

Radiotherapy for urological malignancies

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The majority of radiotherapy for urological malignancies at The Royal Marsden is delivered to men with prostate cancer. Although localised, low-risk disease may only require monitoring for many years, prostate radiotherapy is an effective treatment option for intermediate- and high-risk cases.

Radiotherapy works by delivering targeted, high energy X-rays that cause DNA damage. Because cancer has poor DNA repair mechanisms, it is selectively killed while healthy tissues repair themselves. Fortunately, techniques that aim to target the prostate as accurately as possible and minimise the dose to the surrounding organs have dramatically improved in recent years.

What normally happens?

Once patients have consented to radiotherapy, a planning CT is used to individualise treatment according to their anatomy. Thorough preparation and verification of imaging before treatment ensure accurate delivery of external beam radiotherapy to the prostate over 20 separate clinic visits (fractions).

The role of androgen deprivation therapy

Alongside radiotherapy, patients receive androgen deprivation therapy (ADT) to improve outcomes by preventing androgens (produced by the testes, adrenal glands and prostate cancer itself) from promoting cancer cell growth.

Most patients receive gonadotropin-releasing hormone (GnRH) agonists, such as goserelin (Zoladex), which are given with an anti-androgen to cover the initial surge in testosterone. For patients with aggressive, metastatic or spinal disease, or those at high risk of cardio- or cerebro-vascular complications, GnRH antagonists, such as degarelix (Firmagon), may be more suitable.

Because of side effects such as hot flushes, sexual dysfunction, cardiovascular risks and bone complications, ADT is stopped after 6 months in intermediate-risk patients and 2–3 years in high-risk patients, who also need to take steps to protect their bone health.

What side effects should patients expect?

One challenge presented by the prostate is its mobility, which necessitates adding margins to the treatment area to allow for movement. Resultant side effects in the adjacent bladder and rectum can be minimised with careful preparation before radiotherapy, including assessment of baseline urinary symptoms, bladder filling (to push the bladder out of the way) and bowel emptying with microenemas.



Most patients experience urinary (increased frequency, urgency, reduced flow) and bowel (diarrhoea, flatulence, mucus, discomfort) symptoms that commonly persist for up to 4 weeks after radiotherapy.

Treating side effects

Patients with side effects should be advised on diet and fluid intake, and offered medication such as alpha blockers and anticholinergics for severe obstructive and irritative urinary problems, or loperamide and suppositories for diarrhoea and bowel soreness, respectively.

These treatment approaches can also be applied to long-term urinary and bowel side effects, which affect 5% of patients moderately and 1% significantly 2 years after prostate radiotherapy. GPs should seek specialist urology advice for persistent severe side effects and request a 2-week wait referral for symptoms such as haematuria, rectal bleeding and change in bowel habit.

Treatment options for the 40% of patients who experience changes in sexual function, such as impotence and altered ejaculation, include phosphodiesterase type 5 (PDE5) inhibitors, alprostadil injections, vacuum pumps and penile implants.

Follow up

Prostate-specific antigen (PSA) level should be checked every 6 months for 5 years following radiotherapy and annually thereafter, with a rise above 2 ng/ml (or 0.2 ng/ml with previous prostatectomy) prompting referral back to specialist cancer services for investigation.

Recurrence is encouragingly low; the recent CHHiP trial revealed that 90% of intermediate-risk prostate cancer patients remain disease-free 5 years after radiotherapy.

Changing paradigm

Current research is focused on reducing the number of radiotherapy treatment fractions to 5 or less and improving outcomes for higher-risk prostate cancer patients.

Thanks to state-of-the-art technology, such as stereotactic body radiotherapy (SBRT) and MRI-guided radiotherapy, patients can now be offered high-dose, precise, curative treatment that minimises side effects by geometrically protecting healthy tissues from toxicity.

