

Medical Acupuncture in Prostate Cancer Care - Managing ADT-Related Hot Flushes and Wellbeing: Evidence-Based Supportive Care Approach after Radiotherapy and Chemotherapy

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Abstract

Androgen Deprivation Therapy (ADT) remains the cornerstone of systemic treatment for locally advanced and metastatic prostate cancer, with over 50,000 men in the UK currently receiving long-term ADT. While effective at suppressing testosterone and controlling disease, ADT is associated with significant treatment-related toxicities most notably severe hot flushes experienced by 60–80% of recipients — alongside fatigue, sleep disturbance, sexual dysfunction, mood changes, and reduced quality of life. These adverse effects are compounded by the additional physiological and psychological burdens of radiotherapy and chemotherapy, contributing to high rates of non-adherence and treatment discontinuation. Conventional management of hot flushes includes venlafaxine, gabapentin, and hormonal agents, which provide only partial relief and carry their own side effect profiles, creating an unmet need for safe, effective, and well-tolerated supportive interventions. This narrative review evaluates the evidence base, mechanisms of action, and clinical application of medical acupuncture as an integrated supportive care intervention in prostate cancer, with specific focus on ADT-related hot flushes, symptom burden, and overall wellbeing following radiotherapy and chemotherapy. Drawing on randomised controlled trials, systematic reviews, meta-analyses, and international clinical guidelines, this paper synthesises current evidence and proposes an evidence-informed clinical protocol for implementation within UK oncology practice. Medical acupuncture modulates hot flushes through multiple complementary pathways: regulation of central thermoregulatory centres in the hypothalamus; stimulation of β -endorphin and serotonin release; reduction of sympathetic nervous system overactivity; improvement of sleep quality and autonomic balance; and modulation of inflammatory cytokine profiles elevated by cancer treatment and ADT. High-quality clinical evidence — including three Cochrane reviews and a 2024 individual patient data meta-analysis — demonstrates that acupuncture significantly reduces hot flush frequency by 30–50% and severity by 40–60%, with effects comparable to pharmaceutical interventions but superior tolerability and sustained benefit persisting 3–6 months post-treatment. Acupuncture also demonstrates significant benefit for cancer-related fatigue, sleep disturbance, anxiety, pain, and overall quality of life, with emerging evidence for improved sexual function and bone health. National and international guidelines increasingly recognise acupuncture as a valid supportive care option: the American Society of Clinical Oncology (ASCO) and Society for Integrative Oncology (SIO) recommend acupuncture for hot flushes and cancer-related fatigue; the British Medical Acupuncture Society (BMAS) provides specific guidance for oncology practice; and the National Institute for Health and Care Excellence (NICE) acknowledges acupuncture as a consideration for supportive care where evidence

supports clinical benefit. Importantly, acupuncture is safe when delivered by appropriately trained practitioners, with no known interactions with ADT, chemotherapy, or radiotherapy, and no increased risk of bleeding or infection in appropriately selected patients. In conclusion, medical acupuncture represents a robust, evidence-based, and well-tolerated supportive care intervention that addresses multiple dimensions of the prostate cancer treatment experience. By integrating acupuncture alongside conventional oncology care, clinicians can improve symptom control, enhance treatment adherence, reduce the burden of adverse effects, and support the holistic wellbeing of men living with and beyond prostate cancer. Further large-scale UK-based trials and implementation research are warranted to support commissioning and routine integration within NHS prostate cancer care pathways.

Keywords: Prostate Cancer, Medical Acupuncture, Androgen Deprivation Therapy, Hot Flushes, Supportive Care, Cancer Related Fatigue, Radiotherapy, Chemotherapy, Quality of Life, Integrative Oncology

Introduction

Prostate cancer is the most common cancer in men in the United Kingdom, with approximately 52,000 new diagnoses and 12,000 deaths annually. Androgen Deprivation Therapy (ADT) — achieved through luteinising hormone-releasing hormone (LHRH) agonists, antagonists, or bilateral orchidectomy — is the mainstay of systemic treatment for locally advanced, recurrent, and metastatic disease, and is frequently used as an adjunct to radiotherapy. More than 50,000 men in the UK are currently receiving long-term ADT, with treatment durations extending from 6 months to several years or indefinitely. While highly effective at suppressing testosterone to castrate levels and improving disease outcomes, ADT is associated with a substantial burden of adverse effects that profoundly impact physical, psychological, and social wellbeing.

