AbstractID:8727Title:Studyoftranslationa l andr otational setuperr orsandtheircorrectionmethods forhead&neckpat ientsusingkil ovoltagecone -beamcom putedtomogr aphy(kVCB CT)

Purpose: T oinvestigatethemagnit udeofth esi xdegree setuperrorsinh ead&neckpatients(HNC)andevaluatewhich correctiondata, obtainedfrom thre ed egree ands ixd egree 3D/3D registration,is moreappropriate fors etupcor rectionif thes etuperr ors arecorrected by translationalshifts .

Methods and Materi als: kVCBCTimagesw ereacqu iredonthefi rstdayof treatmentand weekly thereafter for 21HNCpatients treated with IM RT. A total of 14 5 CBCT image sets were acquired. The C BCT images were regi stered with the corresponding planning CT images using two d ifferent 3D rigid registration approaches. With Approach1 t he registrati ons were conducted with translations alone, with Appr oach2 al lsixdegreesweret akenint oaccou nt. The se tuperr orwit hthem aximumr otational error was simulatedonplanningCT f or twop atients,t hen theerrorswer ecorr ectedby applying the translationaldataobtainedf romApproach1 (Correction1)a ndApp roach2(Cor rection2), respectively. Dosimetricindiceswer ecompar edf ort hetwo corrections.

Results: Forthe se 21HNCpa tients,t hea veragetranslation al errorsdeterminedwithApproach1were1.0±3.5, 0.8±3.5,1.6±3.8m m and thevaluesdete rminedwith Ap proach2were1 .1±5.0,0 .4±3.8,2 .2±4.7mminLR,APandSIdi rectionsr espectively.Theaverage rotationalerrors determinedbyA pproach2we re0.6 ^{o}±1.1^{o},0 .1°±1.9^{o},0.3 ^{o}±0.8^{o} andthe average maximume rrorswere 0.9 ^{o}±1.6^{o}, 0.5^{o}±3.0^{o},0.4 ^{o}±1.1^{o}a roundLR,AP andSIa xesresp ectively.T hePTVpres criptiondose coverage was86.1% and 92.3% f orpatient1, 92.1%a nd92.4%forpatent 2 withCorr ection1andCorre ction2respectively .

Conclusions: Relatively l arge r otational errors were observed in HNC pati ents. Instinctively, it appeared that the Corr ection1 were more accurate thanCorr ection2if onlyt ranslationalcorrectio nswereinvolved . Theresultf orpatient1 showedth at itmay not bethe case.The dosim etricimpa ct ofb oth correctiveapproaches hast obefu rtherinve stigatedto evaluate which approach should be applied toco rrectthe setuperro rs.