Purpose: To retrospectively assess the influence of prone versus supine patient position on setup shifts and target margins for image guided radiotherapy (IGRT) of prostate cancer.

Methods: Ninety prostate cancer patients were treated at our institution between September 2006 and June 2011 with IGRT utilizing daily megavoltage cone beam; 52 patients were prone receiving 1577 fractions and 38 supine receiving 1035 fractions. Patients were setup to skin tattoos, imaged with megavoltage cone beam, then moved to treatment position by the alignment of three intraprostatic fiducials with lateral, longitudinal, and vertical shifts. The magnitude of the daily shift is root sum of squares of the translations.

Results: Patients positioned prone had a mean daily shift magnitude 1.4 mm greater than supine: 7.5 Å± 4.0 mm vs. 6.1 Å± 2.9 mm (p << 0.001). The mean magnitude of the daily shift for prone vs. supine respectively were 3.7 Å± 3.1 mm vs. 2.6 Å± 2.3 mm laterally, 3.5 Å± 3.0 mm vs. 3.3 Å± 2.6 mm longitudinally, and 3.9 Å± 3.5 mm vs. 3.1 Å± 2.4 mm vertically. The percentage of daily shifts within our intuitionâ€™s planning target volume (PTV) margin (7 mm posterior and 10 mm for all other directions) for prone vs. supine respectively were 97.3% vs. 99.5% laterally, 97.1% vs. 98.2% longitudinally, and 93.1% vs. 96.8% vertically.

Conclusion: When prostate cancer patients were setup for IGRT utilizing daily megavoltage cone beam, the daily shifts from the skin tattoos to intraprostatic fiducials were greater on average if positioned prone vs. supine. Without IGRT, part of the prostate would be outside of the PTV for more treatments when positioned prone rather than supine.