AbstractID:8 597 Title:Monitor ingandQual ityAssura nceofthe Tomothe rapyHi -Artusing thebuild -inMVCTdetec tor

Purpose

Monitoringthe He lical Tomotherapy(HT) ma chine usingth esi gnals fromt hesystem s'b uilt-inM egavoltageCT -detector (MVCT),lea dingtoa filmlessQualityAssurance(QA)   p rogram

MethodsandMa terials

Fourmonito ringtoolsare developed inth e RISO whichare inuse fo rbot hHT machines,sinceM ay2007 :
-'TomoOutp ut'fordailyme asurementof outputand energy.
-'TomoSc ope'p rovidesa30Hzgr   aphicalp resentationof theoperati onalstat eoft hem achine,whileradiat ing.
-'TomoPh ysics'providesbo thapulse -by-pulseana lysis and at rend-analysisoft hetransve rsalprofilean dof 18 different machinep arametersand comb inations from that.
-'TomoQA'auto matesQA,usingan   Al-stepwedgep hantom.

Results

Anumberofp   arametersaremon itoreddai ly, likewat er-flows,air -pressure,wa ter-temperature,CT -channelsand m onitor-chambers.T hetran sversalp rofileistunedwit hint ypically 2%. Driftin dicatestarget deg radation.Outpu tshow sava riation of 0.8%.Driftindo sera te is0 .9%/200sec for one HTand 0.3%/ 200sec forthe oth er. Geometricsta bilityasf unction ofga ntry positionise xcellent:top -top0.5CT -channel.
TheQAto olres ults(sept'07 -feb.'08):The longitudinalprofi leFWHM1 0mmvaries0.0 5mm(1σ).En ergyva ries0 .2%(1 σ). Synchronizationo f MLC-gantryvar ies0.2deg (1 σ).Couch speedvaries0.2%(1σ).A re startedp roceduresho uldclosely align theinterr uptedo ne.Smal lmismatchesof 0.2mm   areme asured(1 σ). Stabilityoft hesag ittaland transver sal lasersisgoo d (σ=0.4mm).

Conclusions

Themonitoringtool shave increasedourunderstandi ngof th e behaviouroft hise mergingtre atmentm odality.The QAtoo lis time efficientb ecausethe analysisisfi lmless and addresses severali temssim ultaneous.W eaim tor un thep rocedureon a dailybasis. Ane wQAprog rami simple mentedbase d onthesetool sand experiences. Thisp rogramisin usesince   September 2007.Futurefunc tionalitywill incorporate gantrybeh aviourandMLC   dynamics.