

Cancer outcomes following high-intensity focused ultrasound treatment of clinically localised prostate cancer: a national cohort study

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Introduction

- National guidelines recommend the radical treatment of patients with clinically significant prostate cancer using surgery or radiotherapy.
- Typically, these treatments are directed at the whole gland and they can have significant side-effects
- Focal therapies such as high-intensity focused ultrasound (HIFU) aim to reduce treatment-related side effects whilst maintaining cancer control.
- There is evidence that HIFU has substantially fewer side effects but there is little comparative data regarding cancer outcomes.
- Our objective was to report 5-year failure-free survival following HIFU.

Methods

- This observational cohort study used linked national cancer registry data, radiotherapy data, administrative hospital data and mortality records of 1,381 men treated with HIFU for clinically localised prostate cancer in England.
- The primary outcome, failure-free survival, was defined as freedom from local salvage treatment and cancer-specific mortality.
- Secondary outcomes were freedom from repeat HIFU, prostate cancer-specific survival (CSS) and overall survival (OS).
- Cox regression was used to determine whether baseline characteristics, including age, treatment year, T-stage and International Society of Urological Pathology (ISUP) grade group were associated with FFS.

Results

- The median follow-up was 37 months (IQR 20-62).
- The median age was 65 years (IQR 59-70) and 81% had an ISUP grade group of 1-2.
- FFS was 96.5% (95% CI 95.4-97.4%) at 1 year, 86.0% (95% CI 83.7-87.9%) at 3 years and 77.5% (95% CI 74.4-80.3%) at 5 years. 5-year FFS for ISUP grade groups 1-5 was 82.9%, 76.6%, 72.2%, 52.3% and 30.8%, respectively ($P < 0.001$).
- Freedom from repeat HIFU was 79.1% (95% CI 75.7-82.1%), CSS was 98.8% (95% CI 98-99%) and OS was 95.9% (95% CI 94.2-97.1%) at 5 years.

Figure 1. Kaplan-Meier curves showing failure-free survival

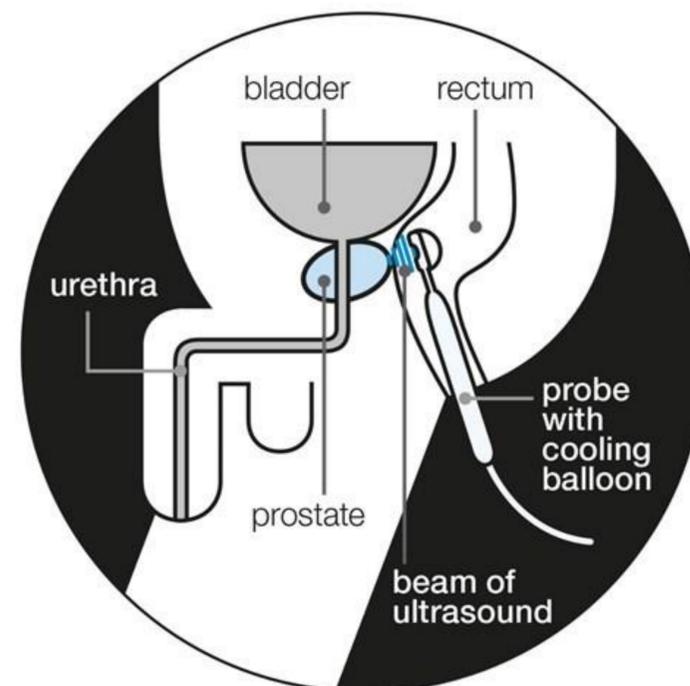
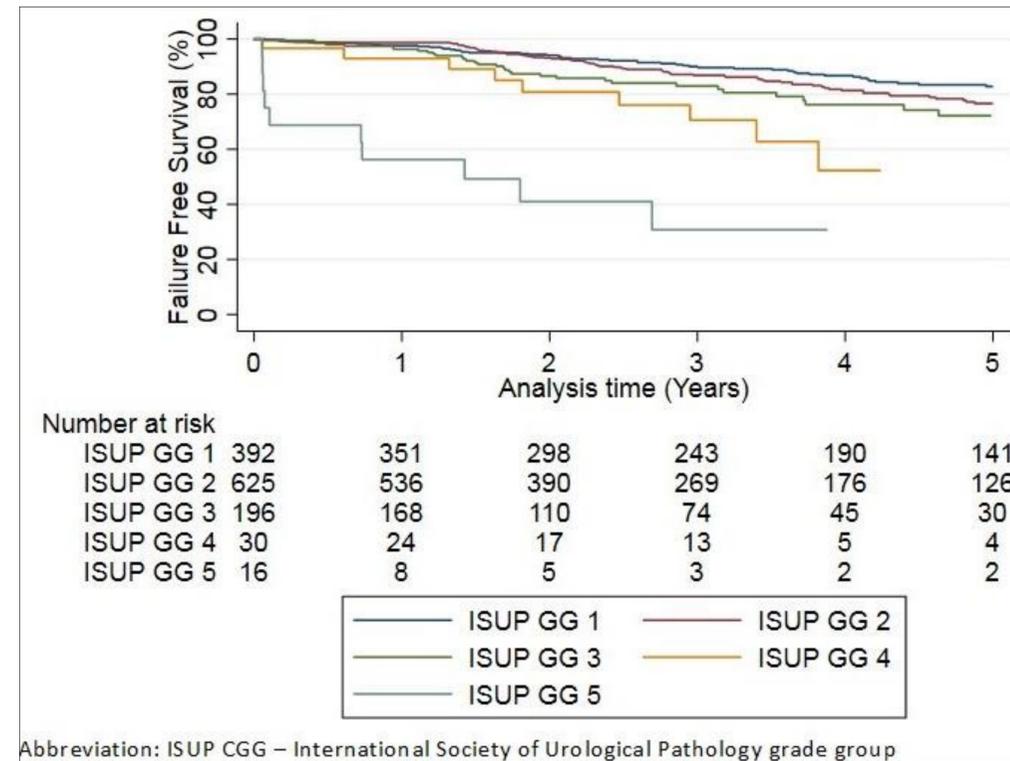


