

Treatment Routes in Prostate Cancer

Urological Cancers SSCRG



Introduction

To better understand outcome measures, it is necessary to analyse what treatment pathway a patient has followed after diagnosis. Until recently it was difficult to attempt this due to the poor recording of several key data items, particularly radiotherapy. With the release of the National Radiotherapy Dataset (RTDS), recording completeness of radiotherapy data has increased. This means we are now able to take a meaningful look at the treatment pathways of each patient. Equally importantly, we can also identify the cohort of patients who have no treatments recorded, to potentially give information on active surveillance programmes.

The NICE guidance on prostate cancer diagnosis and treatment (2008) makes the following recommendations:

1.3.3 Men with low-risk localised prostate cancer (see table 1) who are considered suitable for radical treatment should first be offered active surveillance.

1.3.5 Active surveillance should be discussed as an option with men who have intermediate-risk localised prostate cancer.

1.3.9 Men with localised prostate cancer who have chosen an active surveillance regimen and who have evidence of disease progression (that is, a rise in PSA level or adverse findings on biopsy) should be offered radical treatment.

1.3.20 Men with prostate cancer who have chosen a watchful waiting regimen with no curative intent should normally be followed up in primary care in accordance with protocols agreed by the local urological cancer MDT and the relevant primary care organisation(s). Their PSA should be measured at least once a year.

1.3.10 The decision to proceed from an active surveillance regimen to radical treatment should be made in the light of the individual man's personal preferences, comorbidities and life expectancy.

1.3.11 Healthcare professionals should offer radical prostatectomy or radical radiotherapy (conformal) to men with intermediate-risk localised prostate cancer.

1.3.12 Healthcare professionals should offer radical prostatectomy or radical radiotherapy (conformal) to men with high-risk localised prostate cancer when there is a realistic prospect of long-term disease control.

1.3.13 Brachytherapy is not recommended for men with high-risk localised prostate cancer.

1.3.16 Adjuvant hormonal therapy is recommended for a minimum of 2 years in men receiving radical radiotherapy for localised prostate cancer who have a Gleason score of ≥ 8 .

1.6.1 Neoadjuvant and concurrent luteinising hormone-releasing hormone agonist (LHRHa) therapy is recommended for 3 to 6 months in men receiving radical radiotherapy for locally advanced prostate cancer.

The primary treatment for men with metastatic prostate cancer is hormone therapy.

Methodology

This analysis looks at one calendar year of incidence data, 2009. The radiotherapy and HES data is complete to the end of the 2009/10 financial year. Hence all men diagnosed had a minimum of three months after diagnosis in which radiotherapy or surgery could take place and still be captured.

All patients diagnosed with a prostate cancer in 2009 were extracted from the National Cancer Data Repository (NCDR) along with a flag identifying whether they had a chemotherapy or hormone therapy treatment related to their prostate cancer recorded on their local Cancer Registry Database.

These cohorts were then linked to the RTDS by NHS number to ascertain whether the patients had a recorded radiotherapy treatment for their prostate cancer. The RTDS currently only holds data on external radiotherapy treatment. Brachytherapy will be recorded in future.

Finally the cohorts were linked to the Hospital Episode Statistics dataset (HES) by NHS number to ascertain whether a prostatectomy had been carried out. The HES data also supplied ethnicity of the patient, and 63% of men had a valid ethnicity assigned.

This produced a dataset of individual patients each with a treatment flag for radiotherapy, chemotherapy, hormone therapy and surgery (prostatectomy). This dataset was analysed, with the proportion of patients assigned to each route shown in Table 1.

Table 1: Treatment routes for patients diagnosed with a prostate cancer (ICD10 C61), 2009, based on HES, RTDS and Cancer Registration data.

