

Purpose:

Elekta recently introduced a new delivery control system called PreciseBeam® VMAT that provides dynamic delivery capabilities including volumetric modulated arc therapy (VMAT). VMAT is a rotational approach to the delivery of IMRT that can be delivered on a conventional linear accelerator. In this study, we report on our initial clinical experience with Elekta VMAT.

Method and Materials:

The PreciseBeam® VMAT control system has been installed on an Elekta Synergy and an Elekta Precise linear accelerator in our clinic. We have tested the delivery system in conjunction with three inverse planning solutions: (1) an in-house arc sequencing algorithm that translates optimized fluence maps into deliverable VMAT plans, (2) the Ergo++ planning system that utilizes anatomy based inverse planning, and (3) the SmartArc planning module in the Pinnacle³ treatment planning system. The optimized treatment plans have been verified using phantom irradiations with the IBA MatriXX 2D ion chamber array embedded in a MULTcube phantom.

Results:

Using our arc-sequencing algorithm for VMAT planning, we treated our first Elekta VMAT patient under an institutional review board (IRB) protocol in July 2008. In January 2009, we treated our first Elekta VMAT case planned using Ergo++. Our initial focus was on more simple concave targets. More recently, we have opened up VMAT for all clinical sites.

Conclusion:

Elekta's Precise Beam® VMAT control system can safely and efficiently delivery highly complex VMAT treatment plans. For simple targets such as prostate, pancreatic, and lung cases, single arc VMAT plans are sufficient and be typically delivered in less than 3 minutes. For more complex cases such as head-and-neck, the use of multiple arcs provides a dosimetric benefit and plans typically take between 4 and 6 minutes to deliver.

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