Sexual dysfunction in men after treatment for lower urinary tract symptoms: evidence from randomised controlled trial

Sara T Brookes, Jenny L Donovan, Tim J Peters, Paul Abrams, David E Neal

Abstract

Objective To examine the impact on sexual function of treatments for lower urinary tract symptoms in men.

Design Multicentre pragmatic randomised controlled trial of standard surgery (transurethral resection of the prostate), non-contact laser therapy, and conservative management (no active intervention).

Setting Three clinical centres in the United Kingdom.

Participants 340 men aged between 48 and 90 years with lower urinary tract symptoms related to benign prostatic enlargement.

Main outcome measures ICS sex questionnaire items concerned with erectile stiffness, ejaculatory volume, pain or discomfort on ejaculation, whether sex life was spoilt by urinary symptoms.

Results Erectile and ejaculatory dysfunction were common (70%) and problematic at baseline and showed the expected trends with ageing. After treatment, reduced ejaculation was reported in all groups but was not significantly worse after standard surgery than after laser therapy. Erectile function was significantly improved after standard surgery; no significant difference was found between standard surgery and laser therapy (odds ratio 0.70, 95% confidence interval 0.36 to 1.38). Standard surgery (transurethral resection of the prostate—TURP) has been reported to cause sexual dysfunction, with nearly three quarters of men experiencing retrograde ejaculation and over 13% experiencing impotence after standard surgery according to a systematic review. Although the results had wide confidence intervals, these figures have been broadly confirmed in recent randomised trials.

Concerns about the morbidity associated with standard surgery have led to the introduction of less invasive treatments, including laser therapy. Results of some small scale trials have shown these treatments to cause less sexual dysfunction. However, one trial of contact laser therapy compared with standard surgery concluded that these treatments resulted in similar levels of impotence. One major methodological rigorous trial concluded that standard surgery did not result in more impotence than watchful waiting. The impact of these treatments on sexual function thus remains uncertain because of the limited power of most previous studies combined with the lack of standardisation of what constitutes sexual dysfunction and often a failure to collect baseline as well as follow up data.

We investigated self reported sexual dysfunction at baseline and follow up in men with lower urinary tract symptoms who took part in a randomised trial of standard surgery, non-contact laser therapy, and conservative management (no active intervention).

Methods

The trial was a multicentre, pragmatic randomised controlled trial stratified by centre. The study had approval from ethics committees at each of the three participating centres and all patients provided written informed consent.

We included men who were attending urology clinics if they presented with uncomplicated lower urinary tract symptoms (international prostate symptom score...
To examine the change in degree of dysfunction between randomisation and follow up within each of the treatment groups separately. We carried out primary comparisons between treatments on an intention to treat basis using proportional odds models to obtain odds ratios and 95% confidence intervals\(^5\) with adjustment for stratification and baseline level of the relevant outcome measure. We used a two sided 5% significance level for all outcomes for the global test across the treatment groups and the Bonferroni procedure for multiple comparisons to determine which of the three arms was significantly different from the others.\(^2\) We compared the occurrence of new cases of dysfunction after treatment between the three treatment groups using exact tests. Stata software was used for all statistical analyses.\(^2\)

### Results

Of the 340 men recruited to the trial, 117 were randomised to standard surgery, 117 to laser therapy, and 106 to conservative management (fig 2). Baseline sociodemographic characteristics were similar between the treatment groups, as was mean age (66-67 years).\(^1\)

We used descriptive statistics to compare sociodemographic factors and the prevalence of sexual dysfunction across the treatment groups at randomisation and to examine the relations between the prevalence of sexual dysfunction and age at randomisation for all groups combined. We used proportional odds models with adjustment for age\(^2\) to examine the relations between sexual dysfunction and lower urinary tract symptoms at baseline. The odds ratios from these models represent the likelihood of having a worse outcome (more severe dysfunction) across the range of possible categories rather than dichotomising the outcome variable into presence or absence of dysfunction.

We used Wilcoxon matched pairs signed ranks tests (retaining the full range of responses to the questions) to examine the change in degree of dysfunction
Sexual dysfunction at baseline
At baseline 298 men (88%) returned the ICS sex questionnaire. Despite the sensitive nature of the questions little information was missing (2-7% for erectile and ejaculatory function and pain or discomfort on ejaculation, 16% for sex life spoilt by urinary symptoms). The prevalence of each dysfunction and the problem caused was similar across the treatment groups at baseline. Erectile and ejaculatory dysfunction were common (reported by 70%) and became more common with increasing age (table 1). Pain or discomfort on ejaculation was less common but showed a similar relation with age, while sex life spoilt by symptoms declined with increasing age. All dysfunctions were reported to be highly problematic, particularly for younger men.

Proportional odds models, adjusted for age, showed significant associations between the overall prostate symptom score and erectile dysfunction and sex life spoilt by symptoms at baseline (table 2). In both cases a higher prostate symptom score (that is, worse symptoms) was associated with more severe sexual dysfunction. No consistent relations were found between individual symptoms in the ICS male questionnaire and sexual dysfunction, and none remained significant after we applied a Bonferroni correction for multiple significance tests. However, we found highly significant associations between the quality of life item on the prostate symptom score and erectile dysfunction, ejaculatory dysfunction, and sex life spoilt by symptoms (table 2).

