Pilot study: effects of parenteral glutamine dipeptide supplementation on neutrophil functions and prevention of chemotherapy-induced side-effects in acute myeloid leukaemia patients

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.

CRD summary
This study evaluated the cost-effectiveness of glutamine dipeptide supplementation, in encouraging phagocytosis and superoxide anion generation, and decreasing side-effects, in patients on chemotherapy for acute myeloid leukaemia. The authors concluded that glutamine dipeptide supplementation might enhance neutrophil phagocytic function, maintain nutritional status, and be cost-effective, but larger trials were needed. The study was well reported; thorough comparisons with other studies were made; and the conclusions were appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study evaluated the cost-effectiveness of glutamine dipeptide supplementation, in encouraging phagocytosis and superoxide anion generation, and decreasing side-effects, in patients on chemotherapy for acute myeloid leukaemia.

Interventions
Intravenous glutamine dipeptide, 30g per day, was compared with 25g per day of a standard amino acid mixture (Aminosol). Each treatment was delivered for the first five days of each chemotherapy cycle, by a peripheral venous catheter, installed at the start of chemotherapy.

Location/setting
Thailand/in-patient care.

Methods
Analytical approach:
The economic evaluation was conducted alongside a randomised controlled trial of 16 patients. The perspective was not explicitly stated.

Effectiveness data:
All the effectiveness data were from the trial. The primary effectiveness measures were neutrophil phagocytosis and neutrophil superoxide anion generation. Blood counts were taken daily, and when the absolute neutrophil count was over 500 per microlitre a sample of heparinised blood was obtained to measure neutrophil phagocytosis and superoxide anion generation. Other effectiveness data included the incidence of neutropenia, infection, stomatitis, and diarrhoea as side-effects of chemotherapy.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measures of benefit were the percentages of patients, who were free from: severe oral mucositis (grades 3 and 4), severe diarrhoea (grades 3 and 4), prolonged diarrhoea (more than 10 days), and prolonged neutropenia (more than 14 days).
Cost data:
The costs were those of the hospital stay. This included accommodation, food and ancillary charges, pharmacy, laboratory, and radiology costs, which were from the Ramathibodi hospital in Bangkok, Thailand. All costs were calculated per patient and reported in Thai baht (THB).

Analysis of uncertainty:
The results were presented with standard deviations, and analyses were undertaken to identify statistically significant differences between the groups. Subgroups were analysed for cost category differences.

Results
The levels of phagocytosis and superoxide anion generation were statistically significantly higher in the glutamine dipeptide group than in the control group, but both groups were statistically significantly lower than normal values. In the glutamine dipeptide group, superoxide anion generation was not statistically significantly different from normal.

There were no statistically significant differences in any costs, and in freedom from infection, severe oral mucositis, severe diarrhoea, prolonged diarrhoea, and prolonged neutropenia. The total costs per patient for glutamine dipeptide were THB 186,840 (SD 71,979), and for control they were THB 196,778 (SD 58,910).

Authors' conclusions
The authors concluded that glutamine dipeptide supplementation might enhance neutrophil phagocytic function, maintain nutritional status, and be cost-effective, but larger trials were needed.

CRD commentary
Interventions:
The interventions and methods of measurement were thoroughly described and seem to have been reasonable. It was not clear whether there were other interventions that could have been analysed.

Effectiveness/benefits:
The effectiveness data were presented in sufficient detail. The methods used to collect them, and the processes involved in generating the outcomes, were thoroughly and clearly explained. The method of randomisation, and any blinding, were not reported, so it is unclear whether there was a possibility of bias, but the baseline characteristics were presented and no statistically significant differences were found. The time horizon was not clear, but follow-up was short, so the long-term outcomes of glutamine dipeptide and the control treatment were not observed.

Costs:
The cost perspective was not explicitly stated, but only the costs of the hospital stay were included, which may have excluded relevant costs. The costs were adequately reported, but at a total level that will not allow their transfer to other settings. No resource use data were presented, and the individual cost components and subcategories of costs were not reported. The price year was not stated, which will hinder reflation exercises.

Analysis and results:
The results were clearly presented and sufficient analysis was undertaken. Given the very small sample, a more thorough analysis of uncertainty would have had little benefit. The authors thoroughly discussed the limitations of their study; they explored potential reasons for their results; and they compared their results with those of other studies.

Concluding remarks:
The study was well reported; thorough comparisons with other studies were made; and the conclusions were appropriate.

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