ILROG Mini-Atlas: Head and neck Location

59-year-old male presenting with bilateral cervical adenopathy

Work up and staging revealed Diffuse Large B cell Lymphoma involving the right nasopharynx and bilateral cervical neck (Figure 1)

Treatment Plan: 3 cycles of R-CHOP (Rituximab, Cyclophosphamide, Doxorubicin, Vincristine, Prednisone) followed by consolidative radiation therapy to 30 Gy. The patient achieved a complete response on PET-CT imaging (Five Point Score of 2 of 5) after completion of R-CHOP (not shown).

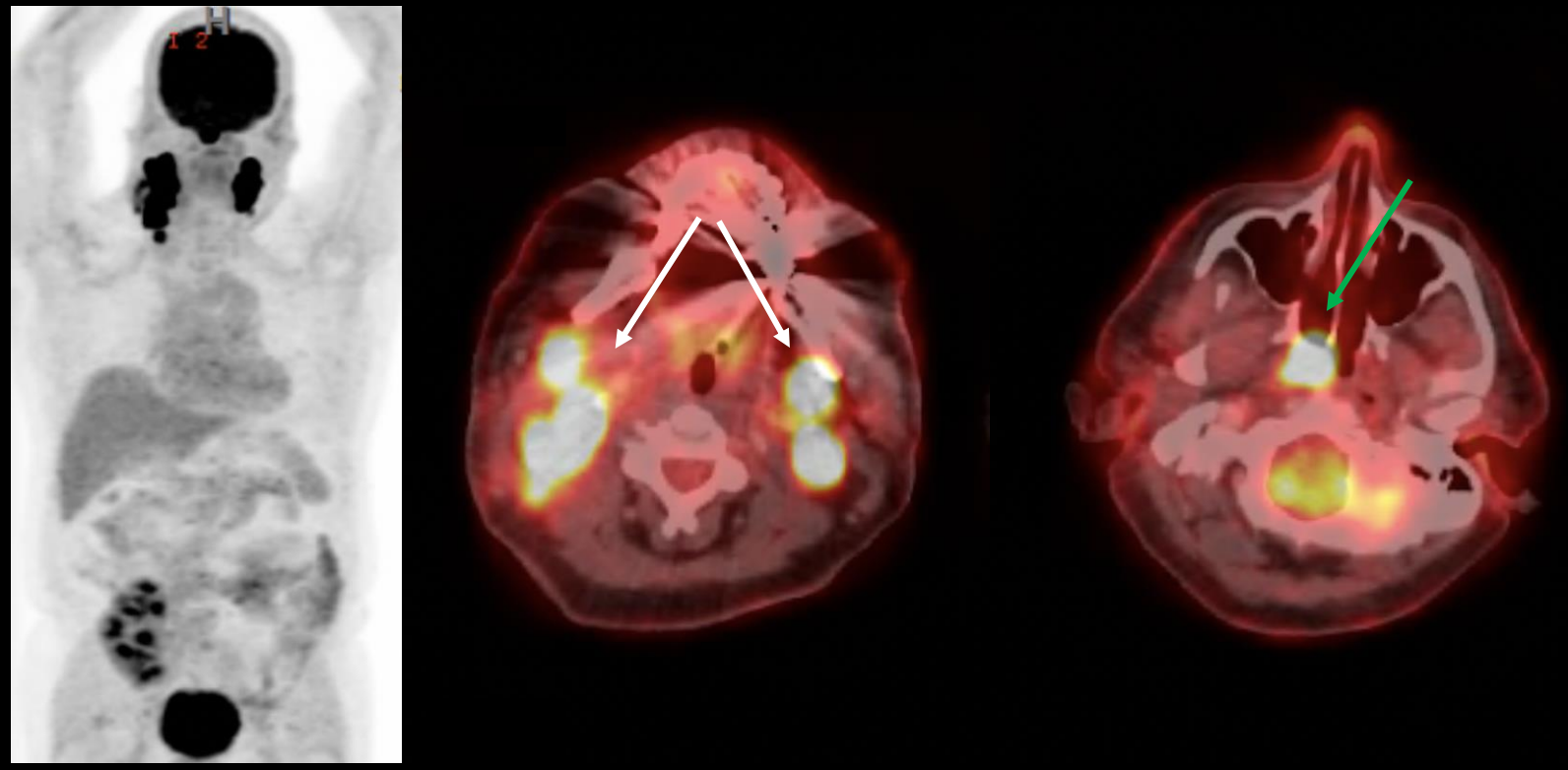
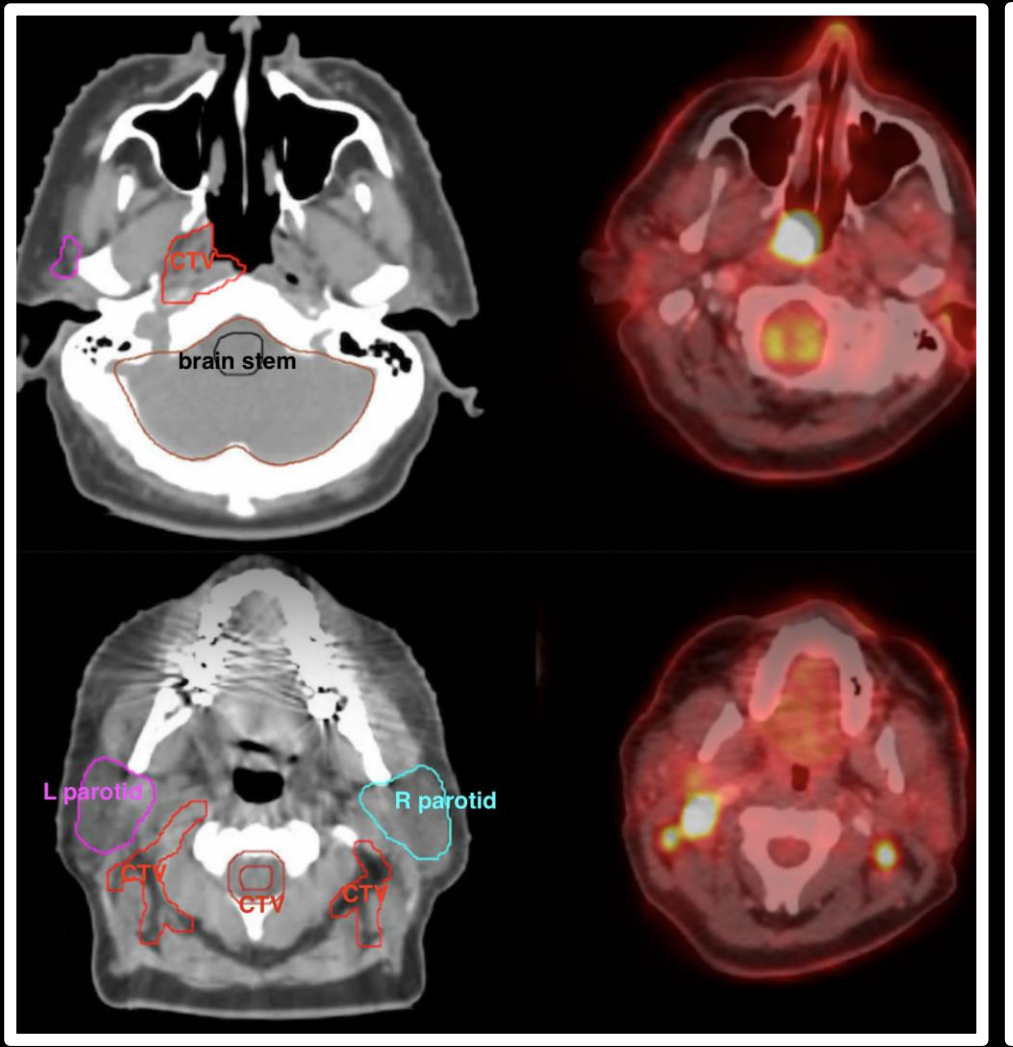
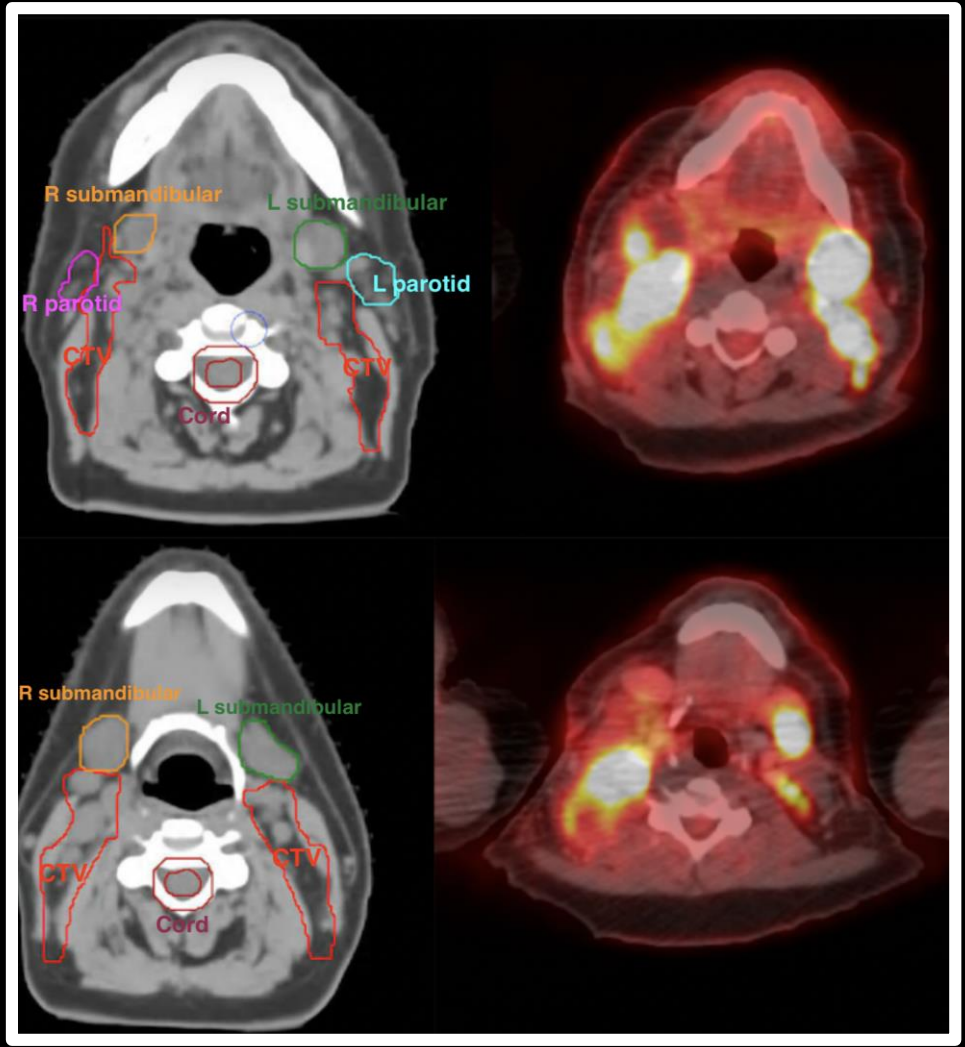