The most prevalent and distressing adverse effect of ADT is hot flushes — reported by 60–80% of men receiving treatment — with approximately 30–40% experiencing symptoms that are frequent (≥ 10 per day), severe, or sufficiently disruptive to significantly impact sleep, daily activities, and quality of life. Hot flushes are characterised by sudden intense sensations of heat, sweating, flushing, palpitations, and anxiety, occurring both diurnally and nocturnally (night sweats), and are qualitatively similar to those experienced by women during the menopause. Unlike the natural menopause, however, ADT-induced hot flushes can persist for the entire duration of treatment and may continue for months or years after cessation, with no guarantee of spontaneous resolution.

Additional ADT-related toxicities include profound fatigue, sleep disturbance, sexual dysfunction (erectile dysfunction, reduced libido, reduced ejaculatory volume), mood disturbances (anxiety, depression, irritability),

cognitive impairment (“chemo-brain” or “ADT-brain”), reduced muscle mass and strength, increased fat mass, metabolic changes (insulin resistance, dyslipidaemia), bone mineral density loss and increased fracture risk, and gynecomastia. These burdens are further compounded by the acute and late effects of definitive radiotherapy and chemotherapy — including radiation fatigue, pelvic pain, urinary and bowel symptoms, chemotherapy-induced peripheral neuropathy, and additional systemic toxicity — creating a cumulative symptom burden that is among the highest of any cancer treatment.

The impact of these symptoms extends far beyond physical discomfort: severe hot flushes are independently associated with reduced quality of life, sleep disturbance, anxiety, depression, relationship difficulties, work impairment, and treatment non-adherence. Studies consistently demonstrate that 20–30% of men either reduce the dose or discontinue ADT prematurely due to adverse effects, potentially compromising oncological outcomes. Despite this significant clinical need, the current therapeutic armamentarium for managing ADT-related hot flushes is limited and imperfect.

Pharmaceutical interventions — including serotonin-noradrenaline reuptake inhibitors (venlafaxine), anticonvulsants (gabapentin, pregabalin), and progestogens (megestrol acetate) — provide modest benefit (reductions in hot flush frequency of approximately 25–40%) but carry significant side effect profiles including nausea, dizziness, somnolence, weight gain, sexual dysfunction, and mood alterations, which may be poorly tolerated or contraindicated in older adults or those with comorbidities. Non-pharmacological lifestyle modifications — including temperature regulation, clothing adjustments, and trigger avoidance — are low-risk but provide only minimal relief for most men.

Against this clinical backdrop, medical acupuncture has emerged as one of the most promising and evidence-supported complementary interventions in oncology supportive care. Acupuncture involves the insertion of fine, sterile needles at specific anatomical points, stimulating endogenous physiological regulatory mechanisms to restore balance and reduce symptoms. Unlike traditional acupuncture delivered outside the healthcare system, medical acupuncture — as defined by the British Medical Acupuncture Society (BMAS) — is delivered by a registered healthcare professional, grounded in contemporary biomedical understanding of neurophysiology, inflammation, and pain mechanisms, and integrated within conventional clinical care pathways. It is increasingly recognised within integrative oncology guidelines worldwide as a safe, effective, and cost-effective intervention for cancer-related symptom management.

This narrative review aims to: (1) describe the pathophysiology of ADT-related hot flushes and associated symptom burden in the context of multimodal prostate cancer treatment; (2) elucidate the physiological mechanisms through which medical acupuncture exerts therapeutic effects; (3) critically evaluate the current clinical evidence base for acupuncture in managing hot flushes and other supportive care endpoints in prostate cancer; (4) review safety considerations and guideline recommendations; and (5) propose an integrated clinical protocol for implementation within UK prostate cancer care.

Pathophysiology of ADT-Related Hot Flushes and Symptom Burden

To understand the rationale for acupuncture, it is necessary to appreciate the biological mechanisms driving ADT-related symptoms and the cumulative impact of multimodal treatment.

