

Definitive Radiotherapy for Merckel Cell Carcinoma of Temple: Intensity Modulated Radiotherapy (IMRT), Matched Electron Fields (MEF) or .decimal Bolus Electron Conformal Therapy (BolusECT™)?

*Anesa Ahamad MD, †Donald Weed MD, ‡Darel Pruett MD, §Daniel Saulpaugh CMD, ¶Eduardo Fernandez MD PhD,

* 21st Century Oncology, Key West, FL, †University of Miami, FL, ‡Pruett Dermatology, Key West, FL, §21st Century Oncology, Greenbelt, MD, ¶21st Century Oncology, Ft. Lauderdale, FL

Background:

Patients who decline head and neck surgery for Merckel cell carcinoma(MCC) may be treated with radiotherapy. The primary and comprehensive nodal volume are often treated using IMRT which incurs a risk of mucositis. For an 87 year-old female with a 1.5cm MCC 1.5cm lateral to orbital rim, we delivered 50Gy to elective nodal regions and 70Gy to primary following comparison of three techniques.

Materials and Methods

Simulation: immobilized patient, radio-opaque wires to delineate skin target, dummy eyes-shield in-situ, and reference BBs. Targets and normal organs from scalp to below clavicle were outlined. Dosimetry was computed for the 3 techniques: IMRT, MEF and BolusECT™, normalized to at least 95% target-volume coverage using CMS XiO®. BolusECT™ uses a single electron beam with a computer designed variable-thickness compensator. Repeat simulation was performed with fabricated bolus.

Results

	IMRT	MEF	BolusECT™
Mean Dose oral-cavity/lips	21.4Gy	9.3Gy	3.6Gy
Mean Dose larynx	31.5Gy	43.7Gy	17.5Gy
Mean Dose pharynx	23.4Gy	20.1Gy	6.0Gy
Mean Dose cervical esophagus	33.7Gy	31.0Gy	9.1Gy
	IMRT	MEF	BolusECT™
Volume of oral-cavity/lips >40Gy	40cc	22.7cc	12.2cc
Volume of oral-cavity/lips >40Gy	17.5cc	8.8cc	0.9cc
Volume of pharynx >45Gy	4.2cc	9.0cc	0.5cc
	IMRT	MEF	BolusECT™
Treatment delivery time (minutes)	10.4	1.8	0.9

50Gy was delivered to target volume from scalp to supraclavicular fossa with BolusECT™ using a **single 15MeV beam**. 20Gy boost was delivered by a single appositional **6MeV beam**.

There were no treatment interruptions. She developed *No observable mucosal changes*, sustained weight-loss of 1lb; **Grade 1:** fatigue, alopecia, skin and oral discomfort, hyperpigmentation, and dysphagia; **Grade2:** dysguesia and xerostomia. She remains without evidence of disease.

