patients are dual scanned i.e. IV contrast 3D scan followed by non contrast 4DCT.
Sixty five percent of centres agreed or strongly agreed updated guidelines would be useful.

Conclusion: The results suggest adherence to RCR guidelines is poor. Very little current evidence exists relating to optimal IV contrast protocols both in the UK and internationally. No standardised guidelines exist in relation to 4DCT IV contrast protocols and timings which in some centres is resulting in patients being dual scanned. There are many areas such as flow rates, timings and administration in conjunction with advanced techniques which require further research to enable updated standardised guidelines to be identified. The need for updated guidelines is supported by 65% of respondents of this study.

Poster Viewing: 8: Physics: Inter-fraction motion management II  

PV-0375  
Comparison of carina- versus bony anatomy-based registration for IGRT in esophageal cancer.  
M. Machiels1, P. Jin1, C.H.M. Van Gurp1, J.E. Van Hooft1, T. Alderliesten1, M.C.C.M. Hulshof1  
1Academic Medical Center, Radiation Oncology, Amsterdam, The Netherlands  

Purpose or Objective: In image-guided radiotherapy (IGRT) for esophageal cancer, it is common to use bony anatomy-based registration (BR) for setup verification. A recent study, in which we investigated fiducial marker-based registration relative to BR, indicated marker-based registration to be infeasible due to tissue deformation. In the present study, we investigated the feasibility and geometric accuracy of carina-based registration (CR) for CBCT-guided setup verification in esophageal cancer IGRT.

Material and Methods: Retrospectively, 24 esophageal cancer patients with 65 implanted fiducial markers, visible on planning CTs and follow-up CBCTs, were included in this study. Fiducial markers were considered as standard for tumor position. All available CBCT scans (n=236) were independently rigidly registered to the reference CT with respect to either the bony anatomy or to the carina using XVI software (Elekta Ltd. Crawley) to determine the individual marker displacement relative to the bony anatomy and to the carina, respectively. Automatic registrations were visually checked and manually adjusted when necessary. Subsequently, we assessed and compared per individual marker the mean marker displacement over the treatment course (systematic position error, SE) associated with either BR or CR. Markers were classified into four subgroups based on their locations in the esophagus (proximal, mid-esophagus, distal, cardia) and analysis was similarly as mentioned above performed per subgroup. Comparison between both registration methods was done using a paired Wilcoxon signed-rank test.

Results: The distributions of the absolute mean systematic position error of the individual markers relative to the bony anatomy and carina, especially in the CC direction. Figure 1.B, illustrates the slightly favorable use of the BR for proximal located markers. Markers located in the mid-esophagus show a smaller SE in CC and AP direction when using the CR, however this difference was not significant. For markers located in the distal esophagus and cardia, the BR is favorable in AP direction (p<0.001). Furthermore, the majority of the CRs were more challenging given the low contrast resolution in comparison with the BRs.

Conclusion: The mean marker displacement (SE), residual tumor position error, over the treatment course remains large and is in most directions even slightly larger when using CR compared with BR. Only for tumors located in the mid-esophagus the CR can be slightly favorable. However, esophageal tumors typically extend across regions and the majority of tumors are located distally. Therefore, our data endorse the use of BR over CR for setup verification.

PV-0376  
Contrast-enhanced respiration managed cone-beam CT for image-guided intrahepatic radiotherapy  
M. Lock1, N. Jensen2, R. Kozak3, J. Chen4, T. Lee5, E. Wong6  
1London Regional Cancer Centre - Victoria Hospital, Department of Radiation Oncology, London, Ontario, Canada  
2Næstved sygehus, Department of Oncology, Næstved, Denmark  
3University of Western Ontario, Medical Imaging, London, Canada  
4University of Western Ontario, Radiation Oncology, London, Canada  
5University of Western Ontario, Lawson Imaging, London, Canada  
6University of Western Ontario, Physics and Astronomy, London, Canada