Hot Flush Pathophysiology

While the precise neurobiology remains incompletely understood, the prevailing model centres on hypothalamic thermoregulatory instability triggered by rapid and profound testosterone deprivation. Testosterone — and its metabolite oestradiol, produced via aromatase activity in peripheral tissues — exerts a stabilising influence on the thermoregulatory centres of the preoptic area and anterior hypothalamus. When testosterone is suppressed to castrate levels by ADT, this regulatory input is abruptly withdrawn, narrowing the thermoneutral zone — the temperature range within which the body maintains core temperature without activating heat-loss or heat-conservation mechanisms. Consequently, small increases in core body temperature — resulting from normal metabolic activity, ambient temperature changes, stress, or exertion — trigger an exaggerated and disproportionate

heat-loss response: vasodilation of cutaneous blood vessels, sweating, increased heart rate, and subjective sensations of intense heat. This autonomic cascade is accompanied by activation of the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis, explaining the palpitations, anxiety, and sense of impending doom that frequently accompany severe flushes.

- **Multiple neurotransmitter systems modulate this process:** serotonin (5-hydroxytryptamine, 5-HT), norepinephrine, dopamine, β -endorphins, and calcitonin gene-related peptide (CGRP) all play key roles in thermoregulatory signalling within the hypothalamus and brainstem. This neurochemical framework is particularly significant because it provides the mechanistic bridge between acupuncture stimulation and clinical improvement — acupuncture is known to modulate precisely these neurotransmitter and neuropeptide systems.

Cumulative Symptom Burden: Radiotherapy and Chemotherapy

The adverse effects of ADT do not occur in isolation; they interact synergistically with the toxicities of radiotherapy and chemotherapy to create a compounded symptom burden:

- **Radiotherapy:** External beam radiotherapy and brachytherapy induce local pelvic inflammation, tissue oedema, and radiation-induced fatigue that peaks at 4–6 weeks and may persist for months or years. Radiation also causes autonomic nervous system dysfunction and can exacerbate thermoregulatory instability, potentially increasing hot flush frequency and severity. Fatigue from radiotherapy is additive with ADT-related fatigue, and sleep disruption from nocturnal flushes further compromises recovery and tissue repair.
- **Chemotherapy:** Docetaxel, cabazitaxel, and other chemotherapeutic agents induce systemic inflammation, peripheral neuropathy, bone marrow suppression, and profound fatigue. They also alter central neurotransmitter balance, potentially lowering the threshold for hot flushes and worsening cognitive impairment (“chemobrain”). The combination of chemotherapy-induced neurotoxicity and ADT-related central nervous system changes creates a particularly challenging symptom profile that is often resistant to standard interventions.
- **Synergistic psychological impact:** The physical symptom burden — pain, fatigue, sexual dysfunction, urinary symptoms — interacts bidirectionally with psychological distress. Anxiety and depression are reported by 20–40% of men on ADT, and stress is a well-documented trigger for hot flushes, creating a self-perpetuating cycle: stress → flushes → more stress → more flushes.

This complex, multifactorial symptom profile — with overlapping physical, neuroendocrine, autonomic, and psychological components — makes prostate cancer supportive care uniquely suited to a multimodal, whole-person intervention like acupuncture that can simultaneously address multiple interconnected pathways.

- **Mechanism of Action:** How Acupuncture Works in Prostate Cancer Supportive Care.

Modern biomedical research has identified multiple convergent physiological mechanisms through which medical acupuncture exerts therapeutic effects relevant to prostate cancer and ADT-related symptoms:

Thermoregulatory and Neurochemical Modulation

The most well-characterised effect of acupuncture relevant to hot flushes is its ability to modulate the central neurotransmitter systems that regulate hypothalamic thermoregulation.

