For CTM-based TC and TS, results are presented in Table 1, where 11 of 15 patients had parts of the cord < 1mm of the TS circumference. Based on a 21.9 Gy max TS point dose in 3 fractions, the potential max TC point dose is 20.0 Gy ± 1.4 Gy, assuming a dose fall-off of 10% per mm. This is equivalent to 43.6 Gy ± 5.3 Gy in 2 Gy fractions given α/β = 2. As seen in Table 1 this could lead to a potential risk of radiation myelopathy higher than 5% in 11 out of the 15 patients. Figure 1 shows the comparison of TC and TS and highlights the parts where the TC protrudes out close to the TS edge (color-coded in red).

Conclusion:

- Achieved ≤ 2.5% of prescribed dose except for osseous muscle (−4.5%) and parotids (5.0%) for the last CBCT using indirect propagation. Mean relative dose difference between automated and corrected contours was within ±2.5% of prescribed dose except for osseous muscle (−4.5%) and parotids (5.0%) for the last CBCT using indirect propagation. Mean editing time was significantly faster than contouring from scratch (p<0.005).

Conclusion: Compared to a golden standard of manually corrected contours the DIR algorithm was accurate for use in CBCT images of head and neck cancer patients and the minor inaccuracies had very little consequence for mean dose in most clinically relevant OAR. Accuracy was higher for the first CBCT compared to the last. The indirect method of propagating contours to the last CBCT via the first CBCT yielded worse results than direct propagation from pCT.

EP-1907

Accuracy of software-assisted contour propagation from planning CT to cone-beam CT in head and neck C. Hvid1, U. Elstrøm2, K. Jensen1, C. Grau1
1Aarhus University Hospital, Dept of Oncology, Aarhus C, Denmark
2Aarhus University Hospital, Dept of Medical Physics, Aarhus C, Denmark

Purpose or Objective: Recent years have seen a number of studies documenting accuracy and time savings for various software solutions used for automated contouring of target volumes and organs at risk (OAR) in radiotherapy, thus easing the heavy workload associated with replanning needed for implementing adaptive treatment strategies. The vast majority of studies have been performed on CT images and experience with other imaging modalities is limited. This study aims to determine the accuracy of a deformable image registration (DIR) algorithm for OARs in the neck region, when applied to cone beam CT (CBCT) images.

Material and Methods: For 30 head and neck cancer patients 14 OARs including parotid glands, swallowing structures and spinal cord were delineated. Contours were propagated by DIR to CBCTs corresponding to the first and last treatment fraction. An indirect approach propagating contours to the first and then the last CBCT was also tested. Propagated contours were compared to a gold standard (manually corrected contours) by Dice similarity coefficient (DSC) and Hausdorff distance (HD). Dose was recalculated on CBCTs and dosimetric consequences of uncertainties in DIR were reviewed. Time consumption for editing automated contours was recorded.

Results: Mean DSC values of ≥ 0.8 were considered adequate and were achieved in base of tongue (0.91), osseous muscle (0.85), glottic (0.81) and supraglottic larynx (0.83), inferior pharyngeal constrictor muscle (0.84), spinal cord (0.89) and all salivary glands in the first CBCT. For the last CBCT by direct propagation, adequate DSC values were achieved for base of tongue (0.85), osseous muscle (0.84), spinal cord (0.87) and all salivary glands. Using indirect propagation only base of tongue (0.80) and parotid glands (0.87) were ≥ 0.8. Mean relative dose difference between automated and corrected contours was within ±2.5% of prescribed dose except for osseous muscle (−4.5%) and osseous muscle (5.0%) for the last CBCT using indirect propagation. Mean editing time was significantly faster than contouring from scratch (p<0.005).

Conclusion: Compared to a golden standard of manually corrected contours the DIR algorithm was accurate for use in CBCT images of head and neck cancer patients and the minor inaccuracies had very little consequence for mean dose in most clinically relevant OAR. Accuracy was higher for the first CBCT compared to the last. The indirect method of propagating contours to the last CBCT via the first CBCT yielded worse results than direct propagation from pCT.