Overall Route	Total	Percentage of Total
No Treatment Recorded	14,906	43
Hormones	6,871	20
Hormones + Radiotherapy	5,210	15
Prostatectomy	3,658	10
Radiotherapy	2,879	8
Prostatectomy + Radiotherapy	360	1
Other	963	3
Total	34,847	100

Source: RTDS, HES, English Cancer Registries

As there are a large proportion of patients with no recorded treatment, the data were compared to the Cancer Waiting Times database (CWT). Although CWT was not designed to record treatment it does have fields for general treatment intentions and whether radiotherapy is palliative or curative.

It was found that 85% of radiotherapy records had no intent recorded and so it was decided not to use CWT to derive palliative/curative radiotherapy.

There were about 500 men with a CWT treatment intention of brachytherapy and several thousand recorded as 'Active Monitoring' (in reality a combination of active monitoring and watchful waiting) hence the CWT database will be the main source of these treatment pathways.

All groups may contain men who are 'self-treating' in a variety of ways, possibly at the advice of a GP or consultant. Such self-treatment may include increased exercise, nutritional supplements or

alternative therapies. These data are not available for inclusion in this analysis, which focuses on clinical treatments only.

Results

Table 2: Treatment routes for patients diagnosed with a prostate cancer (ICD10 C61), 2009, with CWT data included.

Overall Route	Total	Percentage of Total
No Treatment Recorded	7,600	22
'Active Monitoring'	5,104	15
Hormones	8,408	24
Hormones + Radiotherapy	5,210	15
Prostatectomy	3,658	10
Prostatectomy + Hormones	102	0
Prostatectomy + Radiotherapy	360	1
Radiotherapy	3,074	9
Brachytherapy	470	1
Other	861	3
Total	34,847	100

Source: RTDS, HES, CWT, English Cancer Registries

A large proportion of patients are in the “No Treatment Recorded” group (22%). This group will be a mixture of those having no treatment at all, those treated at private hospitals, and some whose treatment has not been recorded.

Active monitoring is used here as a catch-all term for two treatment pathways: active monitoring (as a stricter definition) and watchful waiting. The distinction between the two is not possible with CWT data but will be recorded in the forthcoming Cancer Outcomes and Services Database (COSD).

Active monitoring is typically used in those patients who are diagnosed with slow-growing, localised tumours who wish to avoid treatment for as long as possible. A patient will be monitored closely via prostate specific antigen (PSA) testing, digital rectal exams and prostate biopsies. The intention is to perform curative treatment when the cancer has progressed sufficiently.

Watchful waiting is used where curative treatment is not appropriate, but the patient is currently asymptomatic. Patients in this group may have several other unrelated health issues that mean a radical curative procedure is not viable or a patient may have advanced cancer involving tumours which are too large to be operated on. The overall intent is palliative care for relief of symptoms, when they develop.

The main three treatments recorded are prostatectomy, external radiotherapy and hormone therapy. These treatments, both alone and in combination, account for well over half (60%) of all treatment paths. Radiotherapy is an important treatment as in total 26% of men had radiotherapy at some point, mostly in combination with other treatment types.

However, radiotherapy can be given both with curative and palliative intent. It is not currently possible to see which group is larger as treatment intention is not recorded in RTDS and is poorly

completed in CWT. In principle the likely intent could be determined from the number of fractions given, but this is not in the extract sent to the cancer registries.

As the recording of hormone therapy treatment is provided directly to cancer registries by trusts, rather than in a formalised national database, it might well be incomplete. Thus some men with no recorded treatment may have had hormone therapy and some men with radiotherapy treatments may have received it in combination with hormone therapy. Over the last decade there has been a large rise in the proportion of men recorded as being treated with hormone therapy. This is very likely to be partly attributable to improvements in data collection and data quality.

There may be differences in uptake of treatment between different ethnic groups, the most and least deprived populations and in different area of England. This has been calculated for the main treatment routes.

Table 3: Main treatment routes for patients diagnosed with a prostate cancer (ICD10 C61), by ethnic group, 2009.