Figure 1. PET-CT demonstrating FDG avid bilateral cervical neck adenopathy (white arrow) and avid nasopharyngeal involvement (green arrow)

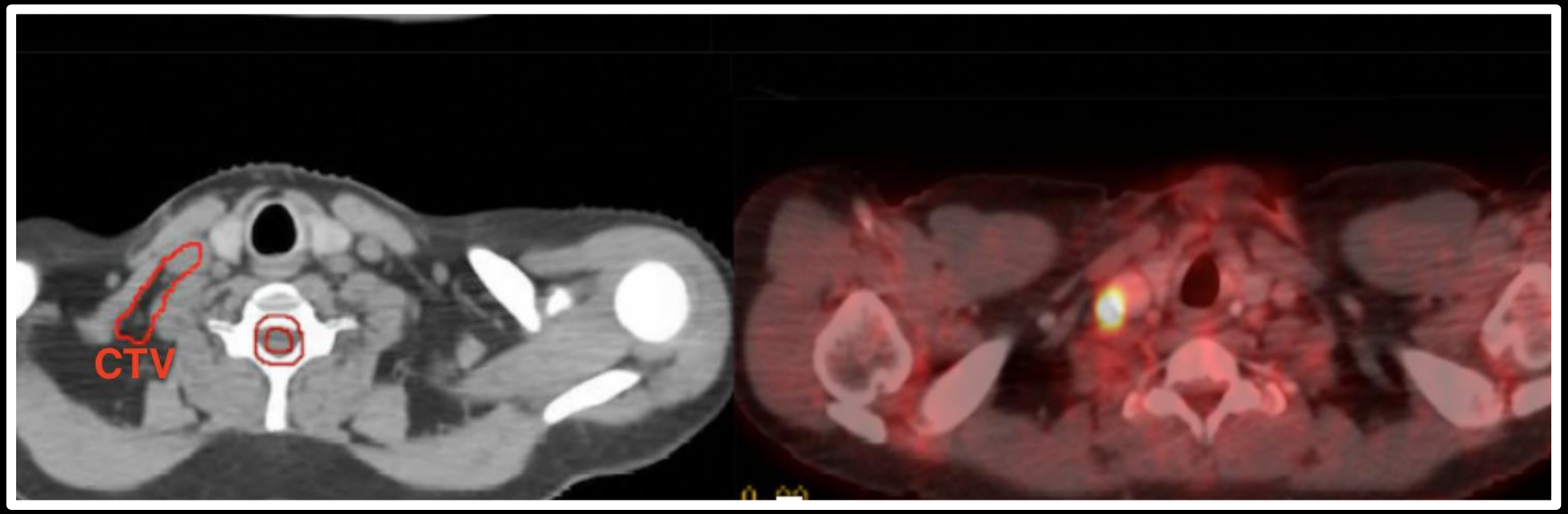




Contouring Tips

- Limit the CTV to the fat in between the muscles; avoid uninvolved structures (muscles, parotid, and submandibular glands)
- Respect normal tissues that were not invaded by tumor and instead were displaced by disease (submandibular glands were pushed anteriorly by nodal involvement but were not invaded therefore do not warrant coverage)

