Objective

Spine stereotactic body radiotherapy (SBRT) is an emerging treatment for patients with spinal metastases and is rapidly being adopted in the clinic. Spinal cord is one of the most important organs at risk in Spine SBRT. To contour spinal cord, myelo-CT or MRI fusion are used. To date, inter modality validation between Myelo-CT and MRI fusion in contouring spinal cord has not been evaluated. A multi-center contouring study was performed to evaluate inter modality variations between Myelo-CT and MRI fusion.

Material and Methods

Six matured radiation oncologists from 2 centers joined this study. Plain CT, myelo-CT and MRI scans were performed on 12th thoracic to 5th lumbar vertebra of a patient who had bone metastases in 4th lumbar vertebra. The myelo-CT and MRI were registered to a plain CT by a radiation oncologist. Six radiation oncologists contoured lumbar 1st to 2nd spinal cord without metastases in vertebra on registered myelo-CT and MRI independently for this study. To avoid inter Radiation Treatment Planning system variations, all registration and contouring were performed on RayStation. Inter modality variation between myelo-CT and MRI fusion, inter observer variations in myelo-CT, and inter observer variations in MRI were evaluated with Dice similarity coefficient.

Results

Inter modality Dice similarity coefficient between myelo-CT and MRI was 0.801 ± 0.026. (Average ± SD) Inter observer Dice similarity coefficient in myelo-CT was 0.873 ± 0.030. (Average ± SD) Inter observer Dice similarity coefficient in MRI was 0.836 ± 0.092. (Average ± SD) Average volume spinal cord with Myelo-CT was 1.682 ml ± 0.221. (Average ± SD). (Average ± SD) Average volume spinal cord with MRI was 1.873ml ± 0.408. All contours were showed in Figure.

Discussion

All Dice coefficients were larger than 0.7 in this study. Low Bilsky grade might minimize the variations. Spinal cords with tumors which highly invade to epidural space are more complicated to contour and variations might be increased. Further contouring study of spinal cords with tumor which highly invades to epidural space is under construction now.

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Conflict of Interest Disclosure. We have no financial relationships to disclose.