Sexual dysfunction after treatment
At follow up 277 men (81%) returned the ICS sex questionnaire. Table 3 shows the prevalence of sexual dysfunction within each of the treatment groups at baseline and at 7.5 month follow up. Figure 3 summarises the changes in sexual function between baseline and follow up. Analyses within groups showed that there was significant improvement in erectile function (15% increase in number with normal function, Wilcoxon P=0.012) and significant reduction in pain or discomfort (19% reduction in number with pain, Wilcoxon P=0.0064) after standard surgery. Ejaculatory function was significantly worse after all three treatments (average increase of 11% in number with dysfunction, Wilcoxon P <0.005 for all).

Table 4 shows the primary results between groups of proportional odds models with adjustment for centre and baseline level of dysfunction. Overall, there were significant differences between the treatment groups for each of the dysfunctions but not for sex life spoilt by symptoms. Men who had standard surgery were significantly more likely to have improved erectile function than those who had conservative management, while the comparison between standard surgery and laser was not significant (odds ratio 0.70, 95% confidence interval 0.36 to 1.38). Men who had standard surgery were also significantly less likely to report pain or discomfort during ejaculation than those who had laser or conservative management. Ejaculatory function was significantly worse among those who had standard surgery rather than conservative management. The apparently higher levels of ejaculatory dysfunction after standard surgery compared with laser were marginally significant (2.00, 1.03 to 3.87). This significance disappeared after adjustment for multiple

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Table 1 Levels of sexual dysfunction associated with lower urinary tract symptoms and whether this was perceived as bothersome according to age (years) at baseline. Variation in base numbers due to different numbers responding to each item

<table>
<thead>
<tr>
<th>Symptom</th>
<th>&lt;60 (%) with symptom</th>
<th>60-9 (%)</th>
<th>&gt;69 (%)</th>
<th>Total (%)</th>
<th>&lt;60 (%) who were bothered by symptom</th>
<th>60-9 (%)</th>
<th>&gt;69 (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erectile dysfunction</td>
<td>20/62 (32)</td>
<td>103/139 (74)</td>
<td>83/99 (84)</td>
<td>202/290 (71)</td>
<td>18/29 (61)</td>
<td>19/81 (48)</td>
<td>27/111 (24)</td>
<td>68/356 (19)</td>
</tr>
<tr>
<td>Ejaculatory dysfunction</td>
<td>22/51 (43)</td>
<td>95/136 (70)</td>
<td>76/90 (84)</td>
<td>193/277 (70)</td>
<td>12/22 (55)</td>
<td>46/93 (49)</td>
<td>58/198 (30)</td>
<td>117/350 (34)</td>
</tr>
<tr>
<td>Pain or discomfort on ejaculation</td>
<td>7/51 (14)</td>
<td>20/117 (17)</td>
<td>15/65 (23)</td>
<td>42/233 (18)</td>
<td>5/7 (71)</td>
<td>15/20 (75)</td>
<td>11/15 (73)</td>
<td>31/42 (74)</td>
</tr>
<tr>
<td>Sex life spoilt by symptoms</td>
<td>20/48 (34)</td>
<td>49/123 (40)</td>
<td>23/80 (29)</td>
<td>92/251 (39)</td>
<td>23/26 (96)</td>
<td>43/48 (90)</td>
<td>16/21 (76)</td>
<td>84/95 (88)</td>
</tr>
</tbody>
</table>

Table 2 Relations between sexual dysfunction and lower urinary tract symptoms at baseline adjusted for age

<table>
<thead>
<tr>
<th>Symptom</th>
<th>OR* (95% CI)</th>
<th>P value</th>
<th>OR* (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erectile dysfunction</td>
<td>1.04 (1.00 to 1.07)</td>
<td>0.034</td>
<td>1.57 (1.28 to 1.92)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Ejaculatory dysfunction</td>
<td>1.02 (0.99 to 1.06)</td>
<td>0.19</td>
<td>1.61 (1.31 to 1.97)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Pain or discomfort on ejaculation</td>
<td>1.02 (0.97 to 1.07)</td>
<td>0.463</td>
<td>1.20 (0.89 to 1.61)</td>
<td>0.23</td>
</tr>
<tr>
<td>Sex life spoilt by symptoms</td>
<td>1.06 (1.02 to 1.10)</td>
<td>0.004</td>
<td>1.43 (1.13 to 1.82)</td>
<td>0.003</td>
</tr>
</tbody>
</table>

*Odds ratios >1 reflect higher risk of more severe dysfunction for increase of one point on I-SS (international prostate symptom score).
Significant change in dysfunction within groups between baseline and follow up (Wilcoxon $P<0.02$).

‡ For global tests of treatment differences.
† Odds ratios >1 reflect higher risk of more severe dysfunction for first treatment group compared with second.

Transurethral resection of prostate (standard surgery).