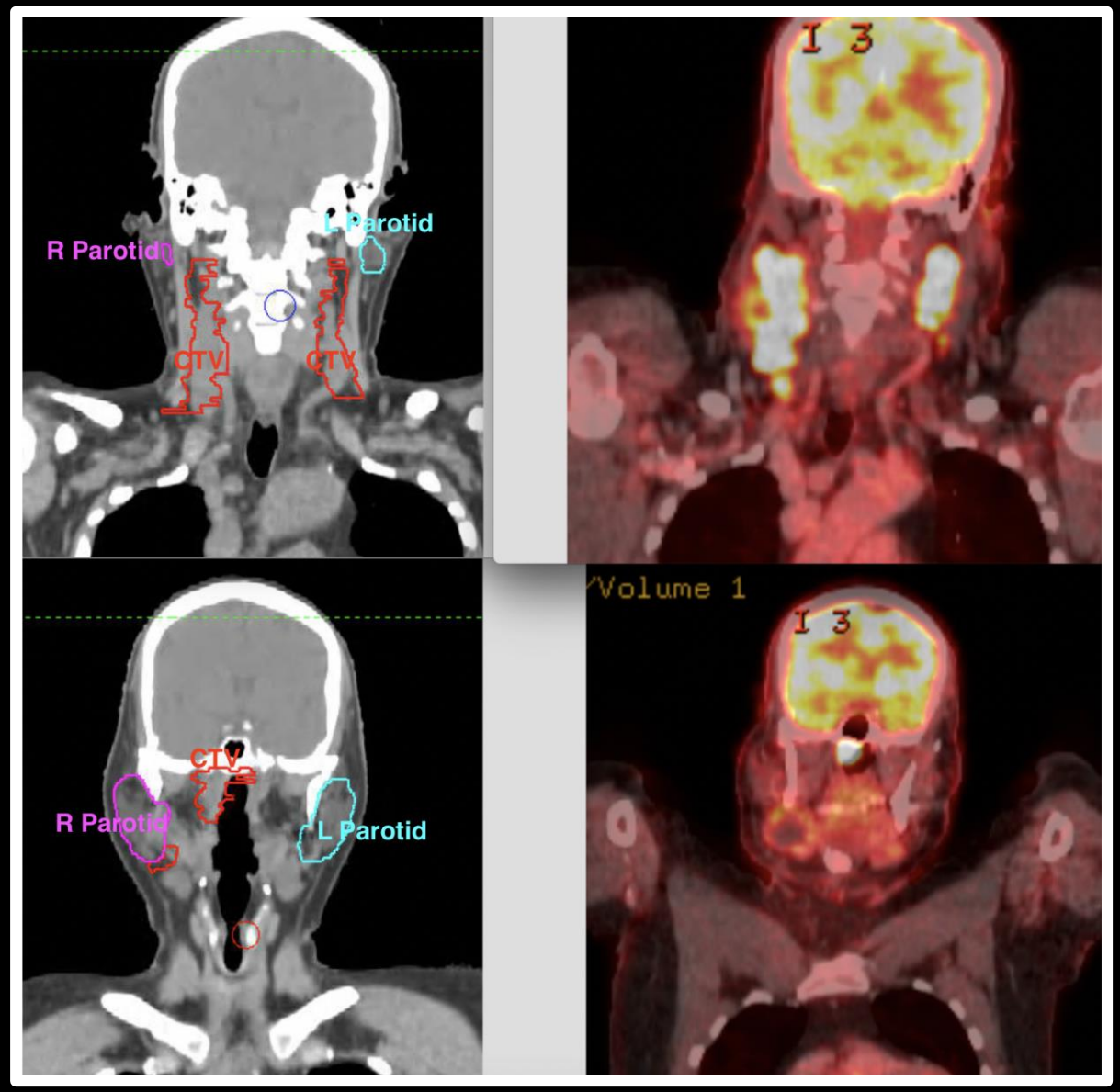
Axial images of the CT simulation (left panel) showing contours of the site of original disease CTV (red) accurately including the longitudinal extent of the disease while respecting the transverse regression as per the ISRT guidelines. A PTV of 3 mm was utilized given the head an neck location and immobilization with an Aquaplast mask.
Right panel is the corresponding prechemotherapy PET/CT images.



Contouring Tips

Note the difference in arm position between CT simulation and diagnostic PET-CT imaging which can make fusions challenging and misleading. Therefore, visual confirmation of the correct anatomical location is advised.

Axial images of the CT simulation (left panel) showing contours of the site of original disease CTV (red) accurately including the longitudinal extent of the disease while respecting the transverse regression as per the ISRT guidelines. Right panel is the corresponding prechemotherapy PET/CT images.



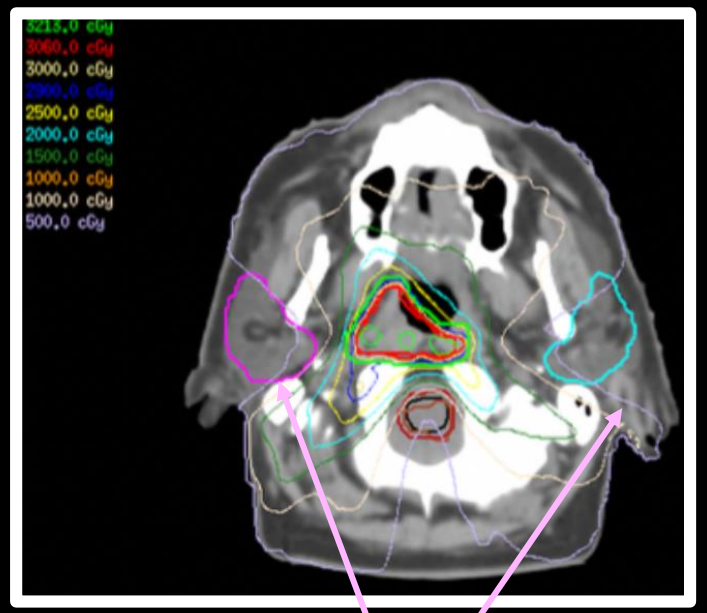
Contouring Tips

The width of the CTV is slimmer compared to the original disease seen on the PET-CT while the superior-inferior extent of disease is maintained illustrating the principle of ISRT.

