

Volumetric modulated arc therapy (VMAT), a rotational approach to intensity modulated radiation therapy (IMRT), has attracted significant attention recently due to its capability of providing highly conformal dose distribution with excellent delivery efficiency. With the current development in both linac control systems and inverse planning solutions, VMAT can now be implemented in clinics with its full capability. This presentation will focus on clinical implementation for Elekta VMAT.

Various inverse planning solutions are available now for Elekta VMAT technique, including Ergo++, Monaco, and Pinnacle³ SmartArc. As a semi-inverse planning tool, Ergo++ can provide reasonable plan quality for relatively simple cases. For more complicated cases, however, full inverse planning approaches, such as Monaco and SmartArc can provide more conformal dose distributions.

VMAT plan QAs using different QA setups were studied and compared. The conventional ion chamber and film combination gives excellent QA results with highest resolution. Comparing to the systems with instantaneous dose readout, the film system takes longer time to perform the data analysis. The QA result of the film system also depends on the types of the film processors and chemicals inside, which is undesirable. The angular dose response exist in both 2D diode array and 2D ion chamber array systems. The 2D diode array also has a dose rate dependent dose response. With these factors taken care of, both systems can be used for VMAT QA. As to the VMAT machine QA, a clinical tool was successfully developed to test the accuracy of the gantry angle, MLC leaf position, as well as dose rate during VMAT delivery.

This presentation will provide the audience an overview of the VMAT technology. The latest development of the inverse planning tools for Elekta VMAT will be presented. VMAT plan QA using different setups as well as machine QA will also be discussed.

Educational objectives:

1. Understand the basics of VMAT technology
2. Getting familiar with different VMAT inverse planning solutions.
3. Getting familiar with VMAT QA techniques.

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