Esophageal Cancer Radiotherapy General Guidelines ___CRT Service @ OHSU

CT Simulation

A volumetric treatment planning CT study will be required to define gross tumor volume (GTV), clinical target volume (CTV), and planning target volume (PTV) (see definitions below). Each patient will be positioned supine (or prone) in an immobilization device in the actual treatment position on a flat table top. Contiguous CT slices, having 3 mm thickness through the regions harboring gross tumor and grossly enlarged lymph nodes and 8-10 mm thickness of the remaining regions are to be obtained starting from the level of the thoracic inlet and extending inferiorly through the entire stomach volume to a point below the celiac axis (T12 in most patients) @ the level of L3 (especially for distal esophagus and/or GE junxn primary tumors). The GTV, CTV, and PTV and normal organs will be outlined on all appropriate CT slices.

A treatment planning FDG PET/CT scan (or CT scan alone) with the patient in the treatment position is encouraged for treatment planning. In the case where the PET/CT is obtained in the treatment position, the CT from this study may be used as the planning CT scan.

Intravenous (i.v.) contrast during the planning CT is optional provided a diagnostic chest CT was done with contrast to delineate the major blood vessels. If not, i.v. contrast should be given during the planning CT. If contrast is used, the densities can be over-ridden or the contrast scan must be registered to a non-contrast scan for treatment planning purposes.

Oral contrast to opacify the stomach will be given 1 hour prior to simulation and oral paste at the time of simulation (to coat the esophagus) for patients who can swallow.

Target Volume Definition [use cross-sectional CT anatomy guides for target delineation]

GTV: The primary tumor (GTV-P) and clinically positive lymph nodes (GTV-N) seen on the pretreatment PET scan (SUV > 3), diagnostic CT scan, esophagram/barium swallow, EUS, EGD, and/or treatment planning CT (>1 cm short axis diameter) will comprise the GTV.

CTV: The CTV is defined to be the GTV-P plus a 0.5 cm to 1 cm margin radially and 3-5 cm cranio-caudally, as appropriate to account for microcopitum or extension. The ipsilateral paratracheal lymph nodes (levels 2 and 4) often comprise part of the CTV. 1 cm margin in all directions on grossly involved LNs (GTV-N). Regional LNs to be covered include periesophageal along entire length of the CTV, celiac axis LNs, peri-gastric LNs along lesser curvature.

PTV: Includes the CTV plus a total margin of 1.0 cm in all directions. If we do use CBCT, then the respective margins on the CTV can be reduced by 0.5 cm, on average.

Dose Constraints for OARisk
Normal tissues to be contoured include both lungs, skin, heart, spinal cord, esophagus, kidneys and liver.

All normal tissues assume treatment at 1.8 Gy/Fx (corrected for heterogeneity).

Highest priority = Cord (50 Gy)

2nd highest priority= Normal lung (more than 2 cm outside PTV) < 45 Gy & total Lung total, defined as the total lung volume minus the CTV (V20 < 35% total or the mean lung dose < 20 Gy)
3rd highest priority= Kidney ( < 2/3 total kidney to receive any dose > 20 Gy)

4th highest priority= Heart ( < 1/2 heat to receive any dose > 40 Gy, & the whole heart may receive up to 30 Gy)

5th highest priority= Liver ( < 1/2 may receive any dose > 30 Gy)

Brachial plexus ( < 66 Gy)

4th highest priority= Esophagus (mean dose < 36 Gy)