# Analysis of the intra-fractional motion of the prostate during SBRT using an EM Transmitter

*Michael Trainer[1], Linda Carruthers[1], Bill Nailon[1], Susan Adamson[1], Duncan McLaren[1], Mike Kirby[2]*

*[1]Edinburgh Cancer Centre (ECC) UK, [2]Liverpool University Directorate of Radiotherapy UK*

*michael.trainer@nhslothian.scot.nhs.uk*

## PURPOSE/OBJECTIVE(S)

Intra-fraction motion of the prostate during hypo fractionated treatment regimens can potentially impact the delivered dose to the prostate. EM Transmitters such as RayPilot, can provide real-time positional information. The purpose of this study was to establish the efficacy of RayPilot for real-time positional verification in prostate SBRT and to assess overall target displacement during treatment.

## MATERIAL & METHODS

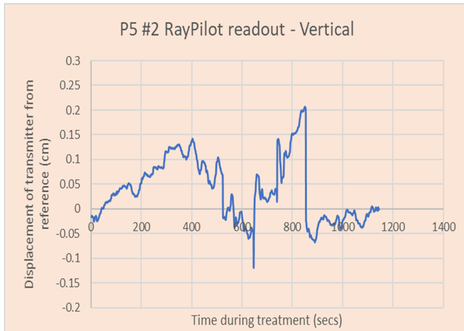
RayPilot real-time tracking system[1] uses a transmitter inserted into the prostate trans-perennially; its position is detected through a table top array with in built antennae. Positional data was exported to Excel for analysis.

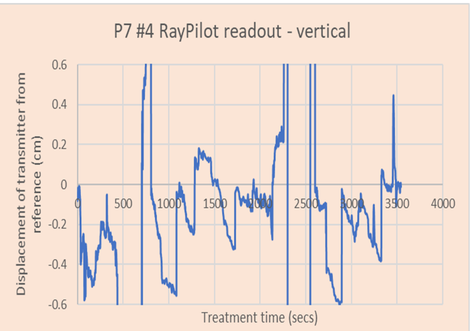
Study Detail:

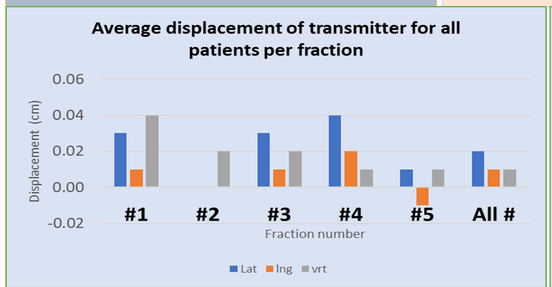
- 7 PRINToUT trial patients
- 36.25Gy / 5#
- Imaging by kV Orthogonal pairs (Primary)
- Pre/post fraction CBCT
- RayPilot for real-time tracking; data recorded every second
- Setup correction threshold 0.2cm
- 3 Arc VMAT treatment

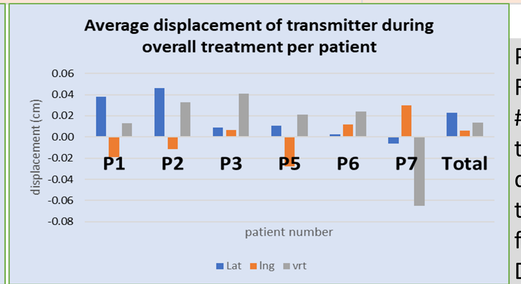
## RESULTS

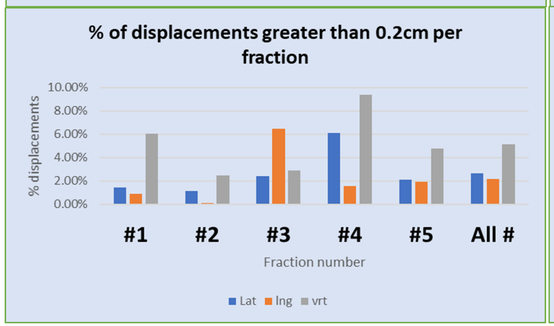
The position of the transmitter after the 1st set up image was recorded and exported to Excel. This included positional information between arcs and during re-set up. Shown are 2 example readouts. P7 #4 required several additional images and re-positioning during this fraction.

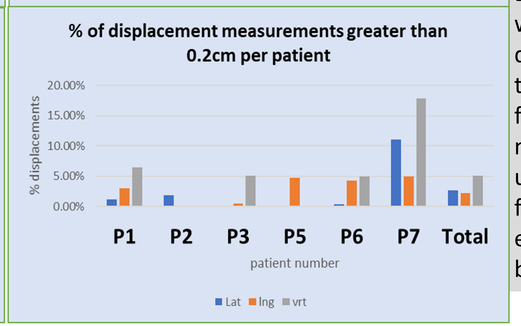



P4 was not treated with the RayPilot system in place after #2; so P4 was excluded from the study. The average displacement of the transmitter was less than 1mm for all patients and all fractions. Data is recorded every second with RayPilot. The overall % of data points outside the imaging threshold for each patient and fraction are shown. These measurements included re-set up and time between arcs; future analysis will try to examine displacements during beam on only

## SUMMARY/CONCLUSION

RayPilot was a viable means for tracking the prostate during SBRT. The position of the target was within 0.2cm for 94.9% of the measurements. Synchronising the software with the treatment beam would help record data only during radiation delivery and help examine the dosimetric impact of the recorded displacements. Further work is being undertaken to assess whether RayPilot could be the primary monitoring device during prostate SBRT.

## REFERENCES

[1] Micropos Medical (2019) 'RayPilot', http://www.micropos.se/products/.

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