes (1525)	00 No RT to draining lymph nodes
Phase III Treatment Modality (1527)	02: External beam, photons
Phase III External Beam Planning Technique (1522)	05: IMRT
Phase III Dose Per Fraction (cGy) (1521)	00200
Phase III Number of Fractions (1523)	035
Phase III Total Dose (cGy) (1527)	001000

Take away point:

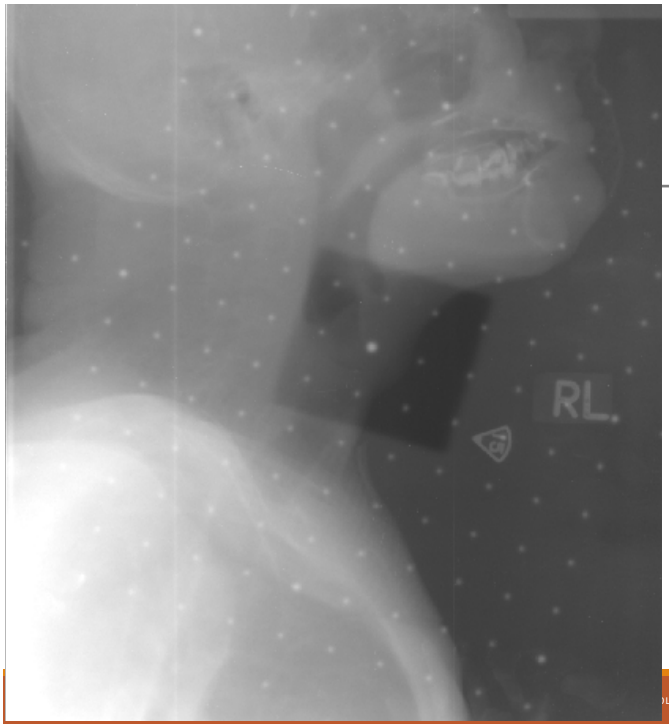
- *The total dose/phase should add up to the total prescribed dose (Total Dose in Radiation Course)!*

Clinical Scenario 2

Course Summary-Case 2	
Total Dose in Radiation Course (cGy)	**007000**
Date Radiation Started	
Date Radiation Ended	
Number of Phases	03
Radiation Treatment Discontinued Early?	01: RT Completed as prescribed
Radiation/Surgery Sequence	03: RT after surgery
Reason for No Radiation	0: RT was administered

Clinical Scenario 3: Glottic Cancer

Treatment Site	Current Dose	Modality	Start Date	End Date	Elapsed Days	# of fractions
Larynx	5,000 cGy	6X/3D	2/26/18	3/30/18		25
Larynx Boost	1,600 cGy	6X/3D	4/2/18	4/11/18		8



Glottis

- SUP BORDER- bottom of hyoid (higher if need for T2)
- INF BORDER- bottom of cricoid (lower if needed for T2)
- POST BORDER- anterior vertebral body (mid body if post disease)
- ANT BORDER- flash skin
- Typical field size: 5 x 5 or 6 x 6 cm.

Phase I Radiation: Clinical Scenario 3-Glottis	
Phase I Primary Treatment Volume (1504)	23: Larynx (Glottis) or hypopharynx
Phase I to Draining Lymph Nodes (1505)	00: No RT to draining lymph nodes.
Phase I Treatment Modality (1506)	02: External beam, photons
Phase I External Beam Planning Technique (1502)	04: 3D Conformal
Phase I Dose Per Fraction (cGy) (1501)	00200
Phase I Number of Fractions (1503)	025
Phase I Total Dose (cGy) (1507)	005000
Phase II Radiation	
Phase II Primary Treatment Volume (1514)	23: Larynx (Glottis) or hypopharynx
Phase II to Draining Lymph Nodes (1515)	00: No RT to draining lymph nodes.
Phase II Treatment Modality (1516)	02: External beam, photons
Phase II External Beam Planning Technique (1512)	04: 3D conformal
Phase II Dose Per Fraction (cGy) (1511)	00200
Phase II Number of Fractions (1513)	008
Phase II Total Dose (cGy) (1517)	001600

Take away point:

- *When early stage glottic cancer is treated with EBRT, the lymph nodes **<u>are not</u>** included in the treatment field.*

Clinical Scenario 3- Glottic Cancer

Course Summary-Case 3	
Total Dose in Radiation Course (cGy)	**006600**
Date Radiation Started	2/26/18
Date Radiation Ended	4/11/18
Number of Phases	02
Radiation Treatment Discontinued Early?	01: RT Completed as prescribed
Radiation/Surgery Sequence	00: No RT and/or surgical procedures
Reason for No Radiation	0: RT was administered

Question 1

Which of the following treatment equipment should not be coded to the Treatment Modality Code 02: External beam, photons?

a. Tomotherapy
b. Gamma Knife
c. Zeiss Intrabeam
d. Mammosite

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Question 2

Treatment Planning Technique code 05: IMRT, is used correctly in which of the following RT prescriptions?

a. 6 MV, 180 cGy x 25 fx = 45 Gy, over 6 weeks, using non-coplanar beams and VMAT

b. 12 MeV, 200 cGy x 5 fx= 10 Gy, over 12 days

c. 10 MVX, 600 cGy x 5 fx= 30 Gy over two weeks, with 7 non-coplanar beams and Rapidarc.

d. None of the above.

Question 3

Which of the following H&N sites does not typically include the regional draining lymph nodes in the PTV when irradiated for early stage cancer?

a. Nasopharynx

b. Glottis

c. Oropharynx

d. Base of tongue (BOT)

Question 4

Patient with an oropharyngeal cancer is prescribed 1.2 Gy/fx, BID for a total of 81.6 Gy, 6MV/IMRT. This type of fractionation is known as:

a. Conventional fractionation
b. Hypofractionation
c. Hyperfractionation
d. Standard fractionation

Question 5

The correct treatment planning technique when the Cyberknife unit is used is

a. 07: SRS, or radiosurgery, robotic
b. 08: SRS,
c. 06: SRS, or radiosurgery, NOS
d. 09: CT-guided online adaptive therapy

In summary…

- EBRT plays a significant role in the management of H&N cancers. Preservation of organ function balanced with tumor control is key.
- Important to keep up with the latest advances in radiation oncology.
- Critical to learn the language of radiation therapy and radiation oncology!
- SIB-IMRT is a very challenging clinical scenario to abstract due to lack of treatment information

Questions

Questions

Questions

Questions

You can submit your RT coding questions to
apollow@mac.com ***or***
wapollo72@gmail.com