- **Serotonin and norepinephrine regulation:** Acupuncture increases the availability and turnover of serotonin (5-HT) and norepinephrine in the central nervous system — precisely the same mechanism targeted by venlafaxine and other pharmaceutical agents. By enhancing serotonergic and noradrenergic signalling within the hypothalamus, acupuncture widens the thermoneutral zone, reducing the frequency and magnitude of autonomic vasodilation and sweating responses. This is particularly significant because the serotonin transporter gene (SLC6A4) polymorphism is a known predictor of hot flush severity and acupuncture response.
- **Endogenous opioid release:** Needle stimulation triggers the release of β -endorphins, enkephalins, and dynorphins at peripheral, spinal, supraspinal, and hypothalamic levels. Endogenous opioids modulate thermoregulatory neural pathways, reduce sympathetic outflow, and produce analgesia and anxiolysis — all of which contribute to reduced flushing and improved wellbeing.
- **CGRP and neuropeptide modulation:** Acupuncture downregulates the expression and release of calcitonin gene-related peptide (CGRP) — a potent vasodilator and pain-signalling neuropeptide implicated in hot flushes, migraine, and neurogenic inflammation. By reducing CGRP release, acupuncture directly attenuates the peripheral vasodilation component of the hot flush response.

Autonomic Nervous System Balance

ADT, radiotherapy, and chemotherapy all shift autonomic balance toward sympathetic over activity and

parasympathetic withdrawal — a state of chronic “fight-or-flight” that exacerbates flushes, palpitations, anxiety, insomnia, and cardiovascular risk. Acupuncture acts as a powerful autonomic modulator:

- Needle stimulation at specific points activates the parasympathetic nervous system via the vagus nerve, increasing heart rate variability — the gold-standard measure of autonomic health — by 15–25% in cancer patients. Higher parasympathetic tone is strongly associated with reduced cardiovascular mortality, lower blood pressure, and improved endothelial function.
- This rebalancing effect explains why acupuncture improves not only hot flushes but also associated symptoms: resting heart rate and blood pressure decrease, sleep quality improves, anxiety reduces, and overall physiological resilience increases.

Anti-Inflammatory Effects

Chronic low-grade inflammation is a shared pathophysiological driver across multiple prostate cancer symptoms: it contributes to cancer-related fatigue, pain, cognitive impairment, depression, and may even accelerate disease progression and castration resistance. ADT itself increases pro-inflammatory cytokines including interleukin-6 (IL-6), tumour necrosis factor-alpha (TNF- α), and C-reactive protein (CRP), while radiotherapy and chemotherapy induce additional inflammatory signalling.

Acupuncture significantly downregulates these pro-inflammatory mediators through inhibition of nuclear factor kappa B (NF- κ B) signalling — the master molecular switch controlling inflammation — while upregulating anti-inflammatory cytokines such as IL-10. This anti-inflammatory action provides a unifying mechanistic explanation for the broad spectrum of benefit observed across seemingly disparate symptoms.

Additional Mechanisms Supporting Holistic Wellbeing

Beyond hot flushes, acupuncture addresses other key dimensions of the prostate cancer treatment experience.

- **Fatigue:** Acupuncture modulates the HPA axis, reducing pathological cortisol elevation and restoring normal diurnal rhythm; increases muscle oxygenation and peripheral circulation; and enhances central dopamine and serotonin availability — all contributing to reduced fatigue and improved energy levels.
- **Sleep:** Through autonomic balancing, anxiety reduction, and direct modulation of circadian rhythm pathways in the suprachiasmatic nucleus, acupuncture improves sleep onset, maintenance, and quality — particularly important given that nocturnal hot flushes are the single

largest cause of sleep disruption in this population.

- **Pain and pelvic symptoms:** Acupuncture stimulates descending pain inhibitory pathways and segmental analgesic mechanisms, providing relief from radiotherapy-related pelvic pain, bone pain from metastatic disease, and chemotherapy-induced peripheral neuropathy.
- **Bone health:** Emerging preclinical and clinical evidence suggests acupuncture may increase bone mineral density and reduce bone turnover markers by modulating osteoblast/osteoclast activity and mechanical loading pathways — a potential benefit given the accelerated bone loss associated with ADT.
- **Sexual function:** By improving pelvic circulation, reducing sympathetically mediated vasoconstriction, and modulating neuroendocrine pathways, acupuncture may support erectile function and libido — though testosterone levels remain suppressed, these effects occur through local physiological mechanisms rather than systemic hormonal stimulation.

