

Purpose:

To evaluate the differences and stability of Twin Peaks linac in TomoTherapy system.

Methods:

In general, the following checks are performed prior to using a new x-ray machine for radiotherapy treatment: acceptance testing, dosimetric commissioning, plan verification, quality assurance procedures, radiation and interlocks safety.

The beam modeling of TomoTherapy machine involves four steps: (I) static beam profiles, (II) helical data, (III) MLC data and (IV) IMRT plan verification.

The commissioning of the Twin Peak accelerator was conducted with a physicist from the TomoTherapy Inc.

Results:

Our experience and data comparison is based on commissioning results of this unit equipped with TomoTherapy's new Twin Peaks linac and the earlier version of Tomo's conventional linac and on nine month of clinical usage.

The photon beam spectrum of helical Tomotherapy in the treatment mode has approximately a maximum energy of 5.7 MeV. Our experience with Twin Peaks yielded about 5.2 MeV.

Similarly earlier units operate with a dose rate of about 850 cGy/min at the isocenter. Our unit's dose rate is about 835cGy/min. During nine months period, deterioration of the target was not observed compared to the earlier models. The dimensional characteristics of the Twin Peak LINAC have maintained the same SAD specification, and spot size capability. There was no difference in the beam performance of units with the two different types of LINAC. Details of the data will be presented.

Conclusions:

Based on acceptance tests and commissioning of Twin Peaks linac helical TomoTherapy Hi Art system and nine months of clinical usage, we found out that the energy and dose rate are lower than the earlier version linacs. The target behavior and profile shoulder curves unlike the other earlier linac have not shown so far any changes. Overall, it is a much better target and improved technology versus the earlier version.