OC-0531 Can SGRT be used with open masks to set-up HNC patients and reduce intrafractional motion?

A. Moreira[1], N. Weitkamp[1], M. Zamburlini[1], H.I. Garcia Schüler[1], M. Guckenberger[1]
[1]*University hospital Zurich, Radiation Oncology, Zurich, Switzerland*

Purpose or Objective

To evaluate the set up and treatment of head and neck cancer patients in an open mask with the aid of surface guided radiotherapy (SGRT). We investigated the initial setup accuracy of an open mask (OM) with SGRT vs. traditional closed mask (CM) system. Additionally, data from the SGRT system was used to evaluate intrafractional motion.

Material and Methods

14 Patients being treated for T1 or T2 larynx carcinomas were evaluated in this study. Patient setup at planning CT was performed using a CIVCO Posifix® thermoplastic mask. For 7 patients the mask was cut out around the face (from 2-5cm above the eyebrow, until 1cm above the lips and on the sides until their ears) as well as over the neck (Fig 1.). Patients' reference surface was imported from the CT scan and regions of interest for both the face and the neck were selected. The patients were positioned until all pre-shift deltas displayed on the SGRT system were as close to zero as possible. After positioning, CBCT imaging was performed to verify the patient's position. The residual set up error as defined by shifts seen on the CBCT image were compared to a control group of 7 patients who were treated using the standard closed mask to evaluate any loss in stability as well as set up accuracy. For the 7 patients treated with an open mask, the intra-fractional motion caused by swallowing was also evaluated using SGRT to monitor the neck area. Gating margins on the SGRT system were set at +/-2mm/2° in each direction and log files were retrospectively analyzed to determine how often the patients swallowed during treatment and how large this motion was.

Results

In total, 153 CBCTs were analyzed: 80 from the OM group and 73 from the CM group. Mean post-match shifts based on CBCT PTV match was -0.1 ± 0.2cm, 0.2 ± 0.4cm, -0.04 ± 0.13cm, 0.4 ± 1.8°, 0.7 ± 2.7°, 0.6 ± 2.5° in the OM plus SGRT group and 0.0 ± 0.3cm, -0.1 ± 0.5cm, -0.1 ± 0.4cm, 0.2 ± 1.4°, 0.6 ± 1.4°, 0.7 ± 1.2°in the CM group, in the VRT, LNG, LAT, Rotation, Roll and Pitch directions respectively. In 27% out of the 211 fractions monitored using SGRT, the radiotherapy delivery was interrupted at least once during treatment due to motion caused by swallowing. During this time, the mean absolute shifts were 1.5±2.6 mm, 3±7 mm, 1.7±1.9 mm in VRT, LONG, LAT directions. This proves that treatment disruption is due to longitudinal motion. Mean absolute motion observed during beam delivery were 0.27±0.23 mm, 0.3±0.3 mm, 0.3±0.4 mm in the VRT, LNG, LAT directions.

Conclusion

Our study shows that SGRT allows for HNC treatment in an open mask with clinically acceptable setup accuracy of less than 2mm in each direction. An open mask creates a better treatment experience for patients with claustrophobia and any potential benefit of increased patient comfort will be investigated in future studies. Additionally, OM allows monitoring and if necessary gating of radiotherapy delivery for swallowing motion, which could influence future PTV definition.

OC-0532 Virtual reality animations, a new strategy to reduce patients' anxiety induced by radiotherapy

G. Van Ooteghem[1,2], X. Geets[1,2]
[1]*Institut de Recherche Expérimentale et Clinique, Molecular Imaging- Radiotherapy and Oncology - MIRO, Brussels, Belgium;* [2]*Cliniques Universitaires Saint Luc, Radiation Oncology, Brussels, Belgium*

Purpose or Objective

Patients facing medical and technological interventions such as radiotherapy, mechanically-assisted and non-invasive ventilation (MANIV), or MRI can experience a high level of anxiety and discomfort in addition of the stressful background linked to cancer. This can lead to negative impacts on their mental status but also have deleterious consequences during radiation treatments (difficulties in positioning, movements during irradiation, impaired breathing) and thus also impact the treatment efficacy. Virtual reality and hypnosis are stress management strategies that showed encouraging results in different medical fields. The efficacy on anxiety of a dedicated hypnotising Virtual Reality Animation (VRA) commercialised by Oncomfort® was evaluated in patients included in a trial assessing MANIV. This trial aimed to demonstrate the safety and the efficacy of MANIV to stabilize and modulate the breathing pattern without any sedation. Patients were therefore connected to a mechanical ventilator and asked to give up control on their breathing. They could thus experience anxiety.

Material and Methods

VRA lasted for 10 to 20 minutes and was proposed before each MANIV session (one coaching session, one simulation session and 2 MRI sessions) (Figure 1).

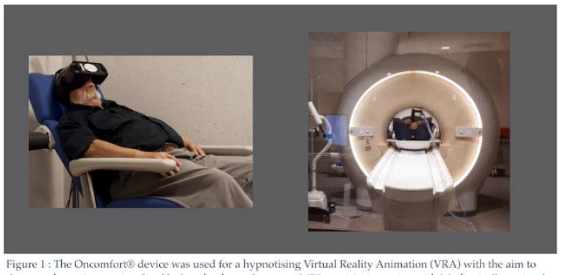

Figure 1 : The Oncomfort® device was used for a hypnotising Virtual Reality Animation (VRA) with the aim to decrease the patient anxiety level before that he underwent a MRI acquisition session with Mechanically-assisted and non-invasive ventilation (MANIV).

VRA assessment was done with questionnaires fulfilled at each session. Patients answered first to multiple choice questions (MCQ), then to the same questions but with a Visual Analogic Scale (VAS) ranging from 0 to 100. On VAS, an effect on anxiety was considered when a difference greater than 10 was observed between two scores.

Results

Twenty-one patients (49-83 years old) participated to the trial. Comfort level obtained during the coaching and simulation sessions and rated before the VRA, after the VRA and during MANIV were 54, 67 and 66 respectively. During the 2 MRI sessions, the comfort level before the VRA, after the VRA were similar (57.5 and 66.5 respectively) but was clearly decreased during the MRI acquisitions (50), raising a probable MRI-driven loss of comfort.

Based on the MCQ, 17 patients (81%) appreciated the VRA experience. Nine patients (43%) felt an improvement of their comfort while 9 patients (43%) did not and 3 (14%) experienced a comfort degradation. VAS scores led to identical conclusions, with only one patient having discrepancies in his answers. Patients with the lowest VAS scores in comfort before the trial were those with the greatest improvement after the VRA. Eight patients (38%) stopped the trial at their request for convenience reasons or due to the degradation of comfort.

Conclusion

The hypnotising Virtual Reality Animation proposed by Oncomfort® can be a good support, especially in very anxious patients. However, some patients may not benefit of this strategy, highlighting the need to adapt to each patient and to further enlarge our stress management strategies.