Ethnic Group	Black	Indian, Pakistani, Bangladeshi	Other Asian	White	Not Recorded	Mixed	Other Ethnic Group
No Recorded Treatment	18%	25%	27%	22%	22%	23%	25%
'Active Monitoring'	12%	11%	9%	12%	19%	14%	11%
Hormones	21%	18%	13%	23%	26%	23%	20%
Hormones + Radiotherapy	9%	13%	13%	14%	18%	9%	7%
Prostatectomy	21%	18%	22%	13%	5%	16%	20%
Prostatectomy + Hormones	1%	0%	0%	0%	0%	0%	2%
Prostatectomy + Radiotherapy	3%	1%	2%	1%	0%	1%	3%
Radiotherapy	13%	11%	11%	9%	9%	11%	7%
Brachytherapy	2%	0%	0%	2%	0%	0%	0%
Statistical significance compared to White men.							
Ethnic Group	Black	Indian, Pakistani, Bangladeshi	Other Asian	White	Not Recorded	Mixed	Other Ethnic Group
No Recorded Treatment	Lower	Higher	Lower	Higher	Higher		Higher
'Active Monitoring'					Higher		
Hormones		Lower	Lower		Higher		
Hormones + Radiotherapy	Lower				Higher		Lower
Prostatectomy	Higher	Higher	Higher		Lower		Higher
Prostatectomy + Hormones					Lower		Higher
Prostatectomy + Radiotherapy	Higher				Lower		
Radiotherapy	Higher						
Brachytherapy					Lower		

Source: RTDS, HES, CWT, English Cancer Registries

There is a lower percentage of hormone therapy in Indian/Pakistani/Bangladeshi and Other Asian men when compared to White men (Table 3). The percentage of men having a prostatectomy is higher in Black, Indian/Pakistani/Bangladeshi and Other Asian ethnic groups, and the percentage of men receiving radiotherapy is higher in Black men. Numbers of patients in the mixed-race ethnic group are small so comparisons are inconclusive.

Patterns of treatment by quintiles of income deprivation are harder to discern (Table 4). The least deprived fifth of the population have lowest use of hormones alone, which may reflect earlier presentation of disease as hormones are generally reserved for advanced/relapsed cases. The least

deprived quintiles have a higher percentage of men receiving prostatectomies, and also brachytherapy usage, which again may reflect more localised disease. Treatment paths are agreed with patients so education and awareness may affect the treatment received. Prostate Specific Antigen (PSA) testing is more common in the least deprived, and is linked with diagnosis at an earlier stage.

Table 4: Main treatment routes for patients diagnosed with a prostate cancer (ICD10 C61), by quintile of income deprivation, 2009.

Income Deprivation Quintile	1 (Least Deprived)	2	3	4	5 (Most Deprived)
No Recorded Treatment	21%	22%	21%	21%	22%
'Active Monitoring'	15%	15%	14%	14%	14%
Hormones	21%	23%	25%	26%	28%
Hormones + Radiotherapy	15%	15%	16%	15%	14%
Prostatectomy	12%	11%	10%	9%	10%
Prostatectomy + Hormones	0%	0%	0%	0%	0%
Prostatectomy + Radiotherapy	1%	1%	1%	1%	1%
Radiotherapy	9%	9%	9%	9%	9%
Brachytherapy	2%	2%	1%	1%	1%
Statistical significance compared to England average.					
Income Deprivation Quintile	1 (Least Deprived)	2	3	4	5 (Most Deprived)
No Recorded Treatment					
'Active Monitoring'		Higher			
Hormones	Lower			Higher	Higher
Hormones + Radiotherapy					Lower
Prostatectomy	Higher	Higher		Lower	
Prostatectomy + Hormones					
Prostatectomy + Radiotherapy					
Radiotherapy					
Brachytherapy	Higher			Lower	Lower

