Purpose: Two treatment delivery modes are provided in Helical/Direct Tomotherapy. TomoHelical delivery mode is an image-guided, intensity-modulated, radiation therapy technique in a continuous helical pattern, using narrow beamlets, which are individually optimized to target the tumor. However, TomoDirect delivery mode is a discrete angle, non-rotational delivery mode and allows treatment plans that include target-specific gantry angles. The user may define the modulation for the plan in 3D delivery mode. During treatment delivery, all beams are at an appropriate speed for each gantry angle. In TomoDirect mode, the treatment planning is completed rapidly without compromising the quality of radiation treatment compared to TomoHelical mode which takes longer planning time.

Methods: To investigate the distinctions between TomoHelical and TomoDirect modes and compare the Dose Volume Histogram (DVH) among target and organs at risk (OAR). Three different sites were selected for this study. Two planning modes were applied. However, other settings such as field width, pitch and IVCT were kept the same for fair comparison. The TomoHelical and TomoDirect were tested using the same prescription to target with OAR constraints.

Results: The results of DVH’s for target coverage and OAR constraints were shown in Figures 1-6 with TomoHelical and TomoDirect modes respectively. Three different treatment sites were summarized. A slightly better coverage to D95 of prescribed dose in TomoDirect mode were shown in comparison to that in TomoHelical mode where the hot spots were revealed.

Conclusions: TomoDirect planning mode is in contract to optimized TomoHelical plan. Without compromising the intended treatment coverage of D95 and minimizing the acceptable dose to the OAR, TomoDirect is a satisfactory option for clinicians and planners to generate a rapid plan instead of TomoHelical mode in TomoTherapy planning system. Shorter treatment time by 15-27% in several cases is another advantage without forsaking the plan quality in TomoDirect.