Original research article

**Treatment planning evaluation of sliding window and multiple static segments technique in intensity modulated radiotherapy**

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**Abstract**

**Background**

The demand of improved dose conformity of the tumor has been increased in radiation therapy with the advent of recent imaging facilities and efficient computer technologies.

**Aim**

We compared the intensity modulated radiotherapy (IMRT) plans delivered with the sliding window (SW IMRT) and step and shoot (SS IMRT) techniques.

**Materials and methods**

Thirteen patients were planned on 15 MV X-ray for five, seven, nine and thirteen beams direction making the dose constraints analogous. Eclipse treatment planning system with Helios inverse planning software, and Linear Accelerator Varian 2100 C/D with 120 multileaf collimators (MLCs) were used. Gamma analysis was applied to the data acquired with the MapCheck 2™ for different beam directions plan in the sliding window and step and shoot technique to meet the 95% pass criteria at 3%/3 mm. The plans were scrutinized using $D_{\text{mean}}$, $D_{\text{max}}$, $D_1\%$, $D_{95}\%$, dose uniformity index (UI), dose conformity index (CI), dose homogeneity index (HI) and monitor units (MUs).

**Results**

Our data show comparable coverage of the planning target volume (PTV) for both the sliding window and step and shoot techniques. The volume of PTV receiving the prescription dose was $99.8 \pm 0.05\%$ and the volume of PTV receiving the maximum dose was $107.6 \pm 2.5\%$ in both techniques. Bladder and rectum maximum mean doses for the sliding window and step and shoot plans were $38.1 \pm 2.6\%$ and $42.9 \pm 10.7\%$. Homogeneity index (HI) for both techniques was $0.12 \pm 0.02$ and $0.13 \pm 0.02$, uniformity index (UI) was $1.07 \pm 0.02$ and $108.0 \pm 0.01$ and conformity index at 98% isodose (CI 98%) was $0.96 \pm 0.005$ and $0.96 \pm 0.005$ for the sliding window and step and shoot techniques, respectively, and MUs were $10 \pm 12\%$ lower in the step and shoot compared to the sliding window technique.

**Conclusion**

All these factors indicate that coverage for PTV was nearly identical but dose to organs-at-risk (OARs) was lower in the step and shoot technique.
Keywords

Conformity index; Homogeneity index; Uniformity index; Organs-at-risk; Intensity modulated radiation therapy