Brachytherapy for prostate cancer: a systematic review of clinical and cost effectiveness

CRD summary
This review compared brachytherapy with alternative approaches to prostate cancer treatment. The authors concluded that the outcome of brachytherapy, external beam radiation and radical prostatectomy appears similar. The evidence presented supports the conclusion, but the quantity and quality of the evidence are limited.

Authors' objectives
To determine the effectiveness of brachytherapy for prostate cancer in comparison with alternative treatment approaches.

Searching
Existing systematic reviews were sought using the HTA database and the Cochrane Library, which the report implied covered studies from January 1966 to 2000. MEDLINE and EMBASE were searched for studies published from January 2000 to August 2001; the search terms were reported. Ongoing trials were sought using Current Controlled Trials Register, the UK National Research Register, and the US National Cancer Institute clinical trials register.

Study selection
Study designs of evaluations included in the review
The inclusion criteria for study design were not stated. Cohort studies, case-control studies and case series were included since no randomised trials or large prospective studies were identified. The median follow-up in the included studies ranged from 2 to 6.5 years.

Specific interventions included in the review
Studies that compared prostate brachytherapy with radical prostatectomy, external beam radiation, or watchful waiting were eligible for inclusion. The comparators in the studies included in the review were radical prostatectomy and external beam radiation. Studies of brachytherapy in combination with external beam radiation compared with either treatment modality alone were also included.

Participants included in the review
Studies in men with localised prostate cancer were eligible for inclusion. In most of the included studies the cancer stage was T1-T2, T1C-T2B or T2b in both groups. The population in one study was described as 79% T1C, T2A in the treatment group and 40% T1C, T2A in the control group; in another it was 79% T1C, T2A in the treatment group and 72% T2C, T3 in the control group. The age range in one study was reported to be 52 to 89 years, while in the other studies the median age was 64 to 74 years.

Outcomes assessed in the review
Studies that reported clinical outcomes were eligible for inclusion. The outcomes of interest were overall and disease-free survival (primary outcomes), complications and quality of life.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were assessed for validity, or how many reviewers performed the validity assessment.

Assessment of study quality
Acceptable study quality was defined as having a comparison group. A validity score indicating very good, good or poor was assigned to each study on the basis of group comparability (age, disease severity, co-morbidity), the duration of follow-up and the number of participants who were followed up. Studies considered to be very good or good were
included in the evidence summary. The authors did not state how the papers were assessed for validity, or how many reviewers performed the validity assessment.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Outcome results were shown as percentages in each treatment group.

Methods of synthesis
How were the studies combined?
The studies were combined in a narrative.

How were differences between studies investigated?
The studies were grouped according to the comparator treatment. The population and intervention characteristics of each study were tabulated, along with the validity scores, for comparison purposes.

Results of the review
Sixteen studies met the inclusion criteria, but only five of these met the validity criteria for inclusion in the evidence summary. In this abstract, included studies refers to the latter.

Brachytherapy compared with radical prostatectomy.

One case series (n=408) found no difference in 5-year PSA (prostate-specific antigen)-free survival among men with low or intermediate risk. Age and clinical stage were not well matched between men who received brachytherapy and those who received radical prostatectomy.

Brachytherapy compared with external beam radiation.

One cohort study (n=2,222), one case-control study (n=282) and one case series (n=318) found no difference in 5- and 7-year PSA-free survival. However, too few patients were followed up in the case-control study to provide valid disease-free survival data, and age and clinical stage were not well matched in the case series. The case-control study reported urethral stricture in significantly more brachytherapy patients, but no statistically significant difference for proctitis or changes in sexual function.

Brachytherapy in combination with external beam radiation.

One case-control study (n=322) showed an increase in PSA-free 5-year survival when brachytherapy combined with external beam radiation was compared with external beam radiation alone. The median age was 5 years older in the control group and follow-up was incomplete. In one case series (n=825), fewer patients treated with brachytherapy alone had rectal complications compared with those who received brachytherapy and external beam radiation.

Cost information
The review objective also mentioned cost-effectiveness. No comparative studies of brachytherapy versus other treatment modalities were found. A report based on Medicare claims determined the 6-month cost of brachytherapy and of external beam radiation to be US $14,000, and the cost of radical prostatectomy to be US $17,000. The review gave the estimated 1-year cost of treatment in Norway (where the review was conducted) as 12,000 Euros for brachytherapy, 14,700 Euros for external beam radiation and 10,700 Euros for radical prostatectomy.

Authors’ conclusions
The outcome appears comparable for brachytherapy, external beam radiation and radical prostatectomy, but the evidence is scarce.
The authors stated that the inclusion criteria were pre-specified. The selection of study designs for inclusion appears to have been based on the best available evidence identified, which is acceptable. However, the search strategy might not have been ideal for the identification of observational studies, or for the minimisation of publication bias. Since study quality was assessed systematically, although the reporting of it was not transparent, its use as a threshold for inclusion was reasonable. There was no information about how the review was conducted; the potential for bias and errors in the study selection, validity assessment and data extraction processes cannot, therefore, be assessed. Pertinent characteristics of the included studies were presented, as were the reasons why other studies were excluded.

A narrative synthesis was appropriate given the variation between study designs and characteristics, and aspects of study quality were taken into account. The evidence presented does support the authors’ conclusion that the clinical outcome appears comparable between treatments, but this must be considered together with the caveat that the evidence presented comprised a small number of imperfect observational studies.

Implications of the review for practice and research
Practice: The authors discussed some practical aspects of delivering treatment options, stating that compared with surgery and radiotherapy, brachytherapy may be a quick out-patient procedure and is usually associated with a rapid return to normal activities.

Research: The authors identified one ongoing randomised trial of brachytherapy versus radical prostatectomy, two of brachytherapy versus radiotherapy, and one of brachytherapy combined with radical prostatectomy.

Bibliographic details

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Other publications of related interest

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Subject indexing assigned by NLM

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.