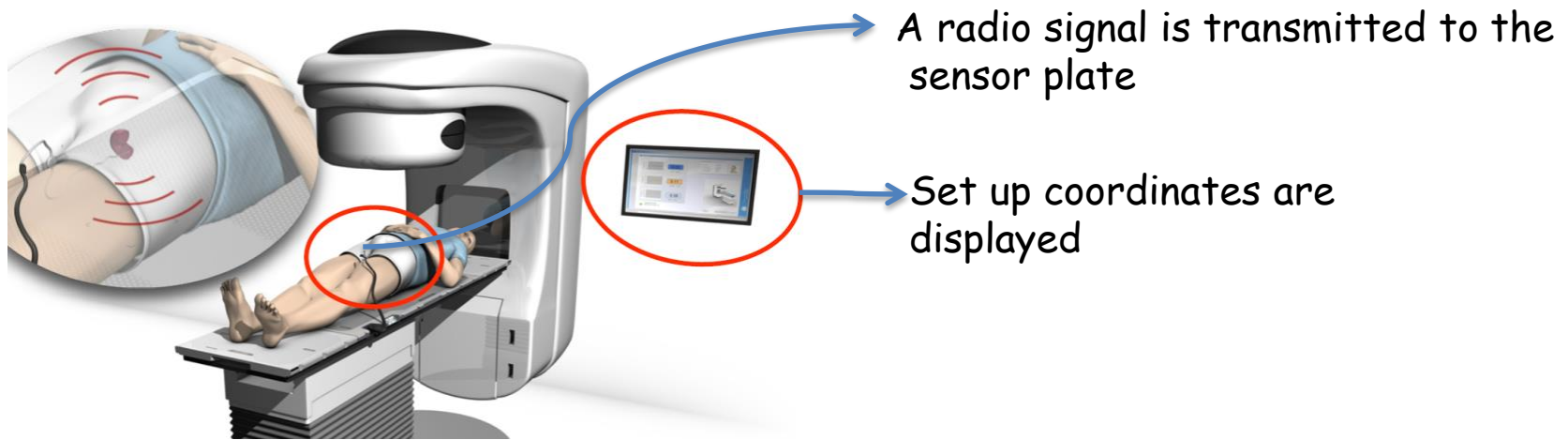


# Use of electromagnetic transmitter to monitor intrafraction motion in prostate cancer radiotherapy: Application, Stability, Treatment Time

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# Introduction

- RayPilot electromagnetic positioning system was examined in hypofractionated RT to track intrafractional organ movement
- Tolerance, positional stability of the system and effect on treatment time was evaluated.



# Materials&Methods

- 5 patients treated with ultrahypofractionated schema **36.25Gy/7.25Gy/5fr** (RTOG 0938)
- 1 patient with mild hypofractionation **70.0Gy/2.5Gy/28fr** (RTOG 0415)
- Orthogonal kV imaging and CBCT before each fraction and the position of the markers and transmitter was evaluated.
- During treatment, prostate movements were recorded in three planes.
- For long-term movements exceeding 0.3 cm, the treatment was stopped and the movement was expected to pass.
- Application-related toxicity was assessed by a questionnaire

# Results

## Application-related toxicity

Transmitter position	Optimal 4 cases	sub optimal 2 cases
tenderness	mild to moderate	
pain	two cases reported tolerable pain during sitting in the perineum.	
infection	one patient developed perineal infection at the exit site of the transmitter	

# Results

## Transmitter position and prostate motion

Transmitter position	In 40 (75%) of 53 fractions, the transmitter was in the planning position.		
Median Shift of transmitter	0.52 cm (0.36-1.31 cm) remaining 13fr		
One case	Transmitter moved from the original position at each fraction And at the end of treatment transmitter was removed and sent to the manufacturer for examination		
Median prostate	Lateral 0.01cm	Longitudinal -0.06cm	Vertical -0.05cm
Movement 3mm-5mm prostate	Lateral 2.65% and 1.5%	Longitudinal 6.0% and 3.0%	Vertical 6.7% and 5.0%
Median Treatment time	12 minutes (4.14-46.42 minutes)		

# Conclusion

- Transmitter placement was well tolerated by the patients.
- No major problems occurred during insertion and removal of the transmitter.
- Orthogonal radiographs taken before treatment showed that the transmitter position was not stable.
- Therefore, it is recommended to use with marker and CBCT for localization.
- Although it may cause prolonged treatment periods from time to time, treatment can usually be completed within 15 minutes of appointment.

# In The Future

- To increase patient number
- New model of RayPilot® HypoCath® prostate and urethral tracking without surgical intervention

