Purpose/Objective
Aim of this study was to determine the magnitude of discrepancies between the evaluations performed by radiation oncologists and radiation therapists on 2-D orthogonal Kilovoltage (Kv) images acquired for daily set-up verification in head and neck cancer patients, in order to define a partial delegation of such process.

Material and methods
Daily on-line kv-images of patients with head and neck cancer were evaluated for set-up verification both on-line by one of 7 radiation therapists (RTT) after an adequate training, and off-line by one radiation oncologist (RO); RO on-line verification is required when displacements are beyond PTV margins. All patients were treated with volumetric-modulated arc therapy (VMAT), using a LINAC 6 MV photon beam equipped with a Millennium 120 MLC and an on-board imaging system (VARIAN Medical System). Manual bone anatomy matching was used to determine translational displacements on all three axes (x, y, z) and discrepancies between RTT and RO were calculated. The concordance of decisions between RTT and RO was calculated, in particular for differences inferior, equal, and superior to 3 mm. Results are presented as mean values, population systematic (Σ), and random (σ) errors. ANOVA test was used to test differences between groups. SPSS software was used for the statistical analysis.

Results
In this analysis, 33 consecutive patients treated from March to September 2015 were included. Nine hundred and ten (910) Kv images were obtained and 2730 measures were made by the RO and RTT (Tab1). An exact match between RO and RTT was observed in 12.2% of cases. An inter observer discrepancy of ±3mm or less, and of ±4 mm or less on at least one direction was recorded respectively in 98.4% and 99.3% Kv images. Mean displacements on all the three axes were about 1mm. The 79% of differences on the cranio-caudal, 82% on the lateral, and 81% in ventro-dorsal direction were between -1mm and 1mm. ANOVA test shown significant differences between the mean displacements of the samples (p <0.05). In AP, CC, and ML directions, systematic discrepancies were 0.33, 0.32, and 0.42 mm, while random discrepancies were 1.25, 1.42, 1.21 mm, respectively. Mean radial discrepancy was 1.78 mm (range 1.11-2.88 mm). According to the van Herk’s formula, CTV-PTV margins needed to account for such inter-observer variability were 1.70, 1.80, and 1.90 mm in AP, CC, and ML directions, respectively (Tab 2).

Conclusion
The study showed a small inter-observer variability between the RO and RTT’s observations after an adequate training. Therefore daily online kv match can be delegated to RTT when displacements are not superior to PTV margins.