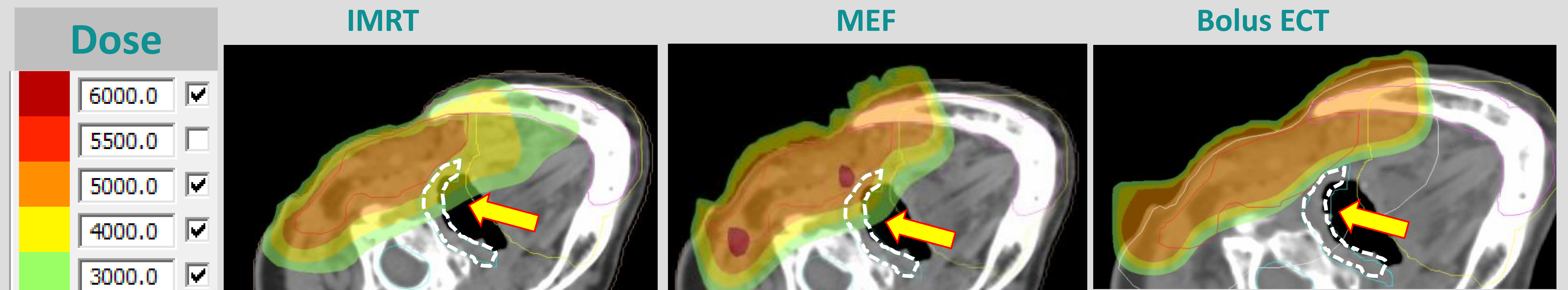
Pre-Treatment



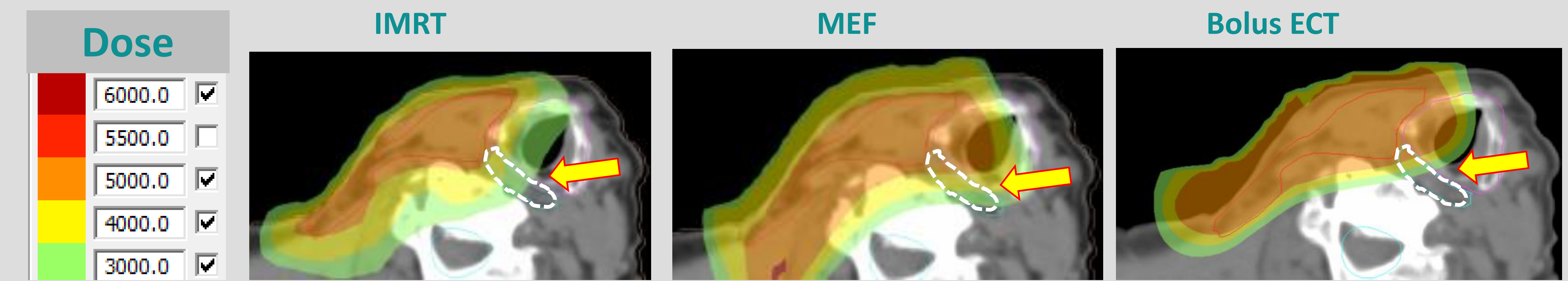
4 weeks Post Treatment



Initial 50Gy: Mucosal dose at oropharyngeal level (mucosa in dashed white contour)



Initial 50Gy Mucosal dose at hypopharyngeal level (mucosa in dashed white contour)



