AbstractID:8896Title:Ana lysisofPros tatePa tientS etupE rroran dOrganMotionErr or usingCal ypsoSetup Sh iftan dTracking Data

Purpose: To evaluatethe pro state patients etupand intra-fraction organmo tionerror dis tributions bya nalyzing initial setup shiftand target trackingd atao btained fromth e Calypso system.

Method and Materials: The s patial coor dinates o f the centroid o f three implanted markers implanted in the prostates of 1 3 patients were mon itored by o ur C alypso system w ith 10 Hz sampling frequency. P atients w ere initially setup to tatto os and th en sh ifted to the Cal ypso localized locat ions. Measu rements wer e performed f or average 32 fractio ns of average time about 8 mi nuteseac h. Foreachpatient,thes ystematic s etup correctionand standar d-deviation (SD)ove ral lf ractionswas obtainedf orth eleft -right(LR),anterio r-posterior(AP)and superior - inferior(SI) axes.Systematics etuperrorwaso btainedastheS Dofth e systematicset uperr orsof allpatients .Si milarly,thesystemat icand rand omco mponentso fpro stateintra -fractionalmoti on were obtained f rom the trackin g data. For a ll pa tients, correlation coeff icients were calculated amongthethreeaxesoftrackin gd ata;th e cumulativep robability oftotal3 Ddisplacementfro m initialsetu pwasalsocalculated.

Results: The systematic and ran domcomp onents ofth e in itial s etup er rorsforLR , APandSI axes are 2 .4mm, 2.6mm an d 3 .2mm, resp ectively and 3.6 mm, 2. 7mm a nd 3.3 mm. Th e correspondings ystematic an dran domco mponentso fpr ostateintra -fractional motion er rors are 0.3mm, 0.5mm and 0. 6mm, and 0.6mm , 1 .1mm and 1.0mm, res pectively. Th e correlation between AP and SI motion was significant. The 3 D displacement d ata in dicates that 11 of 13 patients have9 4.4% orhigher probabilityof pr ostate motion within5mm from the Calypso setup positions. However, onep atients howed2 8.7% probabilityo f motion beyond 5mm.

Conclusion: Inour patientpo pulation,resid ualsy stematicand randomerr orduet oin tra-fraction prostatemotionissmall,onceinter -fractionsetup -organmo tionerr orshaveb eeneliminatedby Calypso-guidedonlin esetup.