Feasibility of post-operative VMAT radiotherapy for circumferential neck keloids: Case Study

Quyen Duong, B.S., CMD; Minh-Tam Truong, MD; Ariel E Hirsch, MD; Akash Parekh, MD; Kimberley S Mak, MD, MPH; Siyoung Jang, PhD; Soyoung Lee, PhD; Harry Bohrs, BSc; Paul Nettey, CMD.; Xin Zhang, PhD

Department of Radiation Oncology, Boston Medical Center, Boston, MA

Introduction

Keloid excisions have utilized electron beam radiotherapy delivered within 24 hours of surgery to reduce the recurrence.

Large keloids of the neck often result in matching problems with moving junctions and excessive hotspots with electron beam radiotherapy.

This study presents a volumetric modulated arc therapy (VMAT) keloid plan for a large circumferential keloid excision.

Methods and Materials

Postop neck keloid excision measuring *21.9 cm × 14.6 cm* was treated with VMAT.

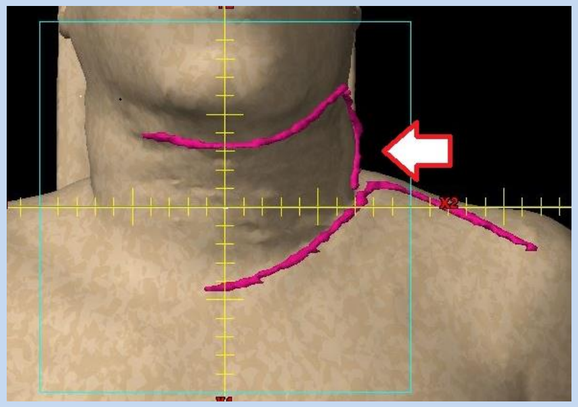

Fig 1. Keloid excision wired at CT simulation.

1800 cGy was delivered in 3 fractions over 3 consecutive days, with the 1ST fraction delivered within 24 hours of surgery.

CT simulation with thermoplastic mask.

CTV = incision and postoperative bed.

CTV +3 mm = PTV.

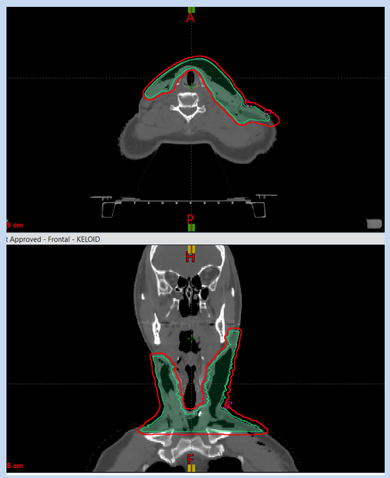

Fig 2. CTV shown in green and PTV shown in red.

Methods (continued)

A VMAT plan was generated using 3 arcs, 6MV photons and 0.8 cm bolus daily.

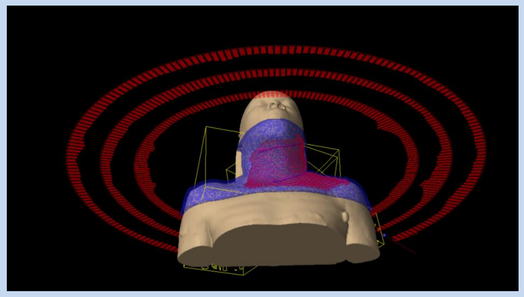

Fig 2. Arcs shown with 0.8 cm daily bolus, as seen in blue, covering the red PTV volume.

The goal was 95% coverage of the PTV with hotspots within 110% of the prescription dose.

5 cm Normal Tissue Ring (NTR) was created 7 mm from PTV.

Upper gEUD objectives were set to 1.1 to the esophagus and larynx to reduce Dmean.

Dmax of brainstem and spinal cord were optimized to less than 50% of Rx.

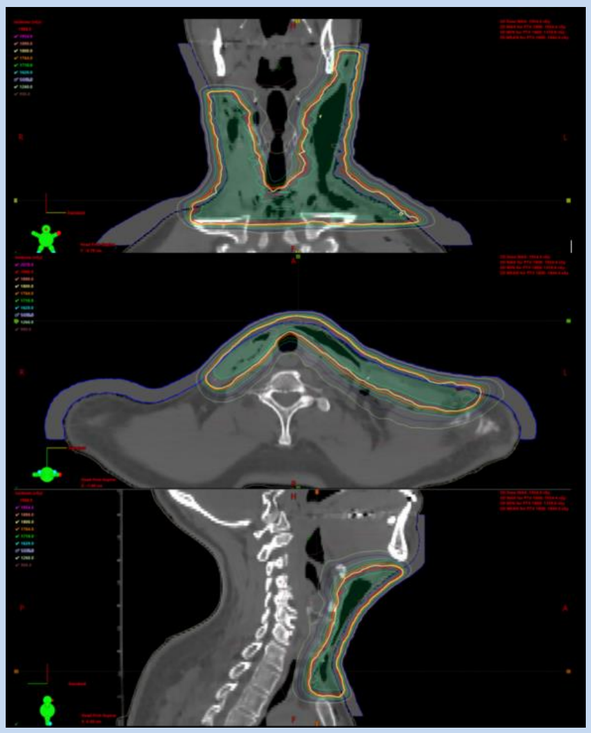

Fig 3. VMAT plan isodose distribution in coronal, axial, and sagittal planes. Yellow representing 1800cGy or 100% of Rx.

The VMAT plan was compared to Electron beam plans with matching electron fields using a moving junction.

Results

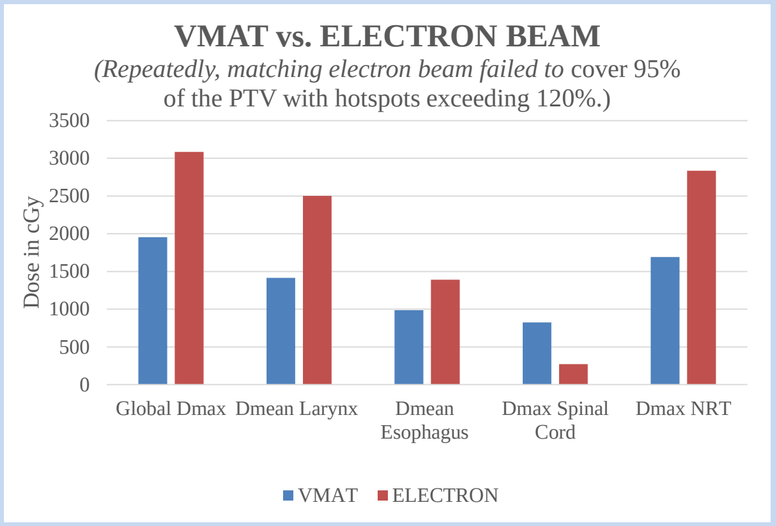

Table 1. VMAT compared to matching Electron beam plans for evaluation of OARs sparing and Dmax values.

Fig 4. Pre-surgical keloid.

Fig 5. Six months post radiation.

Conclusion

A VMAT postoperative keloid plan for complex circumferential neck incisions provide superior target coverage and better OAR sparing compared to EBT plans.