AbstractID:9577Title:Incorporating SPECTFunctionalLung Images in RoutineTreatment PlanningforLungCancer

Purpose: SPECTlung perfusion images has been used to derive functional DVH for planning a decade ago(Markset al 1994), however,it is still not widely used. The current study describes a method to incorporate functional imag es in routine planning based only on commercial TPS.

MethodandMaterials: 12 patients were immobilized with these ame Alpha -Cradle on SPECT/CTcomboun itan dCTs imulator. TheSP ECT was registered to the planning CTb y registeringthelow -resolutionCTto theplanning C T. Thewh olel ungwas divided into several sub-volumes according to the pixel values of thep erfusionimag e (PVPI) abovethebackgr ound. Thelungfunct ionalityw as ass umed to be linear withth ePVP If or up to 80% o fits maximum value,asus edbyother investigators.Th em eanP VPIin each lungsu b-volumew as used to definedt hefunctional ityw eight factor.The $V_{20function}$ wa sdeterminedbase d onth e dose-volume andw eightfactorf oreachs ub-volume.

Results: Thepri ority scorew assetforeachsub -volumeaccordin gto theweightfactorfor IMRT optimization.Fo rnon -IMRT plan,sub -volumeswithh igher weightf actorsser veas avo idance structuresf orfi eldoptimiza tion.The 22% (range1 1-35%)lun gvo lumeh ada weightf actor ≥ meanwe ightfactor.Th e differencebetwee nperf usionweigh tedlu ng volumeandactuallung volumewas –1565 cc(mean , range –491 to –3270 cc).V $_{20function}$ wassma llerthanV $_{20}$ in11of12 patienta ndthedif ference ranged from –0.4% to –12%.

Conclusions:Because theex act relationshipbetween lun gfu nctionality andPVPIisst ill uncertain,largebinnu mbermayno t be required.Ou rm ethodfo rr educingthenumberof functionalbi nstoseveral/ less thanad ozenmay still provideu sefulp redictionf or toxicityand significantlyreduce s theamou ntof effo rti n planningan dcan be routinely implementedin a clinicalsett ing.