Can teaching patients with pelvic tumours about correct positioning improve treatment set-up in radiotherapy?

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Purpose/Objective

The use of daily online IGRT has revealed deviations in roll, pitch and yaw from the planning CT position. In clinical practise we experience that some patients are good at positioning and some have difficulties. Teaching patients about positioning before start of treatment and staff use of a common language when assisting patients to position themselves might assist patients to adopt a more accurate position and thus reduce the number of repositionings. The purpose of this randomised trial was to test whether teaching patients about positioning would A) improve the precision of the position B) reduce the number of repositionings.

Materials and Methods

The randomised study included 25 female pelvic cancer patients (6 patients with anal cancer, 4 patients with rectal cancer and 15 patients with gynaecological cancer) treated with RT of more than 10 fractions immobilised in supine position using a heel and knee fixation system. In the intervention group (12 patients) treatment and positioning before initiating treatment were visually explained using a 3D virtual reality environment (VERT 2.9, VERTUAL). Two practical exercises about movement of the pelvis and the lumbar were also introduced. The staff used specific and common language when assisting the patients concerning positioning before treatment. The control group (13 patients) received the standard treatment. Daily shifts in target at the most cranial, caudal and lateral borders were calculated using a simple triangular calculation after a rigid registration between the first CBCT of each treatment and planning CT allowing for all rotations. Target shifts above 5 mm were considered equal to a required repositioning of the patient. An unpaired t-test was used to compare rotational errors in the two groups.

Results

Target displacements of more than 5 mm were found in 11 fractions in the intervention group, and in 10 fractions in the control group. Offline CBCT image registration resulted in pitch (mean: 0.23°; SD: 1.36°), roll (mean: -0.07°; SD: 0.78°) and yaw (mean: -0.17°; SD: 0.66°) for the intervention group and pitch (mean: 0.21°; SD: 1.32°), roll (mean: -0.25°; SD: 0.81°) and yaw (mean: -0.30°; SD: 0.77°) for the control group. A significant difference was found between the control and intervention group when looking at roll (p = 0.005) and yaw (p = 0.021) but we found no significant difference when looking at pitch (p = 0.894).

Conclusions

The results showed a tendency towards patients being better positioned in the intervention group compared to the control group when looking at roll and yaw. There were an almost equal number of target displacements above 5mm in the two groups.