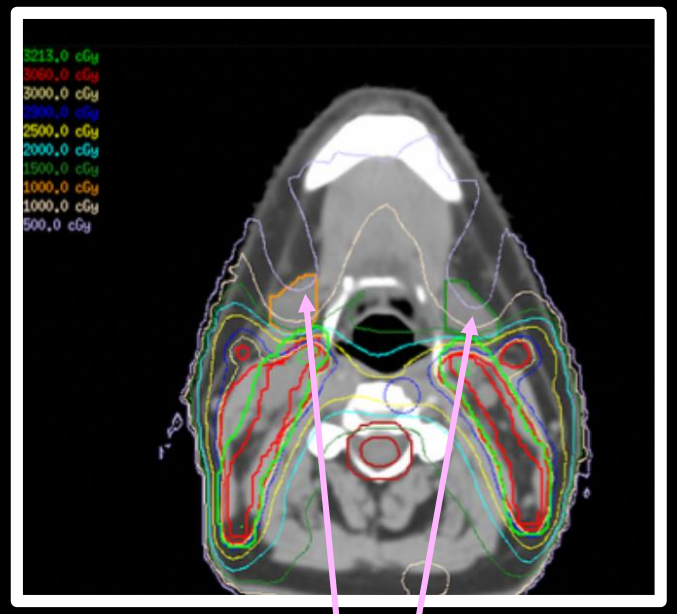
Coronal images of the CT simulation (left panel) showing contours of the site of original disease CTV (red) accurately including the longitudinal extent of the disease while respecting the transverse regression as per the ISRT guidelines.

The right panel illustrated the corresponding prechemotherapy PET/CT images.

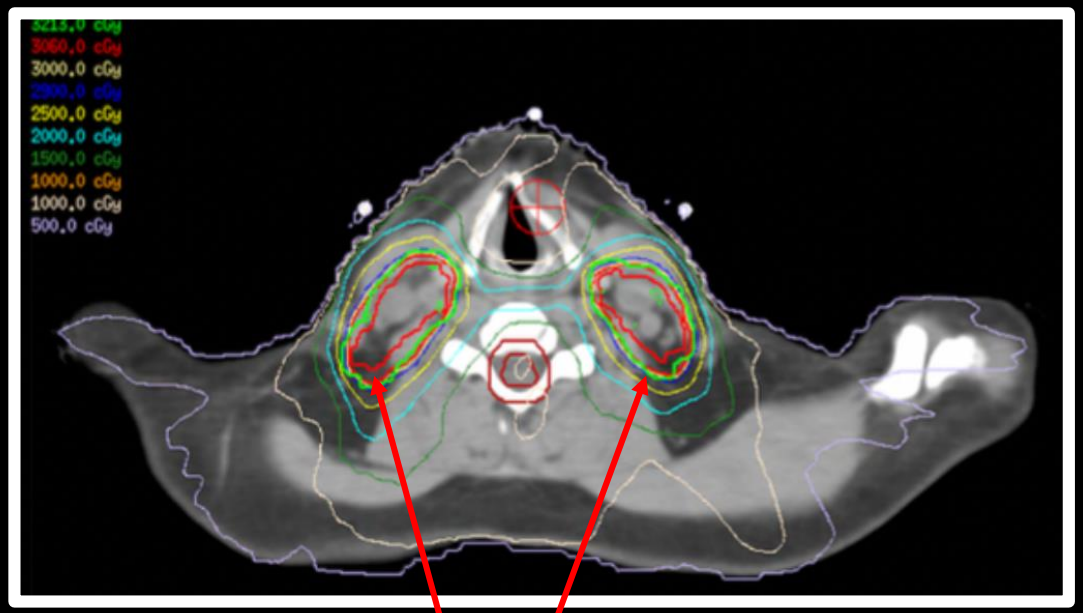
Planning using IMRT encompassing the CTV with 3000 cGy while avoiding both parotid and submandibular glands.



