Purpose:
To perform an inter-comparison of TPS results for different IMRT delivery systems.

Methods:
Patient data with prostate cancer was selected. Same geometries and energy were employed for fixed gantry angle plans. Treatment includes simultaneous irradiation, prostate to 82Gy and seminal vesicles to 64Gy (41 fractions). Plans were normalized to achieve 82Gy minimum dose to prostate.
Plan 1: step&shoot with 1cm leaf-width (MLC-Optifocus), TPS Konrad v2.2 (Siemens).
Plan 2: same plan 1 but with TPS iPlan v4.1 (BrainLAB).
Plan 3: step&shoot with 0.25cm leaf-width (mMLC-Moduleaf, Siemens), TPS iPlan v4.1.
Plan 4: dynamic with 0.5cm leaf-width (MLC-Millenium), TPS Eclipse v8.1 (Varian).
Plan 5: Tomotherapy TPS v3.1.4.7. Longitudinal field size 2.5cm, pitch 0.277 and modulation factor 1.783, leaf width 6.25mm

Results:
Total numbers of MU were 508, 488, 570, 577 and 3219 for Plan 1 to 5.
D98% (V82Gy) for PTV prostate were 81.6Gy (95.7%), 80.7Gy (94.9%), 81.8Gy (97.4%), 80.1Gy (84.6%) and 79.9Gy (82.6%) for Plan 1 to 5. V64Gy for PTV seminal vesicle were 98.2%, 99.9%, 100%, 92.1% and 97.8% for Plan 1 to 5.
Rectum EUD (V40Gy) were 65.1Gy (56.6%), 62.7Gy (53.1%), 61.9Gy (44.3%), 63.3Gy (55.7%) and 61.9Gy (39%) for Plan 1 to 5.
Rectum wall EUD was 66.4Gy, 65.2Gy, 64.8Gy, 64.9Gy and 65.2Gy for Plan 1 to 5.
Bladder EUD (V65Gy) were 47.9Gy (27.4%), 47.4Gy (24.8%), 46.6Gy (24.6%), 46.2Gy (24.4%) and 45.8Gy (20.1%) for Plan 1 to 5. Femoral head D10% were 31.8Gy, 34.5Gy, 33.9Gy, 39.3Gy and 26.1Gy for Plan 1 to 5.

Conclusions:
MUs are lower with step&shoot MLC. MicroMLC produces slightly better conformation of PTVs. Better sparing of rectum and bladder with mMLC and Tomotherapy. For rectum wall EUD shows that mMLC produce the better results. Better sparing of femoral head is obtained with Tomotherapy. All techniques give the OAR’s similar EUD (+/-2Gy), except for femoral heads.