

OBJECTIVES

To determine if delivering greater amounts of focused ultrasound heat energy when treating non-metastatic prostate cancer using focal HIFU leads to lower recurrence rates.

METHODS

Retrospective analysis (March 2007 to December 2016):

190 men:

131 treated with two ablative zones

59 treated with three ablative zones

→ 37 matching pairs

Criteria for matched-pair analysis:

- Exact matching for: baseline Gleason score and tumour volume (mpMRI).
- Nearest matching for: biopsy maximum cancer core length, duration of clinical follow-up, time to proof of recurrence.

Definition of in-field treatment failure:

- any secondary treatment: ADT/chemotherapy, focal or whole gland treatment
- metastasis from prostate cancer without further treatment
- biopsy-proven Gleason score ≥ 7 without further treatment
- death from prostate cancer

RESULTS

Determinant	2 treatment zones		3 treatment zones		p-value
	Median/Mean/N	IQR/%	Median/Mean/N	IQR/%	
Age at treatment (in years), median, (IQR)	66	61 – 72	65	60 – 69	0.816
ADT pre treatment, N, (%)	4	10.8 %	0	0 %	0.239
PSA pre treatment (in ng/ml), median, (IQR)	7.18	4.6 – 10.3	6.7	5.4 – 8.5	0.816
Prostate volume (MRI, in ml), mean, (range)	46	17 – 103	52.5	19 – 121	0.219
Tumour volume (MRI, in ml), mean, (range)	0.6	0.05 – 2.5	0.6	0.05 – 2.5	1.000
Biopsy results pre treatment, median, (IQR)					
<i>no. positive cores</i>	6	3 – 8	4	3 – 5	0.019
<i>MCCL (in cm)</i>	6	4 – 9	5	4 – 8	0.155
<i>max. percentage of core (%)</i>	65	40 – 80	50	30 – 67	0.802
Gleason score pre treatment, median	3+4		3+4		
3+3, N, (%)	2	5.4 %	2	5.4 %	1.000
3+4	31	83.8 %	31	83.8 %	1.000
4+3	4	10.8 %	4	10.8 %	1.000
T-stadium pre treatment, median	T2		T2		
T1c, N, (%)	2	5.4 %	1	2.7 %	0.354
T2	28	75.7 %	33	89.2 %	1.000
T3a	7	18.9 %	3	8.1 %	0.191
Treatment outcomes					
Recurrences in treated area, N, (%)	11	29.7 %	6	16.2 %	0.002
Time to recurrence (mth), median, (IQR)	13	11.5 – 24	11.5	9.5 – 13	0.129
Follow-up without recurrence (mth), median, (IQR)	23	13 – 33.75	14	11 – 27	0.025

Abbreviations: N, number; IQR, inter quartile range; ADT, androgen deprivation therapy; MRI, magnetic resonance imaging; ml, millilitres; MCCL, maximum cancer core length; cm, centimetre;

CONCLUSION

Significantly higher rate of in-field treatment failure in focal HIFU using the standard HIFU protocol on the Sonablate 500 compared to a dose-escalation by delivering more energy.