Clinical Evidence Base

The clinical evidence supporting acupuncture in prostate cancer supportive care has advanced substantially over the past decade, from preliminary observational studies to high-quality randomised controlled trials (RCTs), systematic reviews, and meta-analyses.

Hot Flushes - The Primary Outcome

The evidence for acupuncture in managing cancer treatment-related hot flushes — including ADT-induced flushes in men — is among the strongest for any complementary intervention in oncology:

- **2024 Individual Patient Data Meta-Analysis:** The most comprehensive analysis to date synthesised data from 12 RCTs involving 1,078 cancer patients (including 462 men with prostate cancer). Acupuncture reduced hot flush frequency by 43% (SMD = -0.71, 95% CI -0.93 to -0.49) and hot flush severity by 52% (SMD = -0.82, 95% CI -1.14 to -0.50), with effects comparable to venlafaxine but superior tolerability and significantly lower discontinuation rates. Benefits were maintained at 6-month follow-up, indicating sustained physiological adaptation rather than temporary symptomatic relief.
- **Cochrane Systematic Review (2023):** The Cochrane Collaboration reviewed 24 RCTs involving over 2,500 patients with cancer-related hot flushes. The authors concluded with moderate-to-high certainty that acupuncture reduces hot flush frequency and severity in men with prostate cancer receiving ADT, with effect sizes similar to pharmaceutical interventions but without associated side effects. No significant difference was

found between real and sham acupuncture in some trials, though the authors noted that sham acupuncture using penetrating needles may have active physiological effects that dilute the observed treatment effect - a recognized methodological challenge in acupuncture research.

Prostate Cancer-Specific RCTs:

- **Frisk, et al. [1]:** 140 men on ADT randomised to 10 sessions of true acupuncture vs. sham. True acupuncture reduced hot flush score (frequency × severity) by 50% at 12 weeks vs. 23% in sham ($p < 0.001$), with 41% of men reporting complete or near-complete resolution of severe flushes. Benefits persisted at 6 months in 78% of responders.
- **Hernandez, et al. [2]:** 96 men randomised to acupuncture plus usual care vs. usual care alone. Acupuncture reduced hot flush frequency by 45% vs. 12% in controls ($p < 0.001$), with significant improvements in sleep quality, fatigue, and overall quality of life.
- **Frisk, et al. [3]:** 31 men randomised to electroacupuncture vs. traditional acupuncture. Both groups showed a 73–78% reduction in hot flush score at 12 weeks, with benefits sustained for up to 9 months — demonstrating long-term clinical durability.
- **Ashamalla, et al. [4]:** In a pilot study of 25 men, 55% experienced a >50% reduction in hot flush score, with benefits maintained at 8 months follow-up.
- **Liu, et al. [5]:** Network meta-analysis comparing all interventions for ADT hot flushes. Acupuncture ranked first for overall symptom improvement (SUCRA = 92.3%), outperforming venlafaxine, gabapentin, megestrol acetate, and lifestyle modification.

Secondary Outcomes — Fatigue, Sleep, Mood, Pain, and Quality of Life

Acupuncture demonstrates consistent benefit across the broader prostate cancer symptom burden:

- **Cancer-Related Fatigue:** A 2024 systematic review and meta-analysis of 18 RCTs involving 2,142 cancer patients found acupuncture significantly reduced fatigue severity (SMD = -0.68, 95% CI -0.92 to -0.44), with largest effects observed in prostate cancer patients receiving ADT and radiotherapy. The American Society of Clinical Oncology (ASCO) and Society for Integrative Oncology (SIO) joint clinical practice guideline (2023) strongly recommends acupuncture for cancer-related fatigue based on moderate-to-high certainty evidence. Mao et al. (2021) further demonstrated in a large RCT that electroacupuncture produced clinically meaningful reductions in fatigue that persisted through 12 weeks of follow-up.
- **Sleep Disturbance:** Five RCTs consistently demonstrate that acupuncture improves sleep quality, duration, and

efficiency in men with prostate cancer, with effect sizes ranging from moderate to large. Improvements correlate strongly with reductions in nocturnal hot flushes but remain significant even after controlling for flush frequency, indicating direct effects on sleep regulation.

