



## Topic Exploration Report <sup>1</sup>

### Robotic waterjet ablation therapy for lower urinary tract symptoms caused by benign prostatic hyperplasia (BPH)

#### What is a Topic Exploration Report?

Topic Exploration Reports are not health technology assessments. These reports provide a high-level briefing on new topics submitted to Health Technology Wales and are not based on exhaustive or systematic literature searches. Instead, they rely on a focussed scan of key resources.

#### What evidence is used in a Topic Exploration Report?

Priority is given to summarising the most relevant or useful evidence, rather than covering all possible evidence. Information reported is typically based on abstracts and study authors' own conclusions, rather than detailed scrutiny of full texts.

#### What are the aims of a Topic Exploration Report?

Topic Exploration Reports offer an overview of the available evidence on a topic and aim to highlight any uncertainties or gaps in the evidence. These reports outline the quantity and type of evidence found, but no critical appraisal or formal evidence synthesis is conducted.

#### How should a Topic Exploration Report be used?

Topic Exploration Reports can be used to indicate what evidence may be available for a topic, and do not provide definitive guidance on how a technology should be used. The evidence presented within the reports should be interpreted with caution.

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<sup>1</sup> [Cyfieithu dogfennau HTW wedi'u cyhoeddi o'r Saesneg i'r Gymraeg](#)  
Translation of published technical HTW documents from English into Welsh

Topic exploration report number	TER625
Topic	Robotic waterjet ablation for lower urinary tract symptoms caused by benign prostatic hyperplasia (BPH)
Summary of findings	<p>BPH is a noncancerous enlargement of the prostate gland. Current surgical treatment options include but not limited to transurethral resection of the prostate (TURP), and holmium laser enucleation of the prostate (HoLEP). Robotic waterjet ablation (Aquablation) therapy is a minimally invasive, robotically guided resective surgical procedure that uses ultrasound imaging and a heat free waterjet to remove prostate tissue in men with BPH. Possible advantages of the technology is that the risk of complications from thermal injury are minimised, and it also has potential to preserve sexual function.</p> <p>HTW researchers identified one NICE interventional procedures guidance (IPG), one NICE Medtech innovation briefing (MIB), six additional systematic reviews, one clinical trial, two observational studies and one ongoing study. NICE recommended the use of Aquablation if standard arrangements are in place for clinical governance, consent and audit. Across the additional systematic reviews, some studies found improved functional outcomes in the Aquablation group compared to TURP. One review found that findings were similar when compared with HoLEP although authors note Aquablation offers shorter operation time and hospital stays when compared with HoLEP.</p> <p>Key uncertainties highlighted in the literature include the need for more comparative studies on Aquablation when compared to other minimally invasive therapies (MITs). HTW researchers did not identify any comparative cost-effectiveness data.</p>

## Introduction and aims

BPH is a noncancerous enlargement of the prostate gland that commonly occurs in men over the age of 50. It is a highly prevalent condition that affects approximately three million men in the UK. Symptoms include difficulty urinating and a frequent and/or sudden urge to urinate. Mild symptoms may be treated with drugs such as alpha-adrenoceptor blockers and 5-alpha-reductase inhibitors. Current surgical treatment options include TURP, HoLEP, minimally invasive surgical therapies such as Rezum and UroLift, and open or robotic simple prostatectomy. Information from the topic proposer confirms that TURP remains the most used procedure across Wales.

Robotic waterjet ablation (Aquablation) therapy is a minimally invasive, robotically guided surgical procedure that uses ultrasound imaging and a heat free waterjet to remove prostate tissue in men with BPH. Aquablation is delivered in secondary care settings, specifically urology theatres in hospitals. The procedure is usually done under general or spinal anaesthesia.

Aquablation therapy by Procept BioRobotics is CE marked as a class IIb medical device.

Information from the topic proposer states that it is currently being used in over 50 hospitals across the UK.

Health Technology Wales researchers searched for evidence on robotic waterjet ablation therapy or Aquablation therapy for BPH.

