Conclusions: This data confirms the relevance of rotational shifts in prostate and H&N patients. The correlation between immobilization systems and the rotational shift value is not strong enough to refrain from implementing the robotic couch in IGRT high precision radiotherapy treatments.

**Results:**
- The average amount of deformation of the prostate surface was 0.1 (±0.7) mm in the left-right (L-R) direction, 1.4 (±2.7) mm in the anteroposterior (A-P) direction, and 0.4 (±1.9) mm in the superoinferior (S-I) direction.
- The mean (±SD) 3D deviation (SD) of the prostate was 0.7 cm laterally in H&N patients, 0.5 cm vertically or longitudinally and 0.7 cm laterally in H&N patients.
- In prostate cancer patients, the 98% of the treatment volume was less than 0.5 cm in 92% of the cases. Therefore, the mean (±SD) 3D vector of displacement was 0.3±0.7 mm and 0.2±0.4 mm for the prostate and H&N group respectively.
- The magnitude of roll variation was greater in both groups (mean (±SD) of -0.5±1.2°) than on the left with a maximal value of 2.8° vs 1.9°, while the mean (±SD) interfractional yaw was 0.1±0.7° in prostate and 0±0.6° in H&N patients.
- No correlation was observed between the magnitude of translational and rotational shift in either group. The procedure of online correction added less than one minute to the treatment time when compared to IGRT without robotic 6 DOF couch. The total treatment time (±SD) (IGRT plus delivery) was: 14.5±2.0 min., 15.2±1.5 min., and 15.2±1.5 min. for prostate, brain, and H&N IMRT respectively.

Conclusions: We found that A-P shift of the CoG of the prostate had a highly significant relationship with deformation of the superior-posterior region, middle-anterior region, and middle-posterior region of the prostate surface. The internal margin (IM) for IGRT of the prostate should be taken into account for the prostate deformation. For reducing the IMs and using adaptive radiotherapy for prostate cancer, this analysis method might be useful.

**Purpose/Objective:** To evaluate the role of a specific dietary protocol combined with the use of Image Guided Radiation Therapy (IGRT) in managing late rectal adverse effects >G2 in prostate patients treated with a total dose of 76 Gy delivered with 3D-CRT.

**Materials and Methods:** A commercial linear accelerator Elekta Synergy Beam Modulator integrated with a Cone Beam Computed Tomography (CBCT) for IGRT was used. 20 prostate patients were told to follow a dietary protocol in order to verify the daily setup of the patients an XVI software co-registers images of CBCT scan and CT planning scan (pCT) was employed. An off line analysis allowed to obtain, from the shapes of the rectum, a mean dose volume histogram (DVH) averaging the DVHs of the rectums as they appeared in every verification CBCT. A geometrical model of a rectum was considered as a reference of DVH. The DVH set which gives an NTCP closer to the closest result is the one extracted from the AR. Finally, using gamma distributions, we have analised all the DVHS considering QUANTEC dose-volume constraints more restrictive from that used in our Institution.

**Results:** No patient developed late rectal toxicity after two years of follow up. The Pearson correlation test on NTCP values shows a strong correlation except for NTCP<AR. The Wilcoxon Rank Sum test display a statistically significant difference (p<0.01) between the NTCP values except for the couple NTCP<AR, NTCP<AR and NTCP. The Wilcoxon Rank Sum test display a statistical significant difference (p<0.01) between the NTCP values except for the couple NTCP<AR, NTCP. The DVH which gives an NTCP closer to the closest results is the one extracted from the AR. Finally, using gamma distributions, we found that in most of patients, the DVH of pCT was not within the QUANTEC constraints while DVH of AR respected constraints except for one patient and one constraint. An example of gamma distributions plots for two patients and for the reference dose level of 65 Gy; the red line is the value that corresponds to the percentage of volume established by QUANTEC constraints (V65), the green line and the blue line are the value corresponding to the percentage of volume of AR and pCT respectively. The two plots correspond to two patients that both have V65 higher than V50 but on the right V65 is higher than V50, as well, while on the left it is less than V50 indicating an improvement of the DVH during the treatment.