Purpose:

To evaluate the patient setup accuracy and effectiveness using ExacTrac and CT_on_rails systems

Methods:

We used Brainlab's Exactrac system and Varian/GE's CT_on_rails for spine radiosurgery patient setup. Once the patient was setup using the ExacTrac and couch position was recorded, fiducially markers were placed on stable surfaces based on the room laser to indicate the linac iso for the CT images. CT images were acquired using the on-rail CT with the couch rotated 180 degrees. The couch was returned to 0 degree position, and verification X-ray images were taken and corrections were made by ExacTrac. The treatment CT images were registered with the planning CT using the in-house CAT software and it displays the correct couch position based on CT which can be compared with ExacTrac setup. The corrected couch positions from CT registration are compared to those from ExacTrac. The translational discrepancies needed to be within 2 mm for confirmation. If a discrepancy was greater than 2 mm, investigation or re-setup was required. The rotation deviations were also evaluated by ExacTrac and confirmed by the treatment CT images. We would also re-setup patient if Exactrac detected more than 3 degree rotation, or treatment CT images showed significant target rotation compared to planning CT. The use of the CT_on_rails took little extra time, but make the overall evaluation process easier, faster and with more confidence.

Results:

For 171 treatment sessions using this approach, the mean discrepancies between CT_on_rails and ExacTrac setup is: \(x=0.0\pm1.0\ \text{mm}, \ y=-0.1\pm0.9\ \text{mm}, \ z=0.2\pm0.9\ \text{mm}\); for rotations, about 3% of the cases required re-setup patient due to significant rotation displayed by the treatment CT on the CAT system.

Conclusions:

The combined use of ExacTrac and CT_on_Rails systems can improve the overall setup accuracy and increase the confidence in setup for spine radiosurgery treatments.