PO-RT-37 Commissioning, quality assurance and initial experience of a Calypso® system: Geneva experience.

Giovanna Dipasquale*[1]

[1]Hopitaux Universitaires de Genève (HUG) – Rue Gabrielle Perret-Gentil, CH - 1211 Genève 14 - Suisse, Suisse

Résumé

Introduction: The Calypso® system (Varian medical systems), that uses radiofrequency signals for wireless tumor localization (absolute or relative to a zero set on the day) and tracking during radiotherapy, was installed in Geneva in 2015. Since January 2016 it is used to treat prostate patients (pts) with dynamic edge gating (allows to set motion thresholds which disable radiation delivery if the beacons, representing the target, move outside these thresholds). Here we present our early experience with its use with prostate implanted beacons as well as commissioning results and daily quality assurance (QA).
Materials/Methods: For commissioning, specific tools were made available by the vendor. Furthermore our Rando® phantom was implanted with prostatic transponders to verify Calypso® versus cone beam computed tomography (CBCT) beacon's position and isocenter correspondence as well as to realize an end-to end QA test (to export beacons info from CT scan, import etc). Commissioning QA involved checking: the system calibration and accuracy (isocenter Calypso® versus linac), the optical system monitoring the electro-magnetic array, the localization and tracking functionality, the dynamic edge gating, the correct creation of the reports and beam on radiation detection. Daily QA is performed with the QA fixture phantom and system calibration uses the Isocenter calibration fixture, both delivered with the system. Five patients with different targets are actually under treatment with volumetric modulated arc therapy plans (2 pts for whole prostate gland, 2 pts for pelvic lymph nodes + prostate and 1 pts for prostatic bed). Beacons are implanted with a trans-perineal procedure (not trans-rectal, as suggested by vendor). All patients are positioned supine with a feet immobilization and a knee cousin element on the dedicated Kevlar table top. Calypso® is first used to position the patient and to monitor CBCT image acquisition, for patient overall positioning, and after for patient tracking.

Results: Commissioning was made in half a day, with values within vendor's specifications (Calypso®-Linac isocenter$<$ 0.1cm). Daily QA shows a stability of the system (over more than 50 days, Calypso®-Linac isocenter $<$ 0.13cm). Concerning patients, no beacons implant complications was registered, nor transponder migration seen on CBCT images or detected by Calypso®, even after several weeks of treatment. All patients could be treated using "absolute" isocenter localization and tracking. Care was needed to position the array to avoid possible knee collisions if readjusting the patient or moving the table. When patient's bladder and rectal filling reproduce simulation conditions, only 5 minutes extra are

*Intervenant

necessary to the session for array positioning, tracking and imaging. Clearly, one patient is reproducible on a daily basis (within 0.3cm) and one patients shows a continuous drift of the tracking curve. Other patients do not present a distinct tracking curve behavior.

Conclusions: Overall Calypso® usage is easy and fast. A lower knee cousin will be used in the future to increase clearance between patient and array.

Calypso®, detecting intra-fraction prostate movements, is introducing in our department a new way to perceive organ motion.

Mots-Clés: Calypso, nonradiographic localization/tracking systems, prostate radiotherapy