Cost-efficacy analysis of ondansetron regimens for control of emesis induced by noncisplatin, moderately emetogenic chemotherapy

Lachaine J, Laurier C

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
Twenty-two ondansetron regimens (i.e. serotonin antagonists) for the control of emesis induced by noncisplatin, moderately emetogenic chemotherapy were studied. Full details of the regimens compared were reported in the paper.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients with emesis induced by moderately emetogenic chemotherapy.

Setting
The setting was secondary care. The economic analysis was carried out in Montreal (PQ), Canada.

Dates to which data relate
The effectiveness data were gathered from studies published between 1990 and 2000. The resource data were gathered from a study published in 1999 and from hospitals in the Montreal area. The price year was 2001.

Source of effectiveness data
The effectiveness data were derived from a review of published studies.

Modelling
The authors did not report that a decision analytic model was created to simulate the costs and the health outcomes assigned to each strategy, although it would appear that some simplistic modelling did take place.

Outcomes assessed in the review
The outcome assessed in the review and used in the analysis was the efficacy of each ondansetron regimen. The efficacy was defined as complete control of acute and delayed emesis.

Study designs and other criteria for inclusion in the review
To be retained for the analysis, a published study had to comply with the following criteria:
the chemotherapy had to be a noncisplatin, moderately emetogenic chemotherapy, in accordance with the criteria of the National Cancer Institute of Canada Trial Group;

the chemotherapy had to be administered in a single session (multiple-day chemotherapies were excluded);

the studied population had to be adult and not identified as refractory to previous chemotherapy; and

the efficacy results had to be presented in terms of complete control of both acute and delayed emesis for at least 3 days after the administration of chemotherapy.

Sources searched to identify primary studies
MEDLINE was searched from January 1966 to December 2000 for primary studies.

Criteria used to ensure the validity of primary studies
Not specified.

Methods used to judge relevance and validity, and for extracting data
Not specified.

Number of primary studies included
Approximately 30 studies were included in the review.

Methods of combining primary studies
It was unclear if and how the results of the individual primary studies were combined.

Investigation of differences between primary studies
The authors did not investigate differences between the primary studies.

Results of the review
The efficacy rate of the 22 regimens varied from 24.2% to 90.4%.

Measure of benefits used in the economic analysis
No specific measure of benefits was used. The outcome measure, the efficacy of ondansetron regimens, was used in the economic analysis.

Direct costs
The hospital perspective was adopted. The direct costs were for the acquisition of antiemetics and administration devices, and for pharmacy and nursing time spent preparing and administering the injections. The time required by pharmacists and nurses was estimated from another study published by the authors (see Other Publications of Related Interest). The costs of antiemetics and devices were those paid by hospitals in the Montreal area in January 2001. The average costs per patient were derived by multiplying the unit costs by the quantities estimated from the literature. The unit costs and the quantities of resource were reported separately. All of the costs were adjusted to 2001 Canadian dollars. The costs were not discounted, which was appropriate since they were incurred during a short time (between 2 and 5 days).
Statistical analysis of costs
No statistical analysis of the costs was performed.

Indirect Costs
The indirect costs were not included.

Currency
Canadian dollars (Can$).

Sensitivity analysis
No sensitivity analyses were performed.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The average cost of each ondansetron regimen per patient varied from Can$20 to Can$413.

Synthesis of costs and benefits
Of the 22 ondansetron regimens, 17 were dominated. Of the remaining 5 regimens, two were dominated by extended dominance. Thus, only 3 regimens were dominant, the results for which will be reported here. The 3 regimens were:

ondansetron 1 mg orally (p.o.), three times daily for 3 days (regimen 1);
ondansetron 8 mg intravenously (i.v.) plus dexamethasone 20 mg i.v. and ondansetron 8 mg p.o. twice daily for 2 days (regimen 2); and
ondansetron 8 mg i.v. plus metoclopramide 80 mg i.v. and ondansetron 8 mg p.o. three times daily for 3 to 5 days, and prednisolone 100 mg p.o. for 4 days (regimen 3).

The efficacy rates for the complete control of acute and delayed emesis with the three dominant strategies were 43.8% for regimen 1, 78.4% for regimen 2 and 90.4% for regimen 3.

The incremental effectiveness was 34.6% for regimen 2 compared with regimen 1, and 12.0% for regimen 3 compared with regimen 2.

The average cost per patient was Can$20.11 with regimen 1, Can$113.07 with regimen 2 and Can$260.49 with regimen 3.

The incremental cost per patient was Can$92.96 for regimen 2 compared with regimen 1, and Can$147.42 for regimen 3 compared with regimen 2.

The incremental cost per each additional treatment success obtained with regimen 2 compared with regimen 1 was Can$268.67.

The incremental cost per each additional treatment success obtained with regimen 3 compared with regimen 2 was Can$1,228.50.

Authors' conclusions
The concomitant use of corticosteroids tended to increase the efficacy of the antiemetic regimen, with only a minimal impact on the cost. The cost-effectiveness of extending the use of ondansetron for more than 4 days is questionable.

CRD COMMENTARY - Selection of comparators
The authors did not compare ondansetron regimens with conventional therapy alone (i.e. metoclopramide-based antiemetic regimens). The strategy "no treatment" was not included in the study and this limits the validity of the study. You should decide if the comparisons made are valid for your setting.

Validity of estimate of measure of effectiveness
It appears that a systematic review of the literature has been undertaken. The source searched to identify the primary studies and the inclusion criteria were reported. However, the criteria used to ensure the validity of the primary studies, and the method used to judge the relevance and validity of the data, were not reported. The impact of differences between the primary studies was not investigated. These facts impact on the quality of the results obtained from the review. Sensitivity analyses that varied the values of the effectiveness estimators were not performed, which again limits the validity of the overall results.

Validity of estimate of measure of benefit
The benefits were derived from the effectiveness analysis. The reader is thus referred to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
All the categories of costs relevant to the perspective adopted appear to have been included in the analysis. Additional costs associated with treatment failure, such as medical consultations, cleaning and even additional hospitalisations, were not considered. The authors stated that they excluded these costs because they could not be identified, and this exclusion may have led to an underestimation of the cost-effectiveness of the intervention therapies. The price year was reported and some adjustments were made. It should be noted that the costs of antiemetics and devices were those paid by hospitals in the Montreal area, and these reflect true opportunity costs. Discounting was not performed, which was appropriate since the follow-up considered in the analysis was no longer than several days. A sensitivity analysis on the costs was not performed. Hence the robustness of the results was not examined.

Other issues
The authors did not compare their results with those from other published studies. They also did not address the issue of the generalisability of the study results to other settings. However, the results were well reported and the conclusions reflected the scope of the study. The authors reported some limitations of the study. For example, the lack of a "no treatment" alternative and the exclusion of additional costs due to treatment failures. Sensitivity analyses were not performed to take variability in the cost or effectiveness data into consideration. Consequently, caution should be exercised when extrapolating the study results to different contexts.

Implications of the study
For the authors, the analysis supported the concomitant use of a corticosteroid, twice-daily administration of ondansetron, and the limitation of ondansetron to a period not exceeding 4 days.

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