

# Treatment of Symptomatic Local Recurrence and Bulky Pleural Metastases from Thymoma Using Heterogeneously Prescribed Image-guided Intensity-Modulated Radiation Therapy Techniques (IG-IMRT)

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## Background

- Standard treatment for thymoma includes surgery with post-operative radiation for select patients. Patterns of failure include local tumor recurrence and pleural metastatic spread. These lesions are often refractory to systemic therapy and become progressively symptomatic.
- We present the case of a 66 year old male patient with locally recurrent thymoma with an enlarging upper anterior mediastinal mass, progressive under multi-agent chemotherapy [CAP]. He was also diagnosed with multiple symptomatic right pleural based metastatic lesions. He had undergone initial resection of the primary tumor, and re-resection with adjuvant radiation therapy to 60 Gy for a local recurrence 12 months prior to this presentation. He was referred for consideration of re-irradiation of second local recurrence with concern for impeding airway compromise (Figure 1).
- Owing to prior radiation exposure, he received palliative heterogeneously-prescribed IMRT to the 53 mm upper mediastinal mass to a dose of 37.5 Gy (max. dose 45 Gy) over 15 fxs @ 2.5 Gy/fx with dramatic radiographic response, near complete tumor resolution while under radiation treatment. (Figure 2-3). Based on this favorable response, consensus recommendation was to also initiate focal radiation therapy to the rapidly growing and increasingly symptomatic pleural lesions.

## Methods

Based on PET-CT simulation (Figure 4), an intensity-modulated arc therapy plan (RapidArc, Varian) was developed (37.5 Gy over 15 fractions; heterogeneous dose prescription with dose maximum of 48.8 Gy). Early significant tumor response required re-simulation and adaptive re-planning after 8 fractions (Figure 5). The cumulative V20 lung was 12%, mean liver dose was 18 Gy.

## Results:

At 6 week f/u partial tumor response of pleural disease was documented (volume reduction >75%), (Figure 6). The right sided chest wall pain had resolved, and the patient had regained uncompromised physical activity (ECOG 0). PET-CT at 3 months post completion of RT revealed further disease resolution, with near complete tumor response and decrease in maximum tumor SUV to 2.4 (Figure 7).

## Conclusions

Modern radiation therapy concepts and modalities, namely heterogeneous dose prescription delivered using rotational IMRT techniques, can result in dramatic tumor response of chemotherapy resistant thymoma and offer effective short-term palliation without appreciable toxicity.

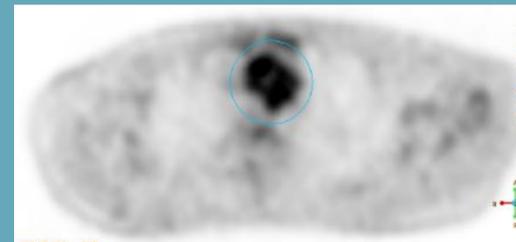


Figure 1: PET-CT simulation of anterior mediastinal lesion; max SUV 3.4

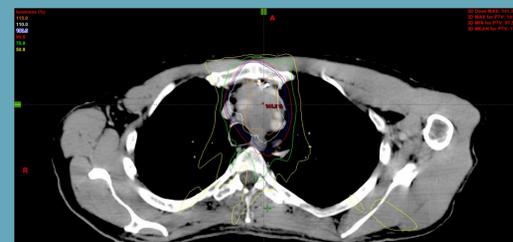
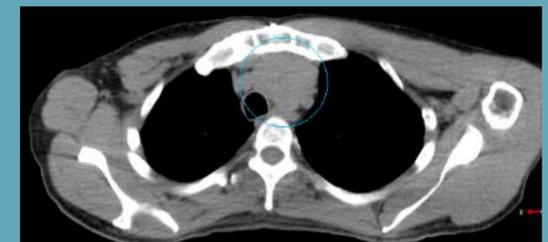


Figure 2: 4 field IMRT plan, Dmax 63.6 Gy, V20 Lung 8%

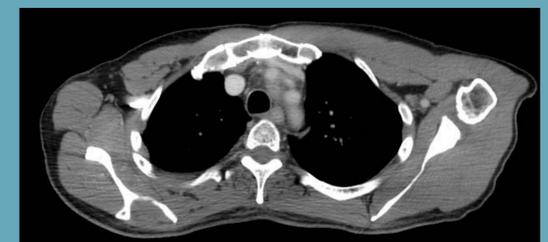


Figure 3: CT thorax at completion of treatment

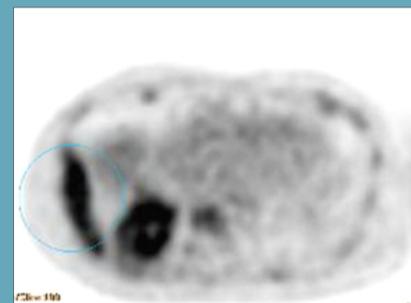


Figure 4: PET-CT simulation. Max SUV 3.8

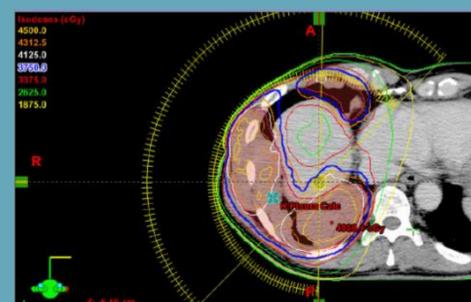


Figure 5: IMRT plan, Dmax 48.8Gy, V20 Lung 12%, mean liver dose 18Gy

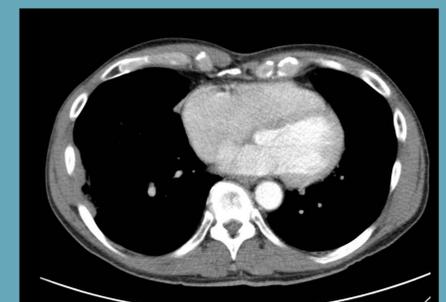


Figure 6: Follow up CT 6 weeks post treatment with >75% tumor reduction

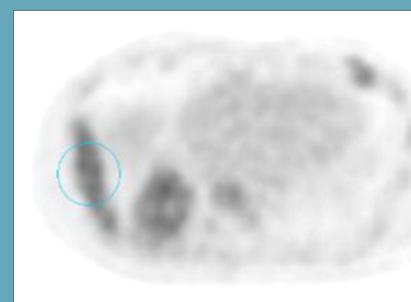


Figure 7: Follow up PETCT at 3 months post treatment. Max SUV 2.4.