Economic analysis of vinorelbine plus cisplatin versus paclitaxel plus carboplatin for advanced non-small-cell lung cancer

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
Two combined drug therapies for patients with advanced non-small-cell lung cancer were considered in the analysis: paclitaxel plus carboplatin (paclitaxel at a dose of 225 mg/m^2 plus carboplatin AUC = 6 every 3 weeks) and vinorelbine plus cisplatin (cisplatin at a dose of 100 mg/m^2 every 4 weeks and vinorelbine at a dose of 25 mg/m^2 weekly).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population was composed of patients with advanced non-small-cell lung cancer. In particular, patients with stage IV or selected stage IIIIB disease, according to the International Staging System for Lung Cancer, were included in the analysis as well as those with positive effusions or multiple ipsilateral lung nodules. Patients were excluded if they had had previous chemotherapy or biologic therapy, but prior surgery and radiotherapy were allowed. Patients with brain metastases were not included in the study.

Setting
The setting was an institution: oncology clinics affiliated with community hospitals and academic medical centres. The economic study was carried out in several clinics of the Southwest Oncology Group (SWOG) in the USA.

Dates to which data relate
Effectiveness and resource used data were gathered from April 1996 to January 1998. The price year was 1998.

Source of effectiveness data
A single study was used as the source of the effectiveness evidence.

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

Study sample
Power calculations and the method of sample selection were not reported, but all the details of the effectiveness analysis were published elsewhere. Overall, 444 patients were enrolled in the study from April 1996 to January 1998.
However, 36 (8%) did not satisfy the inclusion criteria. Specifically, 12 subjects did not have stage IIIB or IV disease, 9 had insufficient documentation, and the remainder did not meet study requirements. 202 patients (median age 61 years, range: 32 - 83 years; 67% male, 79% white) were included in the vinorelbine+cisplatin group and 206 patients (median age 62 years, range: 26 - 80 years; 70% male, 79% white) were included in the paclitaxel+carboplatin group.

**Study design**
The study was an open, randomised controlled trial carried out in 108 sites of the SWOG. The method of randomisation was not reported. Patients were followed for 24 months from the moment of randomisation and were then assessed through a questionnaire (Functional Assessment of Cancer Therapy-Lung Questionnaire) administered at the time of randomisation, and at 3 and 6 months after randomisation. No loss to follow-up was reported.

**Analysis of effectiveness**
The clinical analysis was conducted on an intention to treat basis. The primary health outcomes were survival rates at 1 and 2 years, median survival, and quality of life values. The instruments used to assess these data were not reported. Statistical analyses showing the comparability of the groups in terms of demographics and clinical characteristics were not reported, but the two groups appear to have been quite similar.

**Effectiveness results**
Survival rates at years 1 and 2 were 36% and 16% in the vinorelbine+cisplatin group and 38% and 15% in the paclitaxel+carboplatin group.

Median survival was 8 months in both groups.

Quality of life values were not reported.

Overall, there was no statistically significant difference between the groups with respect to any of the health outcomes considered.

**Clinical conclusions**
The two drug therapies appeared to be equally effective in terms of survival and quality of life.

**Measure of benefits used in the economic analysis**
Since no statistically significant difference was found between the study groups in terms of health outcomes, no summary benefit measure was used and, as such, a cost-minimisation analysis was conducted.

**Direct costs**
Costs occurring after year 1 were discounted at 3%. Unit costs were not reported. Average quantities of resources were reported only for hospital and outpatient services. The cost/resource boundary adopted in the study reflected the perspective of the analysis. The health services costs included in the analysis were as follows: medical procedures, blood products, supportive medication, protocol chemotherapy (delivery and drug), non-protocol therapy, and medical care days/visits. Costs related to the treatment of side-effects of the therapies were also included and were derived from a special form aimed at capturing resource use. The estimation of costs was based on data derived from nationally representative databases and Medicare reimbursement rates. Quantities of resources used were gathered from April 1996 to January 1998. 1998 prices were used through the medical care component of the consumer price index.

**Statistical analysis of costs**
Costs were mainly treated deterministically, but some statistical analyses were conducted to allow comparisons among the cost items included in the analysis.
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
Please refer to the effectiveness results reported earlier.