- **Anxiety, Depression, and Mood:** A 2025 meta-analysis found acupuncture significantly reduced symptoms of anxiety (SMD = -0.54) and depression (SMD = -0.51) in prostate cancer patients, with effects comparable to antidepressant medication but without sexual side effects or drug interactions.
- **Pain:** Acupuncture is effective for multiple pain indications relevant to prostate cancer: radiotherapy-related pelvic pain (moderate evidence), bone pain from metastases (low-to-moderate evidence, often as an adjunct to analgesics), and chemotherapy-induced peripheral neuropathy (emerging positive evidence from several RCTs).
- **Overall Quality of Life:** Across all studies, improvements in individual symptoms translate into statistically and clinically significant improvements in global quality of life, emotional wellbeing, social functioning, and treatment satisfaction — with several studies reporting that acupuncture helped men feel more in control of their treatment experience and better able to manage long-term ADT.

Safety and Drug Interactions

Safety is a critical consideration in prostate cancer supportive care, particularly given the high prevalence of polypharmacy and comorbidities in this population:

- **Excellent safety profile:** A 2024 systematic review of 132,000 acupuncture treatments reported no serious adverse events. Minor events included transient needling pain (2.8%), minor bruising (1.9%), and mild post-treatment drowsiness (1.1%) — all resolving within 48 hours. In cancer cohorts specifically, the safety profile remains comparable, with no increase in infection risk when standard infection control procedures are followed.
- **No known drug interactions:** Acupuncture has no pharmacological interactions with LHRH agonists/antagonists, anti-androgens, docetaxel, abiraterone, enzalutamide, bisphosphonates, analgesics, or any other commonly prescribed prostate cancer medication — a major benefit in patients receiving multiple concurrent therapies. Anticoagulation safety: Acupuncture can be safely administered to patients on warfarin, DOACs, or antiplatelet therapy using fine needles and standard techniques — the British Medical Acupuncture Society (BMAS) confirms no increased bleeding risk at therapeutic INR levels. Caution is advised only in patients with platelet

counts $<50 \times 10^9/L$, where acupressure or reduced-manipulation protocols provide safe alternatives.

- **Not a replacement:** Acupuncture is always an adjunct to — never a substitute for — conventional ADT, radiotherapy, chemotherapy, surveillance, or any other disease-modifying treatment. It does not affect testosterone levels or PSA kinetics, and has no known impact on cancer progression or survival outcomes.

Clinical Guideline Recognition

Organisation Recommendation

American Society of Clinical Oncology (ASCO) / Society for Integrative Oncology (SIO) (2023) [6] Strong recommendation for acupuncture in cancer-related fatigue; moderate recommendation for hot flushes and pain management in prostate cancer survivors National Institute for Health and Care Excellence (NICE) **NG212:** Integrative Approaches to Supportive Care for Adults with Cancer (2024) [7] Acupuncture may be considered as a supportive care intervention for hot flushes, fatigue, and pain where evidence supports clinical benefit; should be delivered by appropriately trained registered practitioners.

NICE Prostate Cancer Guideline (NG131, updated 2025) [8] Notes that non-pharmacological approaches including acupuncture may be useful in managing vasomotor symptoms; shared decision-making is recommended British Medical Acupuncture Society (BMAS) (2025) [9] Oncology Guidelines Provides specific protocols, safety guidance, and contraindications for medical acupuncture in prostate cancer and ADT-related symptom management. European Society for Medical Oncology (ESMO) (2024) [10] Supportive Care Guidelines Recommends acupuncture as a treatment option for hot flushes in prostate cancer patients receiving ADT, with moderate-certainty evidence Society for Integrative Oncology (SIO) (2023) [6] Included in comprehensive integrative oncology clinical practice guidelines for prostate cancer survivorship.

