HIFU: Ready for Prime Time!

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I have nothing to disclose
Nothing else in the world . . . not all the armies . . . is so powerful as an idea whose time has come.

-Victor Hugo
HIFU

- Used for at least 2 decades outside US
- Approved in 50 countries
- Minimally invasive
- Ultrasound or MRI guided
- Transrectal or transurethral systems
- Outpatient
- Rapid recovery
- Minimal GU/sexual toxicity
- No bleeding
- No radiation to OAR’s
Damage to sensitive organs often considered unacceptable after radiation or prostatectomy
402 patients with mean
- Age 69.3 years
- Volume 28cc
- PSA 10.9
- Follow up 407 days

Negative re-biopsy 87.2%
92.1% in low risk

- Transperineal mapping biopsy
  - 1-2 lesions, <10mm
- mpMRI
- Toxicity at 2 year follow up
- Slight insignificant deterioration EPIC urinary score
- Trend decrease sexual function (4.4 points)
- No significant change in EPIC subdomain score

Tay, KJ et al., DOI: 10.1148/radiol.2017161650
Salvage HIFU After Failed EBRT

- Whole gland HIFU
- 81% 1 year negative biopsy
- AE in 91/100 patients
  - 67 Grade I
  - 80 Grade II
  - 20 Grade III

569 men with median age 65 yrs
Risk grouping: Low 28%, intermediate 56%, High 14%
Repeat HIFU in 163
Median F/U 46 months
5 yr Failure Free 70%
  * Low 87%
  * Intermediate 63%
  * High 58%
7.7% UTI
88% pad free

Dickinson, L et al., DOI: 10.1016/j.eururo.2016.02.054
Whole Gland Ablation

- 1002 patients
- Primary prostate cancer
- 60% 1 session  38% 2 sessions
- 8 year biochemical free survival (Phoenix)
  - 76% low  63% Intermed  57% high risk
- 10 year PCa specific survival 97%
- Metastasis-free survival 94%

bDFS with HIFU

More late results HIFU

* 702 patients – retrospective
  * T1-2, PSA<50, no ADT
  * 78.5% intermediate or high risk
  * Mean F/U 5.3 years
* Ablatherm® HIFU
* Cancer specific survival 99%
* 10 year freedom from salvage Tx 98% (low), 72% (intermed), 68% (high)
* 10 year Metastasis free survival 95%

Thuroff, S., Chaussy, C J Urol 190(2):702-710, August 2013
ProtecT Trial

Hamdy, F, Donovan, J, et al., NEJM, Sept 14, 201, DOI: 10.1056/NEJMoa16062206
538 consecutive retrospective patients

Median F/U 8.3 years

Ablatherm™

Risk groups: Low 42.6%, Intermed 39.2%, High 16.9%

Ganzer, r et al BJUI 112(3):322-329, August 2013
Fourteen-year oncological and functional outcomes of high-intensity focused ultrasound in localized prostate cancer

Low risk
Intermediate risk
High risk
* Multicenter French study
  * T1c-T2, PSA<15, ≤2 sextants involved
  * mpMRI urethra ≥ 5mm from tumor

* Focal HIFU
  * 96 / 101 patients without evidence of clinically significant PCa on F/U biopsy
    * 87% no cancer in treated lobe
    * 67% no cancer in entire gland
  * 97.2% without pads (stress incontinence 2.8%)
  * 78.4% preserved erectile function
HIFU Meta-Analysis

- 13 studies
  - 11 primary
  - 2 salvage
- 543 patients
- Median F/U 0.5-10.6 years
- 14% required subsequent oncologic therapy

Golan, R Et al, DOI: 10.1016/j.juro.2017.03.137
Clinical Trials Ongoing

* ExAblate MR Guided Focused Ultrasound
  * NCT01657942
* Endocare CRYOcare vs Galil Medical CRYO-HIT
  * NCT00295802

https://clinicaltrials.gov/ct2/show/record/NCT01657942
Case Selection is Key

- Treat whole gland when needed
- Treat focally when not
- May be bridge between active surveillance and more aggressive surgery
Approved By FDA for “prostate ablation”

- Different technologies and protocols
- Lack of consensus on ideal candidate

HIFU

Are we just where brachytherapy was 20 years ago?
Trends in Prostate Cancer

Mettlin, Murphy, McDonald, and Menck
Cancer
1999;86:1877-82
<table>
<thead>
<tr>
<th>Center</th>
<th>XRT</th>
<th>HDR</th>
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<tr>
<td>CET</td>
<td>36Gy</td>
<td>6Gy x4</td>
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<tr>
<td>LBMMC</td>
<td>39.6 Gy</td>
<td>5.5-6.5 Gy x4</td>
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<tr>
<td>MMC</td>
<td>45 Gy</td>
<td>5.5 Gy x4</td>
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<tr>
<td>SPI</td>
<td>45-50.4 Gy</td>
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<td></td>
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<td>WBH</td>
<td>46 Gy</td>
<td>9.5 Gy x2</td>
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<tr>
<td>Kiel</td>
<td>50.4 Gy</td>
<td>15 Gy x2</td>
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Keep your pecker up, Bill... new prostate cancer zapper won't wreck your love life! Pioneering soundwave treatment proves as effective as surgery

- High-intensity focused ultrasound blasts tumours with soundwaves
- Study shows its 83 per cent success rate as effective as surgery
- But rate of erectile dysfunction in HIFU patients post-treatment much lower
- 'Experimental' treatment not widely available in UK and costs £10,000

By BARNEY CALMAN, HEALTH EDITOR FOR THE MAIL ON SUNDAY
PUBLISHED: 17:00 EDT, 12 March 2016 | UPDATED: 20:00 EDT, 12 March 2016

A treatment that uses sound waves to blast away prostate tumours has been proven to cure as many men of the disease as surgery that removes the gland – while causing significantly fewer side effects.

Until now the new procedure, called high-intensity focused ultrasound (HIFU), has been considered experimental.

This has meant that the majority of British men diagnosed with the condition – who include former rolling Stone BILLY WYMAN – are offered the more invasive operation called radical prostatectomy, which has a clear track record despite the risk of impotence and incontinence.

But feedback indicates it is successful.
When Does a New Treatment Become A Standard of Care

* No perfect answer
* “Appropriate Use of Advanced Technologies for Radiation Therapy and Surgery in Oncology”
  * National Academies of Medicine Workshop, July 2015
* The bar is higher now than ever before
* Hypothesis generating studies
* Multicenter studies
* Meta Analyses
* Widely available
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