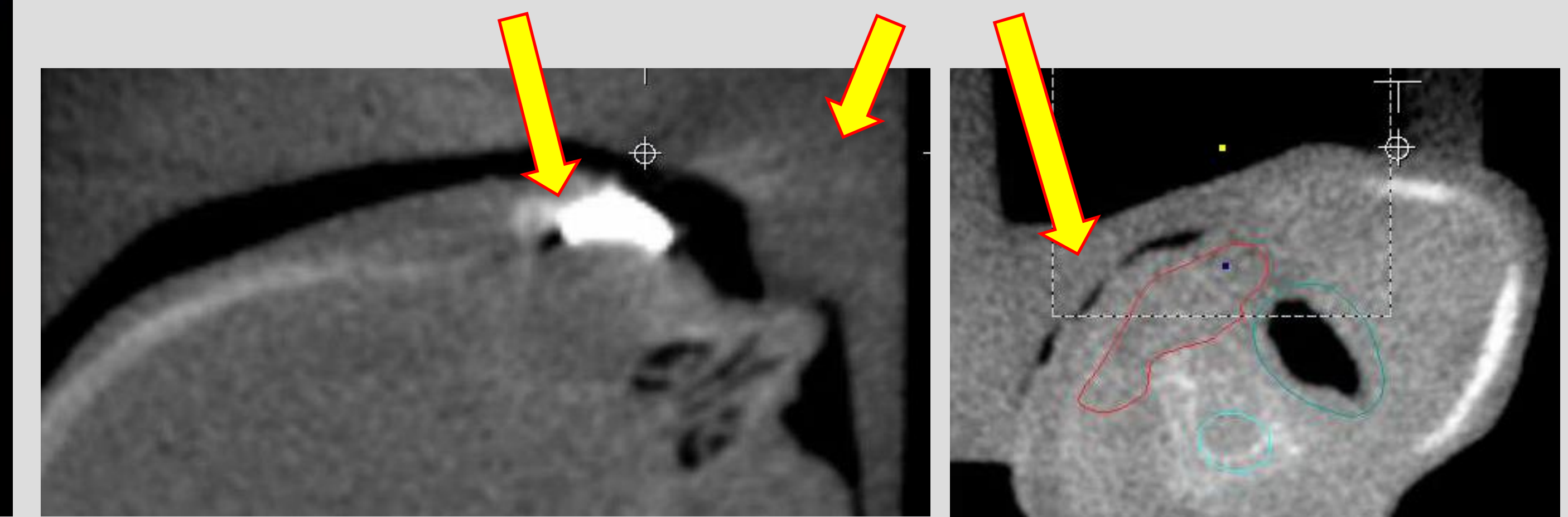
BolusECT™



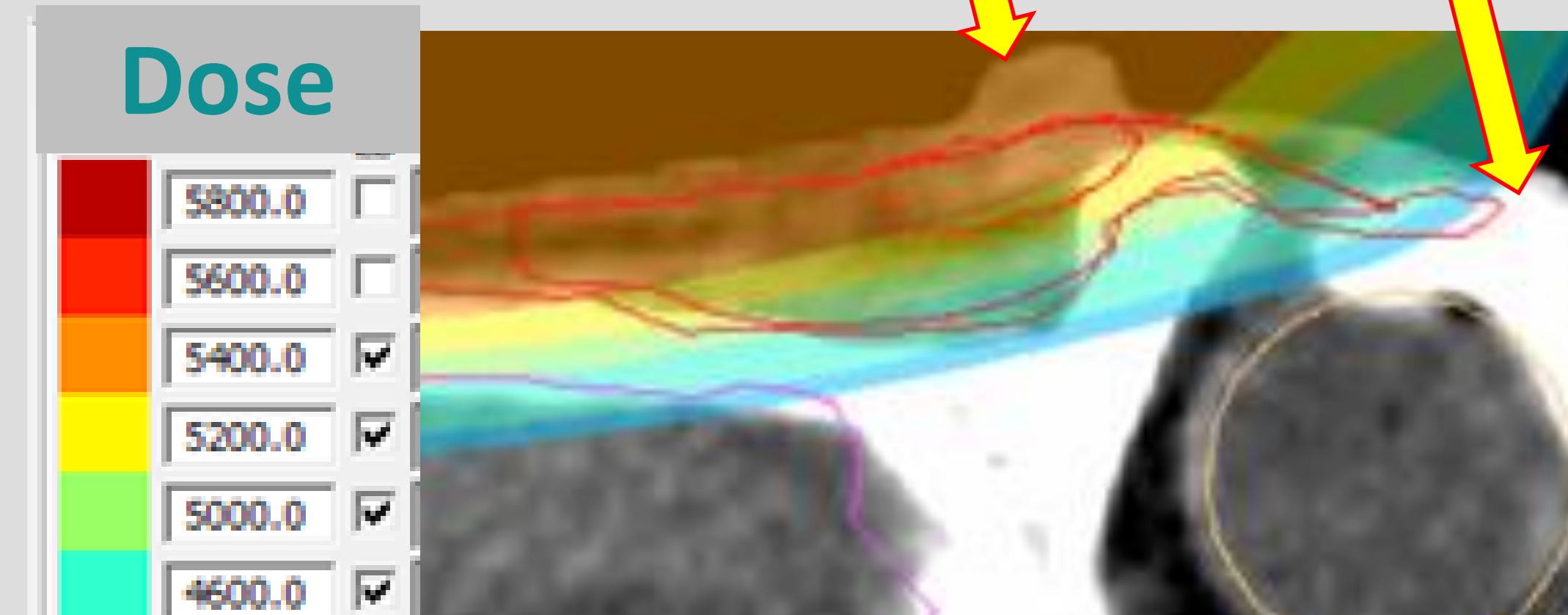
CT simulation image with BolusECT™ in situ