Source: RTDS, HES, CWT, English Cancer Registries

There are differences in treatments by age at diagnosis (Table 5). Men aged over 80 are more likely to have hormone therapy alone, or to have no treatment recorded. Men aged 70-79 also have a higher than average hormone therapy usage. This is probably reflective of more advanced disease at presentation and the life expectancy of this group. The combination of hormones and radiotherapy is most given to men aged 60-79, a group who are most likely to have locally advanced cancer, or high-grade localised cancer. Points 1.3.16 and 1.6.1 of the NICE guidance recommend this combination of treatments for those stages of prostate cancer. This age group is also most likely to undergo an 'Active Monitoring' pathway. Prostatectomy is more commonly given to younger men,

who are likely to have localised disease (through increased PSA test uptake) and a long enough life expectancy to benefit from surgery. Brachytherapy is also more likely in men under 70, consistent with it not being recommended for high-risk localised cancer, and patients having sufficient life expectancy to benefit.

Table 5: Main treatment routes for patients diagnosed with a prostate cancer (ICD10 C61), by age at diagnosis, 2009.

Age at diagnosis	40-49	50-59	60-69	70-79	80 and over
No Recorded Treatment	20%	21%	17%	19%	36%
'Active Monitoring'	11%	13%	15%	16%	12%
Hormones	6%	9%	13%	29%	44%
Hormones + Radiotherapy	9%	12%	18%	19%	4%
Prostatectomy	40%	29%	18%	3%	0%
Prostatectomy + Hormones	1%	0%	1%	0%	0%
Prostatectomy + Radiotherapy	3%	3%	2%	0%	0%
Radiotherapy	5%	8%	11%	11%	3%
Brachytherapy	3%	3%	2%	1%	0%
Statistical significance compared to England average.					
Age at diagnosis	40-49	50-59	60-69	70-79	80 and over
No Recorded Treatment					Higher
'Active Monitoring'	Lower	Lower	Higher	Higher	Lower
Hormones	Lower	Lower	Lower	Higher	Higher
Hormones + Radiotherapy	Lower	Lower	Higher	Higher	Lower
Prostatectomy	Higher	Higher	Higher	Lower	Lower
Prostatectomy + Hormones			Higher	Lower	Lower
Prostatectomy + Radiotherapy	Higher	Higher	Higher	Lower	Lower
Radiotherapy	Lower	Lower	Higher	Higher	Lower
Brachytherapy	Higher	Higher	Higher	Lower	Lower

Source: RTDS, HES, CWT, English Cancer Registries

No correlation of treatment type with region of residence is observed (Table 6). This indicates that personal and disease-related factors have more influence on the treatments available and on patient choices.

Table 6: Main treatment routes for patients diagnosed with a prostate cancer (ICD10 C61), by region of residence, 2009.

Region of residence	North East	North West	Yorkshire and the Humber	East Midlands	West Midlands	East of England	London	South East	South West
No Recorded Treatment	15%	23%	17%	19%	17%	17%	27%	27%	27%
'Active Monitoring'	19%	13%	18%	18%	17%	13%	11%	13%	16%
Hormones	38%	22%	27%	28%	27%	29%	18%	19%	22%
Hormones + Radiotherapy	12%	18%	14%	5%	16%	23%	11%	17%	13%
Prostatectomy	12%	9%	10%	9%	12%	9%	14%	12%	9%
Prostatectomy + Hormones	0%	0%	0%	0%	1%	0%	0%	0%	0%
Prostatectomy + Radiotherapy	0%	1%	1%	1%	1%	1%	2%	2%	1%
Radiotherapy	2%	8%	8%	17%	9%	5%	13%	7%	8%
Brachytherapy	0%	2%	1%	1%	0%	2%	1%	2%	1%
Statistical significance compared to England average.									
Region of residence	North East	North West	Yorkshire and the Humber	East Midlands	West Midlands	East of England	London	South East	South West
No Recorded Treatment	Lower		Lower	Lower	Lower	Lower	Higher	Higher	Higher
'Active Monitoring'	Higher	Lower	Higher	Higher	Higher	Lower	Lower	Lower	Higher
Hormones	Higher	Lower	Higher	Higher	Higher	Higher	Lower	Lower	Lower
Hormones + Radiotherapy	Lower	Higher		Lower		Higher	Lower	Higher	Lower
Prostatectomy		Lower		Lower	Higher	Lower	Higher	Higher	Lower
Prostatectomy + Hormones			Higher		Higher		Lower		
Prostatectomy + Radiotherapy	Lower		Lower				Higher	Higher	
Radiotherapy	Lower		Lower	Higher		Lower	Higher	Lower	Lower
Brachytherapy	Lower	Higher	Lower	Lower	Lower	Higher			