Cost results
The cost of medical procedures and blood products amounted to $2,737 (95% CI: $2547 - $2932) and $198 (95% CI: $147 - $250) in the vinorelbine plus cisplatin group and $3,322 (95% CI: $3074 - $3571) and $229 (95% CI: $130 - $329) in the paclitaxel plus carboplatin group.

Supportive medication costs were $5,557 (95% CI: $4,432 - $6,684) in the vinorelbine plus cisplatin group and $5,039 (95% CI: $3,692 - $6,387) in the paclitaxel plus carboplatin group.

Protocol chemotherapy costs for delivery and drug were $2,251 (95% CI: $1,942 - $2,560) and $5,231 (95% CI: $4,762 - $5,700) in the vinorelbine plus cisplatin group and $995 (95% CI: $815 - $1,175) and $17,094 (95% CI: $15,736 - $18,453) in the paclitaxel plus carboplatin group.

Costs for non-protocol therapy and medical care days/visits were $12,758 (95% CI: $10,237 - $15,279) and $11,557 (95% CI: $9,397 - $13,718) in the vinorelbine plus cisplatin group and $9,002 (95% CI: $7,187 - $10,818) and $13,257 (95% CI: $10,726 - $15,789) in the paclitaxel plus carboplatin group.

Total costs were $40,292 (95% CI: $36,226 - $44,359) in the vinorelbine plus cisplatin group and to $48,940 (95% CI: $44,674 - $53,208) in the paclitaxel plus carboplatin group and the difference was statistically significant, (p = 0.004).

Synthesis of costs and benefits
Not relevant due to the cost-minimisation approach adopted.

Authors' conclusions
The authors concluded that the therapy with paclitaxel plus carboplatin was substantially more costly than the therapy with vinorelbine plus cisplatin, but did not produce any improvement in survival or quality of life. The cost difference was mainly due to the additional cost of the protocol therapy.

CRD COMMENTARY - Selection of comparators
The two drug therapies (paclitaxel plus carboplatin and vinorelbine plus cisplatin) were chosen because they represented the new therapy and the traditional approach, respectively. You, as a user of this database, should assess whether other drug therapies are commonly used in your own setting.

Validity of estimate of measure of effectiveness
The internal validity of the study was likely to have been high given the use of randomisation and the apparent
comparability of study groups. Power calculations were not reported, but the sample size was quite large. The study population was somewhat heterogeneous coming, as it did, from different settings, therefore the external validity of the effectiveness analysis was also high. The authors noted that patient monitoring was probably more intense than in a typical clinical practice, because the study was a controlled trial. Information on second- and third-line chemotherapies was not collected.

**Validity of estimate of measure of benefit**
No summary benefit measure was used and costs and benefits were not combined because a cost-minimisation analysis was conducted, since no statistical difference was found between the groups in terms of clinical outcomes.

**Validity of estimate of costs**
All categories of costs relevant to the perspective adopted appear to have been included in the analysis. The authors highlighted the fact that medical resource use was tracked well beyond the initial protocol treatment period using special forms in each centre in which the study was carried out. Costs were discounted and quantities of resources used were reported for some items. However, unit costs were not reported and cost estimates appeared to be quite specific to the study setting, and therefore may not be valid for different providers in different settings. Statistical analyses on quantities of resources used were not reported.

**Other issues**
The authors compared their findings with those from other studies. The overall generalisability of the study results to other settings was not specifically addressed because sensitivity analyses were not conducted. The authors pointed out some limitations of the study, already reported above.

**Implications of the study**
The use of therapy with carboplatin and paclitaxel has some implications. First, using published incidence rates of lung cancer and assuming that 75% of individuals receive therapy, the widespread use of carboplatin plus paclitaxel therapy would increase the national expenditure by $787 million in comparison with cisplatin plus vinorelbine. Second, although generic forms of paclitaxel have recently been approved in the USA, the cost of the generic drug should fall substantially making therapy with carboplatin plus paclitaxel equivalent to cisplatin plus vinorelbine. Finally, as the authors noted, the results of the present study should be used by "interested parties (physicians, health plans, and patients) to discuss the merits and drawbacks of each regimen".

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**Other publications of related interest**
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