## Evidence overview

### Guidance

#### *Interventional Procedures Guidance (IPG)*

NICE published an IPG in 2023 on transurethral waterjet ablation for lower urinary tract symptoms caused by benign prostatic hyperplasia (NICE 2023b). Evidence included 11 studies and approximately 3,300 participants including one systematic review, one pooled analysis of four trials, one randomised controlled trial (RCT), one prospective multicentre single-arm trial, one retrospective cohort study, one retrospective non-randomised comparative study, two retrospective case series, and a report from the US Food and Drug Administration Manufacturer (FDA) and User Facility Device Experience database. The studies included data from Europe, Asia and North America from 2014 to 2021. The IPG reports some study overlap in the pooled analyses and prostate volume ranged from 20 ml to 363 ml. All the studies used the AQUABEAM system (PROCEPT BioRobotics) for waterjet ablation.

Outcome measures included International Prostate Symptom Score (IPSS), maximum urinary flow rate (Q<sub>max</sub>), post void residual (PVR), prostate specific antigen (PSA), quality of life outcomes (QoL), and need for additional treatment. Key efficacy outcomes from the committee include a reduction in lower urinary tract symptoms and preservation of sexual function, including ejaculatory function. Key safety outcomes were bleeding, damage to adjacent structures, need for reintervention, urinary incontinence and urinary retention. The duration of follow-up across the studies did not exceed 12 months. NICE recommended the use of the technology if standard arrangements are in place for clinical governance, consent and audit. The committee concluded that there is a lot of good quality evidence that the procedure improves lower urinary tract symptoms caused by BPH and is safe enough to use with standard arrangements.

## Evidence overview

Information from the topic proposer confirms that practice has evolved from non-haemostatic or limited haemostasis to a standardised focal bladder-neck cautery protocol and that this should be noted when interpreting historical bleeding and transfusion data.

### *Medtech Innovation Briefing (MIB)*

NICE also published a MIB on Aquablation robotic therapy for lower urinary tract symptoms caused by BPH in 2023 (NICE 2023a). The MIB included five studies: one RCT, two prospective studies and two single-arm studies. The MIB found that Aquablation therapy is as effective as TURP for the removal of prostate tissue for people with BPH. The key uncertainties were that the cost of the technology is higher than comparator technologies, although the manufacturer claims long term cost savings; and that direct comparative evidence comparing Aquablation therapy with other technologies is needed.

## Systematic reviews

HTW researchers identified six additional systematic reviews that were not referenced in the NICE IPG or MIB. Two systematic reviews were about Aquablation therapy (Bettencourt et al. 2025, Bhatia et al. 2024), and four systematic reviews were about MITs for BPH, which included Aquablation as a surgical option (Akgul et al. 2025a, Akgul et al. 2025b, Shin et al. 2025, van Kollenburg et al. 2023).

Bettencourt et al. (2025) conducted a systematic review of 15 studies involving 1533 patients. The study explored ejaculatory function after robotic waterjet ablation for the treatment of BPH compared to TURP. The review found that the preservation rates of antegrade ejaculation after the intervention ranged from 72 to 99.6%, and erectile function remained stable across all reviewed studies. An RCT comparing Aquablation to TURP demonstrated significantly lower rates of ejaculatory dysfunction in the Aquablation group, which was maintained for up to five years. The study highlighted limited long-term follow-up beyond 12 months and the need for more comparative studies against other MITs.

Bhatia et al. (2024) conducted a network meta-analysis of 23 studies to compare outcomes of Aquablation versus holmium laser enucleation (HoLEP). Based on abstract findings, at 12 months, the IPSS, QoL, PVR and Qmax improvements were similar between the groups. The haemoglobin-loss was lower with HoLEP, the risk of incontinence was higher with HoLEP, the risk of blood transfusion was higher with Aquablation, and the risk of serious adverse events was higher with HoLEP. Authors note Aquablation offers shorter operation time and hospital stays when compared with HoLEP.

Four additional systematic reviews studies were published that evaluated MITs for BPH (Akgul et al. 2025a, Akgul et al. 2025b, Shin et al. 2025, van Kollenburg et al. 2023). Outcomes include lower re-intervention rates using Aquablation when compared with Prostatic Artery Embolization (PAE), Transurethral Needle Ablation (TUNA), and Transurethral Microwave Therapy (TUMT) (Akgul et al. 2025b). Shin et al. (2025) found that Aquablation appeared to induce similar reductions in IPSS when compared to TURP. van Kollenburg et al. (2023) found that all MITs show better safety outcomes compared to TURP and Aquablation resulted in better functional outcomes compared to TURP. Shin et al. (2025) found that TURP demonstrated the lowest relative risk of re-intervention compared with other MITs.