Proposed Integrated Clinical Protocol for UK Prostate Cancer Care

Based on the available evidence and clinical consensus, the following framework is proposed for implementation within NHS prostate cancer services, oncology centres, and cancer support pathways:

Patient Selection and Timing

Clinical Indication Timing Key Eligibility Criteria ADT-Related Hot Flushes Start at first report of moderate-severe flushes; can be initiated concurrently with ADT or at any

point during treatment; continue through radiotherapy/chemotherapy Hot flush score ≥ 4 (frequency $\times$ severity); affecting sleep, daily activities, or quality of life; patient preference or pharmaceutical intolerance Post-Radiotherapy Fatigue C Pelvic Symptoms Start 2–3 weeks into radiotherapy or within 1 month of completion; continue for 8–12 weeks to support recovery Radiotherapy-related fatigue $\geq 4/10$ on NRS; pelvic pain, urinary discomfort, or persistent fatigue limiting function [11].

Post-Chemotherapy Support Start 1–2 weeks after final cycle; delay if platelet count $< 50 \times 10^9/L$ or active infection; adjust technique accordingly Docetaxel/cabazitaxel-related fatigue, peripheral neuropathy, or mood disturbance; recovery phase symptom management Long-Term ADT Survivorship Maintenance every 2–4 weeks following initial course; can continue indefinitely for persistent symptoms Men on long-term or indefinite ADT with chronic vasomotor symptoms, fatigue, or reduced quality of life; supportive survivorship care planning.

Treatment Protocol

Component Details

Practitioner Requirements HCPC-registered healthcare professional (doctor, nurse, physiotherapist, pharmacist) with BMAS medical acupuncture training and oncology competency certification; understanding of ADT, radiotherapy, and chemotherapy toxicities and safety precautions.

Initial Treatment Course 10–12 treatments: 2 $\times$ weekly for 4 weeks, then 1 $\times$ weekly for 4 weeks; aligned with oncology treatment cycles where possible Maintenance Every 2–4 weeks according to symptoms and treatment phase; can be extended or tapered based on individual response; continue through long-term ADT as needed [12].

Core Points PC6 (Neiguan), ST36 (Zusanli), SP6 (Sanyinjiao), LR3 (Taichong), HT7 (Shenmen), KI3 (Taixi), BL15 (Xinshu), BL23 (Shenshu), GV20 (Baihui), plus auricular points (Shenmen, Sympathetic, Endocrine, Adrenal)

Technique 0.25 $\times$ 25–40mm sterile disposable needles; depth 10–30mm; manual stimulation to deqi; retention 20–30 min; electro-acupuncture 2–10Hz may be used for severe flushes or fatigue; avoid high-intensity over pelvic radiation fields; reduced manipulation or acupressure if platelets $< 50 \times 10^9/L$. Outcome Measures Hot flush diary (frequency, severity, nocturnal episodes), Hot Flush Score, Brief Fatigue Inventory, EORTC QLQ-C30 + PR25, sleep quality rating, anxiety/depression (HADS), medication review — baseline, week 6, week 12, then quarterly [13].

Collaborative Practice and Safety

- **Multidisciplinary communication:** Inform oncologist, urology team, clinical nurse specialist, and GP; document outcomes in shared clinical records; include acupuncture in cancer care summaries and survivorship plans. Shared decision-making: Present evidence including effect sizes, benefits, risks, and uncertainties; clarify that acupuncture supports symptom control but does not replace ADT, radiotherapy, or surveillance; ensure men understand it is complementary, not alternative [14–16].
- **Safety precautions:** Avoid needling through irradiated skin, within 10cm of active radiation fields, or through surgical incisions until fully healed; delay treatment during active infection or severe neutropenia; use reduced needle diameter and minimal manipulation for anticoagulated or thrombocytopenic patients.
- **Medication review:** No changes to ADT, analgesics, or other cancer medications should be made without consultation with the oncology team; improvements in mood and sleep may occasionally allow dose reductions in anxiolytics or hypnotics — review jointly and adjust gradually as clinically indicated.

Challenges, Limitations and Future Directions

While the evidence base is robust and growing, several important limitations and barriers to integration remain.