Table 3
Levels of sexual dysfunction before and after treatment. Figures are numbers (percentage) of patients

<table>
<thead>
<tr>
<th></th>
<th>Transurethral resection of prostate</th>
<th>Laser</th>
<th>Conservative management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Follow up</td>
<td>Baseline</td>
</tr>
<tr>
<td>Erectile dysfunction</td>
<td>68 (70)</td>
<td>47 (55)*</td>
<td>71 (71)</td>
</tr>
<tr>
<td>Ejaculatory dysfunction</td>
<td>67 (70)</td>
<td>68 (83)*</td>
<td>70 (76)</td>
</tr>
<tr>
<td>Pain on ejaculation</td>
<td>14 (17)</td>
<td>1 (2)*</td>
<td>14 (16)</td>
</tr>
<tr>
<td>Sex life spoilt by symptoms</td>
<td>37 (43)</td>
<td>34 (46)</td>
<td>29 (33)</td>
</tr>
</tbody>
</table>

* Significant change in dysfunction within groups between baseline and follow up (Wilcoxon $P<0.02$).

Table 4
Differences in sexual dysfunction at follow up in treatment groups, adjusted for centre and relevant baseline measurement

<table>
<thead>
<tr>
<th></th>
<th>Erectile dysfunction</th>
<th>Ejaculatory dysfunction</th>
<th>Pain or discomfort on ejaculation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR* (95% CI) $P$ value‡</td>
<td>OR* (95% CI) $P$ value‡</td>
<td>OR* (95% CI) $P$ value‡</td>
</tr>
<tr>
<td>TURP v conservative management</td>
<td>0.37 (0.19 to 0.74) 0.014</td>
<td>3.27 (1.69 to 6.35) 0.0017</td>
<td>0.06 (0.007 to 0.49) 0.0013</td>
</tr>
<tr>
<td>Laser v conservative management</td>
<td>0.53 (0.28 to 1.11) 0.051</td>
<td>1.64 (0.91 to 2.97) 0.070</td>
<td>0.70 (0.26 to 1.93) 0.070</td>
</tr>
<tr>
<td>TURP v laser</td>
<td>0.70 (0.36 to 1.38) 0.304</td>
<td>2.00 (1.03 to 3.87) 0.09</td>
<td>0.09 (0.01 to 0.73) 0.38</td>
</tr>
</tbody>
</table>

TURP—transurethral resection of prostate (standard surgery).

* Odds ratios <1 reflect lower risk of more severe dysfunction for first treatment group compared with second.
‡ For global tests of treatment differences.

Discussion

In older men with lower urinary tract symptoms related to benign prostatic disease, erectile and ejaculatory dysfunction are common and perceived to be problematic. Pain or discomfort on ejaculation and the perception that sex life is spoilt by symptoms are less common but also problematic, particularly among younger men. This evidence from patients’ reports of sexual dysfunction at baseline and follow up in a randomised controlled trial confirms the findings from previous research of a strong relation between age and symptoms of sexual dysfunction.†

Ejaculatory function significantly deteriorated after all treatment for benign prostatic disease (transurethral resection of the prostate (standard surgery) laser therapy, and conservative management). As expected we found significantly higher levels of retrograde ejaculation after standard surgery. However, in contrast with results of previous studies, other aspects of sexual function were no worse after standard surgery. Indeed, men were significantly less likely to experience erectile dysfunction than those undergoing conservative management and (though not significantly) laser therapy. In addition, pain or discomfort on ejaculation was significantly reduced after standard surgery than after laser therapy and conservative management. These results were further supported by the fact that new cases of erectile dysfunction and impotence occurred less often after transurethral resection, with a similar observation for pain or discomfort during ejaculation.

Implications of findings

This study is important for several reasons. Firstly, it contradicts the bulk of observational evidence that transurethral resection of the prostate can cause
What is already known on this topic

Troublesome lower urinary tract symptoms and erectile dysfunction are common and often problematic in older men.

Standard surgical treatment for lower urinary tract symptoms (transurethral resection of the prostate) has been reported to cause greater erectile and ejaculatory dysfunction than newer less invasive treatments such as laser therapy.

What this study adds

While standard surgery and laser therapy are associated with reduced ejaculation, other aspects of sexual function, particularly erectile function and pain or discomfort on ejaculation are significantly improved after standard surgery, with few new cases of impotence.

Standard surgery rather than minimally invasive therapies should be considered for older men who need treatment for problematic lower urinary tract symptoms and who wish to retain or improve sexual function.

In conclusion, assertions that minimally invasive treatment such as laser therapy may have less impact on sexual function than transurethral resection seem to be unjustified. Older men who need treatment for troublesome lower urinary tract symptoms and who wish to retain (or even improve) sexual function may thus want to consider transurethral resection.

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Contributors: JLD, TJP, DEN, and PA initiated and managed the study, which was coordinated by STB. STB, TJP, and JLD analysed the data. STB, TJP, PA, and DEN wrote the paper. JLD, TJP, DEN, and PA are guarantors.

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Competing interests: TJP has received expenses and a fee from Sanofi-Synthelabo for speaking at a symposium.

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