Table 1. Kaplan-Meier estimates of outcomes

	Kaplan-Meier estimate, % (95% confidence interval)			P value*
	1 yr	3 yr	5 yr	
Primary Outcome				
Failure-free survival	96.5 (95.4-97.4)	86.0 (83.7-87.9)	77.5 (74.4-80.3)	<0.001
ISUP GG 1	97.6 (95.5-98.8)	90.0 (86.2-92.8)	82.9 (77.8-86.9)	
ISUP GG 2	98.7 (97.4-99.4)	86.9 (83.2-89.8)	76.6 (71.2-81.1)	
ISUP GG 3	96.3 (92.4-98.2)	82.9 (75.7-88.2)	72.2 (61.5-80.3)	
ISUP GG 4	93.0 (74.6-98.2)	70.6 (47.3-85.0)	52.3 (24.5-74.2)	
ISUP GG 5	56.3 (29.5-76.2)	30.8 (9.1-56.1)	30.8 (9.1-56.1)	
Secondary Outcomes				
Free from repeat HIFU	98.6 (97.8-99.1)	89.1 (86.9-90.9)	79.1 (75.7-82.1)	0.050
ISUP GG 1	97.9 (95.7-98.9)	90.0 (86.1-92.9)	83.5 (78.2-87.6)	
ISUP GG 2	99.3 (98.2-99.8)	89.1 (85.6-91.8)	76.0 (70.0-81.1)	
ISUP GG 3	97.8 (84.0-98.9)	87.7 (80.7-92.3)	72.4 (58.5-82.4)	
ISUP GG 4	93.3 (75.9-98.3)	76.4 (50.4-90.0)	76.4 (50.4-90.0)	
ISUP GG 5	100	100	100	
Cancer-specific survival	99.8 (99.3-100)	99.6 (99.0-99.8)	98.8 (97.7-99.4)	<0.001
ISUP GG 1	100	100	99.6 (97.1-100)	
ISUP GG 2	100	100	99.1 (96.3-99.8)	
ISUP GG 3	100	100	98.9 (92.5-99.8)	
ISUP GG 4	100	100	100	
ISUP GG 5	87.5 (58.6-96.7)	80.8 (51.4-93.4)	80.1 (51.4-93.4)	
Overall survival	99.6 (99.0-99.8)	98.2 (97.2-98.8)	95.9 (94.2-97.1)	<0.001
ISUP GG 1	100	99.1 (97.3-99.7)	98.2 (95.6-99.3)	
ISUP GG 2	99.7 (98.7-100)	98.7 (97.2-99.4)	97.4 (94.9-98.7)	
ISUP GG 3	100	97.8 (93.4-99.3)	93.1 (85.6-96.7)	
ISUP GG 4	96.3 (76.5-99.5)	96.3 (76.5-99.5)	91.0 (67.7-97.7)	
ISUP GG 5	87.5 (58.6-96.7)	73.4 (43.5-89.2)	73.4 (43.5-89.2)	

Abbreviation: ISUP GG – International Society of Urological Pathology grade group
*With adjustment for age, treatment year, ISUP grade group and T stage

Conclusions

- We found that the 5-year FFS after primary HIFU in England is 77.5%.
- Patient selection for HIFU remains key and patients should be appropriately informed about the need for repeat HIFU and further salvage treatment which is dependent on cancer grade.
- Further follow-up beyond 5 years is required to fully judge the impact of HIFU on cancer control in the longer term.

Patient Summary

- 1 in 5 men undergoing HIFU needed further treatment within 5 years.
- The need for further treatment varied according to cancer stage at the time of diagnosis.