

Purpose: The use of hybrid universal clamp/pedicle screws has become increasingly widespread in the treatment of thoracolumbar spinal diseases. The majority of these spinal cord fixation devices are made of Titanium alloys which compose high atomic number (high-Z) elements. The dosimetric impacts on the target volume and organs at risk from implantable spinal cord fixation devices for patients with them undergoing spine irradiation were first-ever evaluated in this study. **Method and Materials:** Five patients with Titanium thoracic spinal fixation systems who are need spine irradiation underwent extended HU range CT scanning followed by 9 equiangular fields IMRT computer treatment planning, where homogeneous and heterogeneous plans based on normal CT to Density table and extended CT to Density table were created respectively for photon beams of energy 6 MV using Collapsed Cone Convolution Superposition algorithm. The DVH based parameters for CTV, spinal cord and lungs were compared. **Results:** In comparisons for heterogeneous IMRT plans based on normal CT to Density table and extended CT to Density table, the difference on the minimum dose, maximum dose and mean dose for CTV were 0.073%, 3.773% and 1.871%, respectively. The difference on the maximum dose for spinal cord was 0.818% and the difference on the V20 for lungs was 1.804%. In comparisons for homogeneous and heterogeneous IMRT plans based on extended CT to Density table, the difference on the minimum dose, maximum dose and mean dose for CTV were 1.276%, 2.419% and 0.985%, respectively. The difference on the maximum dose for spinal cord was 3.218% and the difference on the V20 for lungs was 2.116%. **Conclusion:** For organs at risk in this study, the dose differences introduced by high density materials were smaller than that between homogeneous and heterogeneous plans. Further investigation by Monte Carlo simulation should be done to verify it.