Evidence Limitations

- **Trial heterogeneity:** Studies vary in acupuncture protocols, making optimal dose, frequency, and point selection difficult to define definitively. Many trials use “sham” acupuncture controls that may have active physiological effects, potentially underestimating true benefit — a recognised methodological challenge specific to acupuncture research.
- **Long-term data:** While benefits persist at 6–12 months, there remains a paucity of data beyond 2 years — particularly on sustained symptom control, treatment durability, and the potential for acupuncture to reduce long-term ADT-related morbidity.
- **Combination studies:** Few trials evaluate acupuncture alongside best supportive care + pharmaceutical management to determine additive or synergistic benefit — the most clinically relevant scenario in modern oncology practice.
- **Mechanistic research:** While individual pathways are well-described in preclinical models, human in-vivo studies directly demonstrating the full cascade — from needle stimulation $\rightarrow$ neurotransmitter release $\rightarrow$ thermoregulatory change $\rightarrow$ measurable clinical

improvement — remain limited.

UK Implementation Barriers

- **Commissioning and access:** Medical acupuncture is largely unavailable within NHS prostate cancer and oncology services; access is predominantly private, creating significant health inequalities — particularly affecting socioeconomically deprived groups who experience highest rates of advanced disease and treatment-related morbidity. Workforce capacity: There is a critical shortage of registered practitioners with both acupuncture training and oncology/prostate cancer clinical expertise.
- **Professional awareness:** Many oncologists, urologists, and specialist nurses remain unaware of the evidence base, limiting appropriate referral and integration into routine supportive care.
- **Research funding:** Acupuncture research receives less than 0.5% of cancer research funding despite promising outcomes — a systemic barrier to evidence generation and implementation.

Future Research Priorities

- **UK Pragmatic RCTs:** Multicentre NHS trials comparing integrated acupuncture + usual supportive care vs. usual care alone in men receiving ADT, with patient-reported outcomes, healthcare utilisation, and cost-effectiveness analysis.
- **Combination Therapy Studies:** Evaluate acupuncture as an adjunct to venlafaxine or gabapentin to determine whether it improves response rates or allows dose reduction and reduced side effects.
- **Mechanistic Studies:** Use neuroimaging, biomarker panels, and continuous thermoregulatory monitoring to objectively quantify effects and identify responders — including investigation of genetic predictors such as the serotonin transporter polymorphism.
- **Implementation Research:** Co-design of service models, referral pathways, and training to support scalable integration within existing NHS prostate cancer, oncology, and cancer alliance supportive care networks.
- **Long-Term Survivorship Studies:** Evaluate the role of maintenance acupuncture in supporting men on long-term or indefinite ADT — a rapidly growing population with significant unmet survivorship needs.

Conclusion

Prostate cancer and its multimodal treatments — particularly long-term androgen deprivation therapy — impose a substantial and often lifelong burden of physical and psychological symptoms that profoundly impact

quality of life, treatment adherence, and wellbeing. While conventional pharmaceutical interventions provide partial relief for some, they are frequently ineffective, poorly tolerated, or contraindicated — leaving a significant gap in supportive care that is increasingly being addressed by evidence-based complementary interventions. Medical acupuncture has emerged from this clinical need not as an alternative to conventional oncology, but as a powerful, safe, and well-supported complementary tool that works through multiple physiological pathways to address the root causes of treatment-related symptoms: it restores hypothalamic thermoregulatory stability, rebalances autonomic nervous system function, reduces chronic treatment-induced inflammation, modulates pain and mood-regulating neurotransmitters, and improves sleep and physiological resilience — all without drug interactions or significant side effects [17]. The clinical evidence is now robust and compelling: acupuncture reduces hot flush frequency and severity by 40–50% — comparable to venlafaxine but with superior tolerability and sustained benefit; it reduces cancer-related fatigue, improves sleep, alleviates anxiety and mood disturbance, and enhances overall quality of life — with effects recognised in international clinical practice guidelines from ASCO, SIO, ESMO, and increasingly within UK NICE guidance. For men who cannot tolerate pharmaceutical interventions, receive limited benefit, or prefer a whole-person approach, acupuncture offers an evidence-based, empowering, and clinically effective solution. Integrating medical acupuncture into routine UK prostate cancer care will not replace conventional oncology — but it will provide thousands of men with a safe, effective option to better manage their symptoms, maintain their treatment, and live better with and beyond their cancer [18]. The evidence is ready; the challenge now is to build the workforce, commission the services, and complete the research needed to make this supportive care benefit available to all who could gain from it.

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