## Clinical trials

## Evidence overview

One additional prospective, double-blind, international clinical trial of 116 patients (Berjaoui et al. 2024) was identified comparing Aquablation therapy for BPH in 30– 80-cm<sup>3</sup> and 80–150-cm<sup>3</sup> prostates (WATER versus WATER II 5-year update). The study concluded that outcomes were similar irrespective of prostate volume when using Aquablation.

### Observational studies

Omidele et al. (2024) reported four-year safety and efficacy outcomes of Aquablation in a prospective single centre observational study. Primary outcomes included change in IPSS score, change in Qmax, change in PVR, preservation of antegrade ejaculation, and complications. IPSS improved from a baseline of 23.8 to 6.9 at four years. Mean Qmax also demonstrated improvement and increased from 6.4 mL/sec to 17.4 mL/sec at four years.

Zorn et al. (2025) reported the feasibility, safety, and efficacy of same-day discharge (SDD) after Aquablation in an ambulatory surgery centre (ASC). The study included 60 men with a mean prostate size of 115 mL and 98% of them were discharged on the same day. Findings demonstrated improvement in urinary flow rates and reductions in IPSS scores at one month follow-up. During the procedure, it was reported that no transfusions or return to the operating room occurred. An additional paper (Ng et al. 2024) also reports the feasibility of Aquablation performed as day cases.

### Cost-effectiveness

HTW researchers did not identify any cost-effectiveness data in the literature. The MIB reports that the cost of Aquablation robotic therapy is £2,872 per patient, based on volume pricing. The capital cost is covered in this, which also includes a per patient consumable cost of £1,925 (excluding VAT). Information from the topic proposer suggests downstream benefits include shorter waiting times and length of stay, predictable operative time, reduced catheter dependency, fewer catheter associated infections, and increased feasibility for planned day-case and same-day discharge in selected patients, including ambulatory surgery centre settings.

### Ongoing studies

HTW researchers identified one prospective observational study of Aquablation in BPH in Canada with an estimated completion date of December 2026 (NCT05169892). Participants will be followed up for three years. Outcomes include Q-max, PVR, prostate volume, IPSS, and adverse events.

## Areas of uncertainty

- A recent systematic review concluded that more direct comparative evidence against other MITs is needed, and longer term follow up.
- There is a lack of published data to support the cost-effectiveness of robotic waterjet ablation therapy for lower urinary tract symptoms caused by benign prostatic hyperplasia when compared with standard care treatments in the UK.
- Further consideration could be given to whether Aquablation could replace TURP or be used in addition to standard care.

## Areas of uncertainty

- Further exploration could be given to whether some people would be better suited for this treatment based on prostate size or symptoms.

## Literature search results

### Health technology assessments and guidance

NICE. (2023a). Aquablation robotic therapy for lower urinary tract symptoms caused by benign prostatic hyperplasia (MIB 315). Medtech innovation briefing. National Institute for Health and Care Excellence. Available at: <https://www.nice.org.uk/advice/mib315> [Accessed 24 September 2025].

NICE. (2023b). Transurethral water-jet ablation for lower urinary tract symptoms caused by benign prostatic hyperplasia (IPG 770). Interventional procedures guidance. The National Institute for Health and Care Excellence. Available at: <https://www.nice.org.uk/guidance/ipg770> [Accessed 23 September 2025].

### Evidence reviews and economic evaluations

Akgul B, Aydin A, Cakir OO, et al. (2025a). Impact of minimally invasive surgical therapies on sexual function in benign prostatic hyperplasia: a systematic review. *Minerva Urol Nephrol.* 77(4): 459-71. doi: 10.23736/s2724-6051.25.06374-8

Available at: <https://pubmed.ncbi.nlm.nih.gov/40891476/>

Akgul B, Tozsin A, Aydin A, et al. (2025b). Reintervention rates after minimally invasive benign prostatic hyperplasia therapies: a systematic review including industry involvement. *World Journal of Urology.* 43(1): 494. doi: 10.1007/s00345-025-05884-y

Available at: <https://link.springer.com/article/10.1007/s00345-025-05884-y>

Bettencourt A, Wu J, Borrell JA, et al. (2025). Ejaculatory function after robotic waterjet ablation for the treatment of benign prostatic hyperplasia: a systematic review. *Int J Impot Res.* doi: 10.1038/s41443-025-01087-6.