500 cGy

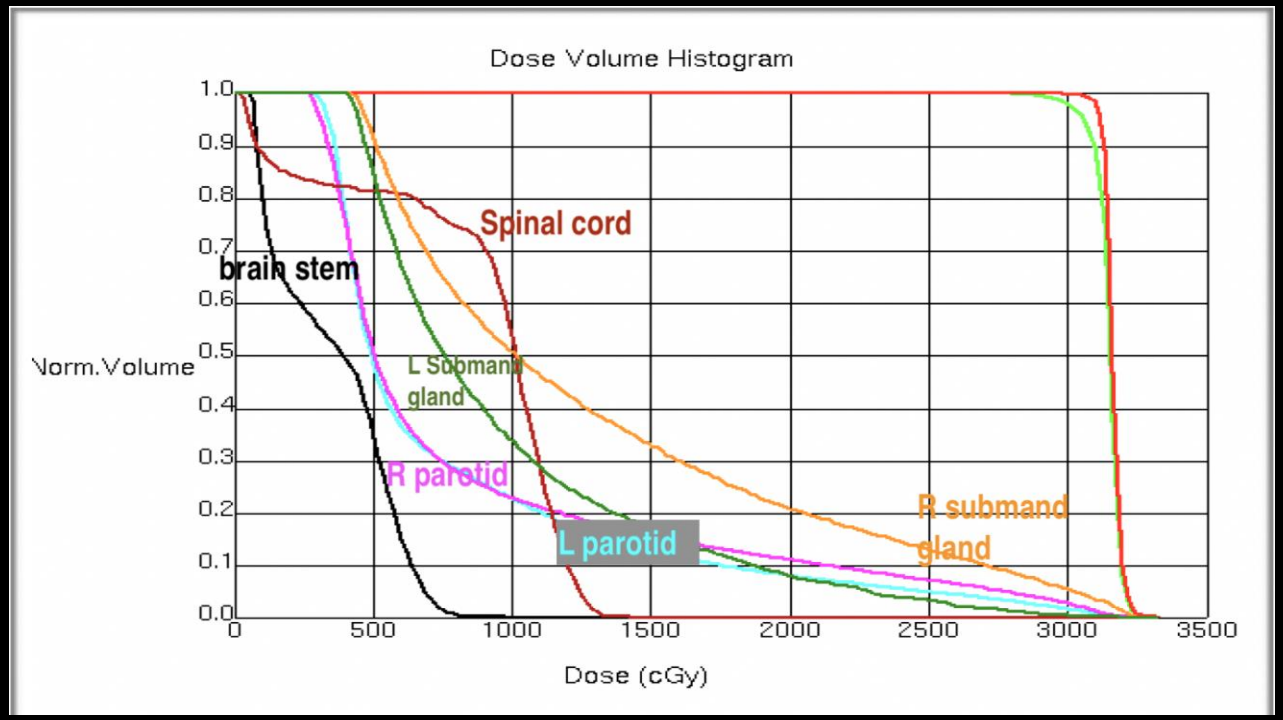


500 cGy



2400 cGy

Plan Evaluation: Assess coverage of the CTV with the prescription dose (30 Gy) as well as the impact of the low doses (5 Gy) on normal tissues. In this case the bilateral parotid and submandibular glands were used as avoidance structures.



Doses to critical organs were maintained well under tolerance:

R parotid mean = 838 cGy

L parotid mean = 789 cGy

R submandibular = 1303 cGy

L submandibular = 971 cGy

Take home message:
For cases of lymphoma involving the head and neck that achieve a complete response to systemic therapy, ISRT can be applied to deliver consolidative radiation therapy.
Nodal regression in the transverse plane permits sparing of normal tissues (including muscles and salivary glands) while the pre-chemotherapy disease extent in the coronal plan should be included in the field.

While traditional dose constraints that are often used in cases of head and neck cancer are often easily achievable, in lymphoma cases with prescription doses of 30 Gy, significantly lower doses to normal tissues should be pursued to minimize long term toxicity and maintain excellent quality of life.