Abstract ID: 16358    Title: A dosimetric study of different MLC expansion aperture for the radiotherapy of lung cancer

Purpose:
To find a appropriate MLC expansion aperture for the radiotherapy of lung cancer.

Methods:
Ten patients with central lung cancer treated with radiotherapy were enrolled in this study. Ten plans were designed for each patient using varian Eclipse treatment planning system. The gantry directions and weights of fields, position of ISO, dose normalization point and the prescription dose were same in the ten plans. The only difference was the MLC aperture margin (the distance between MLC and PTV edge in BEV). The MLC margin were 3 millimeters to 12 millimeters in the ten plans. The dose distribution in the target and the dose to the organs at risk were compared.

Results:
With the MLC aperture margin increased, the target volume receiving prescription dose and the dose to the organs at risk also increased together, the homogeneity in target became better and better and the conformity in target became worse and worse. When the MLC aperture margins were 3mm, 4mm and 5mm, the target volume receiving prescription dose were less than 90% and have not meet the clinical requirement. When the MLC aperture margins were 10mm, 11mm and 12mm, the target volume receiving prescription dose were more than 98%, the homogeneity in target showed best, but the conformity in target were worse and the dose to the organs at risk were significantly higher. When the MLC aperture margins were 6mm, 7mm, 8mm and 9mm, the target volume receiving prescription dose could meet the clinical requirement, the homogeneity and the conformity in target were moderate, Doses to organs at risk were acceptable. In the four plans, no statistically significant differences were observed in the maximum dose to spinalcord.

Conclusions:
For the treatment plan of lung cancer radiotherapy, the study recommended the ideal MLC aperture margin were 6mm–9mm. In practical treatment plans, we could choose the most appropriate aperture margin value according to the specific tumor size, shape and position.