Source: RTDS, HES, CWT, English Cancer Registries

Conclusions

Over one-fifth of men diagnosed with prostate cancer in 2009 have no recorded active treatment. This group will include men on a watchful waiting or active monitoring who are not recorded elsewhere, a small fraction whose treatment has gone unrecorded, and those who are genuinely going without clinical treatment.

Data on non-clinical treatments such as diet and exercise are not available for analysis.

Major treatments recommended for men with prostate cancer are radical prostatectomy or radiotherapy, principally for localised disease; radiotherapy and hormone therapy for locally-advanced disease; and hormone therapy alone for advanced and metastatic disease. The recorded pathways reflect this guidance as these treatments account for 6 out of 10 treatment pathways for men diagnosed with prostate cancer in 2009. Hormone therapy given alone is the biggest treatment group.

The group of men known to be under surveillance is also a sizable group, with 15% of patients included. This group may have grown in size as a result of Improving Outcomes Guidelines (2002) which recommended the increased use of active surveillance, and discussion of patients by Multi-Disciplinary Teams (MDTs). Without a definitive record on monitoring in national databases there can only be approximate statistics on the proportion of men following these pathways, and any trends over time.

Men in ethnic minority groups are generally more likely to receive surgery and radiotherapy, and less likely to have hormone therapy, than White men.

More deprived men are more likely to have hormone therapy or receive no treatment and they are less likely to have a prostatectomy or brachytherapy. This variation with income deprivation is possibly linked to a trend towards earlier diagnosis, in the least deprived groups. This variation in stage at diagnosis is influenced by increased uptake of PSA testing in the least deprived groups.

There is also variation in treatment with age at diagnosis, with prostatectomy and brachytherapy more common in younger men, and hormone therapy in older men. This is likely to reflect the more advanced stage at presentation in older men, or increased co-morbidities.

The NCIN is a UK-wide initiative, working to drive improvements in standards of cancer care and clinical outcomes by improving and using the information collected about cancer patients for analysis, publication and research.

Sitting within the National Cancer Research Institute (NCRI), the NCIN works closely with cancer services in England, Scotland, Wales and Northern Ireland. In England, the NCIN is part of the National Cancer Programme.

Our aims and objectives cover five core areas to improve the quality and availability of cancer data from its collection to use:

- Promoting efficient and effective data collection throughout the cancer journey
- Providing a common national repository for cancer datasets
- Producing expert analyses, to monitor patterns of cancer care
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Further information

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About the South West Public Health Observatory

The South West Public Health Observatory (SWPHO) is part of a network of regional public health observatories in the UK (funded by the Department of Health) and Ireland. These were established in 2000 as outlined in the Government White Paper *Saving lives: our healthier nation*. Key tasks include: monitoring health and disease trends; identifying gaps in health information; advising on methods for health and health impact assessment; drawing together information from different sources; and carrying out projects on particular health issues.

The SWPHO incorporates the National Drug Treatment Monitoring System South West (NDTMS-SW), and in April 2005 merged with the South West Cancer Intelligence Service (SWCIS). The SWPHO works in partnership with a wide range of agencies, networks and organisations regionally and nationally to provide 'a seamless public health intelligence service' for the South West.

For more information about the SWPHO and its partner organisations, please visit www.swpho.nhs.uk