Verification MV cone beam image pre-treatment with eye-shield and BolusECT™ in-situ

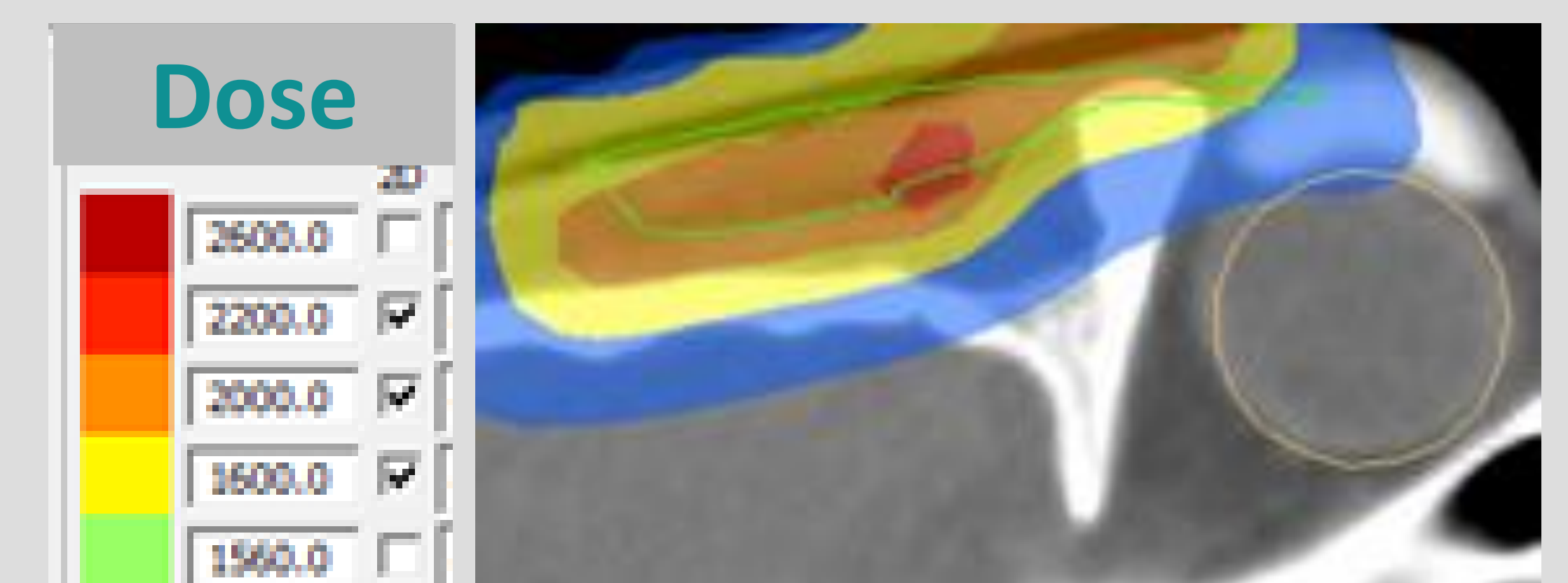


Initial 50Gy to primary lesion



dummy eye-shield

20Gy boost field with skin collimation



Conclusions

While IMRT is a standard technique for most head cancers and offers excellent sparing of normal tissues that avoid late effects, BolusECT™ is appropriate for superficial targets with good sparing of mucosal tissue that reduces acute mucositis that may impair nutrition, quality of life and treatment intensity. Questions or comments: anesa.ahamad@21co.com