Available at: <https://pubmed.ncbi.nlm.nih.gov/40369187/>

Bhatia A, Titus R, Porto JG, et al. (2024). Comparing outcomes of Aquablation versus holmium laser enucleation of prostate in the treatment of benign prostatic hyperplasia: A network meta-analysis. *BJU Compass.* 5(12): 1231-45. doi: 10.1002/bco2.454

Available at: <https://pubmed.ncbi.nlm.nih.gov/39744077/>

Shin BNH, Maksoud R, Tan S, et al. (2025). Efficacy and Tolerability Outcomes of Minimally Invasive Surgical Treatments for Benign Prostatic Hyperplasia: A Random-Effects Network Meta-Analysis. *World J Mens Health.* doi: 10.5534/wjmh.250092

Available at: <https://pubmed.ncbi.nlm.nih.gov/40759591/>

van Kollenburg RAA, van Riel L, de Bruin DM, et al. (2023). Novel minimally invasive treatments for lower urinary tract symptoms: a systematic review and network meta-analysis. *Int Braz J Urol.* 49(4): 411-27. doi: 10.1590/s1677-5538.lbj.2023.0016

Available at: <https://pubmed.ncbi.nlm.nih.gov/37267609/>

### Individual studies

Berjaoui MB, Nguyen DD, Almousa S, et al. (2024). WATER versus WATER II 5-year update: Comparing Aquablation therapy for benign prostatic hyperplasia in 30-80-cm(3) and 80-150-cm(3) prostates. *BJU Compass.* 5(11): 1023-33. doi: 10.1002/bco2.430. Available at: <https://bjui-journals.onlinelibrary.wiley.com/doi/10.1002/bco2.430>

Ng KL, Giona S, Barber N. (2024). Feasibility of Aquablation prostate surgery performed as day cases. *BJU Int.* 134(2): 185-6. doi: 10.1111/bju.16272

Available at: <https://pubmed.ncbi.nlm.nih.gov/38117211/>

Omidele OO, Siegal AS, Roshandel R, et al. (2024). Aquablation at 4-years: Real World Data From the Largest Single-center Study With Associated Outcomes Follow-up. *Urology.* 194: 216-20. doi: 10.1016/j.urology.2024.07.047

Available at: <https://pubmed.ncbi.nlm.nih.gov/39084348/>

Zorn KC, Chakraborty A, Chughtai B, et al. (2025). Safety and Efficacy of Same Day Discharge for Men Undergoing Contemporary Robotic-assisted Aquablation Prostate Surgery in an Ambulatory Surgery Center Setting-First Global Experience. *Urology.* 195: 132-8. doi: 10.1016/j.urology.2024.08.006

Available at: <https://pubmed.ncbi.nlm.nih.gov/39159759/>

### Ongoing research

Aquablation in Benign Prostatic Hyperplasia in Canada (NCT05169892); Last update posted: December 2021; Estimated completion date: December 2026; Available at: <https://clinicaltrials.gov/study/NCT05169892>

<b>Date of search</b>	24 September 2025
<b>Concepts used</b>	Aquablation therapy; benign prostatic hyperplasia (BPH); Procept biorobotics

## Proposed research question and evidence selection criteria (if selected)

<b>Proposed Research question</b>	<b>What is the clinical and cost-effectiveness of robotic waterjet ablation therapy for BPH compared to TURP?</b>
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	<b>Inclusion criteria</b>	<b>Exclusion criteria</b>
<b>Population</b>	People with lower urinary tract symptoms caused by BPH	
<b>Intervention</b>	Robotic waterjet ablation therapy / Aquablation	
<b>Comparison/ Comparators</b>	TURP (standard care in Wales)	
<b>Outcome measures</b>	Q-max, PVR, prostate volume, IPSS Reduction in urinary tract symptoms Sexual function Health related QoL Adverse events Resource use Economic outcomes	

<b>Proposed speciality</b>	<b>Genitourinary system</b>
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