The utility of serial complete blood count monitoring in patients receiving radiation therapy for localized prostate cancer

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The health technology considered in the study was complete blood count (CBC), a weekly monitoring system for patients receiving definitive radiation therapy for prostate cancer. The technique measures white blood cells (WBCs), haemoglobin, and platelets, to estimate whether, as a result of the treatment, their count falls below defined critical thresholds.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients receiving radiation therapy for prostate cancer. Patients with distant metastatic disease, undergoing prior radiotherapy or chemotherapy, with adoption of palliative strategies, or lack of CBC following baseline were excluded.

Setting
The setting was secondary care. The economic study was carried out at the Veteran Administration Hospital, Philadelphia, USA.

Dates to which data relate
The effectiveness evidence and resource used data were collected between January 1994 and July 1996. The price year was not reported.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was undertaken retrospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations were not performed to determine the sample size. The sample consisted of 110 prostate cancer patients treated with radiation therapy between January 1994 and July 1996 at the authors' institution. Patients were excluded if CBCs were performed at outside laboratories. Overall, 89 subjects formed a single group in the sample.
(mean age: 69 years, range: 51 - 80) and were treated with radiation therapy. Several subgroups were also considered. Fifty-seven patients (67%) received concurrent hormonal therapy, based on luteinizing hormone-releasing hormone (LHRH) agonist, antiandrogens, or both. Fifty-nine patients (33%) received radiation to the prostate alone or prostate and seminal vesicles. Seventy-three patients (82%) had hypertension and 42 patients (47%) had diabetes.

**Study design**
The study was a cohort study, carried out in a single centre (the authors’ institution). Patients were followed for 7 weeks to observe the trend of CBC during radiation therapy. CBCs were performed each week.

**Analysis of effectiveness**
All 89 subjects included in the study were accounted for in the analysis. The primary health outcomes used in the study were the absolute and weekly changes in platelets, haemoglobin, and WBCs both in the main group and in the subgroup analysis. Statistical analyses were undertaken to show the comparability among the different subgroups.

**Effectiveness results**
In the main group of patients, CBCs showed that platelets, haemoglobin, and WBCs did not fall below critical thresholds (defined as WBC less than 2 counts x 1000/mm^3, haemoglobin less than 8 g/dl, platelet less than 50 counts x 1000/mm^3) at any point during the treatment.

31% of patients experienced declines of greater than 50 in platelets.

25% of patients experienced declines of greater than 2 in WBCs.

47% of patients experienced declines of greater than 1 in haemoglobin.

Subgroup analysis indicated that cancer stage was associated with a significant greater than 2 haemoglobin decline and hormonal therapy was correlated with a drop of greater than 50 in platelets.

**Clinical conclusions**
The results (both in the overall and subgroup analysis) show that severe haematopoietic effects (reduction of haemoglobin, platelets, and WBCs) in prostate cancer patients receiving radiation therapy were not common and therefore the use of weekly CBCs may not be necessary.

**Measure of benefits used in the economic analysis**
Health outcomes were left disaggregated and a summary benefit measure was not calculated, therefore a cost-consequence analysis was carried out.

**Direct costs**
Discounting was not relevant, given that costs were incurred over a 7-week period. Quantities and costs were not reported separately and the cost/quantity boundary adopted was that of the hospital. The costs of obtaining a CBC and the costs of the time spent by the staff were included in the study. The estimated costs were based on actual data derived from the authors' institution. The resource use data were gathered between January 1994 and July 1996. The price year was not reported.

**Statistical analysis of costs**
No statistical analysis was reported.
Indirect Costs
Indirect costs were not included.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was carried out.

Estimated benefits used in the economic analysis
See effectiveness results above.

Cost results
The cost of a single CBC was about $30, and the cost of a 7-week course cost about $240. The time spent by the departmental staff was about 30 minutes per week with a weekly cost of $20 and a total cost of $140 for the 7-week course. Overall, the cost per patient of performing CBC was estimated to be approximately $400.

Synthesis of costs and benefits
Not relevant.

Authors' conclusions
The authors concluded that, in the patient population at their institution, CBC was both unnecessary, because patients receiving prostate radiation therapy did not experience significant declines in their CBCs, and expensive, given the considerable cost of serial CBC monitoring.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator was clear. The no-test strategy was selected because the authors' objective was to assess the opportunity of performing CBC.

Validity of estimate of measure of effectiveness
The analysis was based on a cohort study, which was appropriate for the study question. However, the internal validity of the study was weakened by the lack of statistical analyses to take into account potential biases and confounding factors. The study sample appeared to be quite representative of the study population.

Validity of estimate of measure of benefit
Not applicable.

Validity of estimate of costs
The cost estimates used in the study were quite specific to the authors' institution. Few details relative to the resources used were reported and statistical analyses on quantities were not carried out. The price year was not reported. Costs and quantities were not reported separately.

Other issues
The generalisability of the results to other settings was quite limited and sensitivity analyses were not performed to
investigate the robustness of the results. Further, as the authors acknowledge, some caution is necessary when the study findings are extrapolated to other patient populations, especially as regards the specific type of cancer. The authors made appropriate comparisons of their findings with those of other studies.

**Implications of the study**
The authors recommended performing a baseline CBC, and if normal, no other monitoring, resulting in cost-savings and reducing patient discomfort. The authors highlighted the need for further research to better assess the cost-effectiveness of CBC.

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None stated.

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