Economic implications of early treatment of migraine with sumatriptan tablets

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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 early treatment of migraine with sumatriptan was studied. Two dosages, 50 and 100 mg, were considered. These were administered when the pain was mild.

Type of intervention

Treatment.

Economic study type

Cost-effectiveness analysis.

Study population

The study population comprised a hypothetical cohort of 1,000 patients suffering from mild migraine. All patients had a diagnosis of migraine, with or without aura, as defined by the criteria of the International Headache Society.

Setting

The setting was primary care. The economic study was conducted in the USA.

Dates to which data relate

The effectiveness and resource use data were gathered from studies published between 1994 and 2000. The price year was likely to have been 2000.

Source of effectiveness data

The effectiveness evidence was derived from a review of published studies and authors' assumptions.

Outcomes assessed in the review

The outcomes estimated from the literature were the treatment success rates, frequency of migraine, and the mean number of doses. Treatment success was defined as the rate of pain-free response at 2 hours, at 4 hours, and sustained 2 to 24 hours post-dose.

Study designs and other criteria for inclusion in the review

A review of the literature does not appear to have been undertaken. One of the primary studies was a double-blind, randomised clinical trial (protocol S2CM09), while another was a retrospective analysis of the previous trial. Details on the other sources were not provided.

Sources searched to identify primary studies

Not stated.

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

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

Number of primary studies included
Four primary studies provided the clinical evidence.

Methods of combining primary studies
Not carried out.

Investigation of differences between primary studies
Not stated.

Results of the review
The rate of pain-free response at 2 hours was 51% with early treatment and 31% with delayed treatment for sumatriptan 50 mg, and 67% (early) and 36% (delayed), respectively, for sumatriptan 100 mg.

The rate of pain-free response at 4 hours was 75% with early treatment and 56% with delayed treatment for sumatriptan 50 mg, and 90% (early) and 61% (delayed), respectively, for sumatriptan 100 mg.

The rate of pain-free response sustained 2 to 24 hours post-dose was 34% with early treatment and 19% with delayed treatment for sumatriptan 50 mg, and 53% (early) and 24% (delayed), respectively for sumatriptan 100 mg.

Migraine frequency was 1.5 episodes per month. Therefore, in a cohort of 1,000 patients, a total of 18,000 migraine headaches would be treated.

The mean number of doses per episode was 1.20 with early treatment and 1.31 with delayed treatment for sumatriptan 50 mg, and 1.21 (early) and 1.28 (delayed), respectively, for sumatriptan 100 mg.

Methods used to derive estimates of effectiveness
The authors made a key assumption to simplify the analysis.

Estimates of effectiveness and key assumptions
It was assumed that all migraine headaches began with an initial phase of mild pain.

Measure of benefits used in the economic analysis
The summary benefits measures used were the treatment success rates, as they were estimated from the literature.

Direct costs
Discounting was not relevant since the costs were incurred during a short time. The unit costs were presented separately from the quantities of resources used. The analysis of costs included sumatriptan (either 50 or 100 mg). The

cost/resource boundary of the study was not reported. Resource use was estimated from published data. The costs were estimated using the average wholesale prices obtained from the Drug Topics Red Book. The cost of a sumatriptan 100-mg tablet was assumed to have been equal to that of a 50-mg tablet. The costs were estimated in 2000 prices.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not included.

Currency
US dollars ($).

Sensitivity analysis
Sensitivity analyses were not conducted.

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

Cost results
In the whole cohort of 1,000 patients (18,000 headache episodes), the total costs of treatment were $345,780 with early treatment and $377,460 with delayed treatment for sumatriptan 50 mg. The corresponding costs for sumatriptan 100 mg were $348,660 (early) and $368,820 (delayed), respectively.

Synthesis of costs and benefits
The average cost-effectiveness ratios were calculated to combine the costs and benefits of alternative sumatriptan treatment strategies. An incremental analysis was not relevant since early treatment dominated delayed treatment, which was both less efficacious and more costly.

For pain-free response at 2 hours, the average cost per migraine treatment success was $37.67 with early treatment and $67.65 with delayed treatment for sumatriptan 50 mg. The corresponding costs for sumatriptan 100 mg were $28.91 (early) and $56.92 (delayed), respectively.

For pain-free response at 4 hours, the average cost per migraine treatment success was $25.61 with early treatment and $37.45 with delayed treatment for sumatriptan 50 mg. The corresponding costs for sumatriptan 100 mg were $21.52 (early) and $33.59 (delayed), respectively.

For pain-free response sustained 2 to 24 hours post-dose, the average cost per migraine treatment success was $56.50 with early treatment and $110.37 with delayed treatment for sumatriptan 50 mg. The corresponding costs for sumatriptan 100 mg were $36.55 (early) and $85.38 (delayed), respectively.

Authors' conclusions
The early treatment of migraine with sumatriptan (both 50 mg and 100 mg) was a cost-effective strategy in comparison with delayed treatment.

CRD COMMENTARY - Selection of comparators

The authors provided a justification for the choice of the comparators, that is, early versus delayed sumatriptan (50 or 100 mg). This selection was appropriate, as the aim of the study was to compare different treatment strategies for the same medication. The authors stated that the comparison between sumatriptan and other medications had already been conducted. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness

The effectiveness evidence came from completed studies. However, a review of the literature does not appear to have been conducted. The primary studies seem to have been identified selectively. Most of the evidence came from a single trial, which had a high internal validity due to the robust design and the large sample size. Information on other primary sources was not provided. The authors also made a key assumption. This information was considered valid and was not investigated in the sensitivity analysis.

Validity of estimate of measure of benefit

The summary benefit measure was derived directly from the effectiveness analysis and was specific to the disease considered in the study. Therefore, it appears hardly comparable with the benefits of other health care interventions. The impact of the interventions on quality of life was not assessed, but other studies had shown that the achievement of pain-free status improved patient satisfaction. The authors noted that three different definitions of treatment success were used.

Validity of estimate of costs

The perspective of the study was not explicitly stated and only the drug costs were considered in the analysis. The unit costs were presented separately from the quantities of resources used, which permits replication of the study in other settings. The source of the data was reported. The period during which the costs were collected was given, which makes reflation exercises in other settings easy. The costs were treated deterministically and no sensitivity analyses were conducted. Thus, the cost estimates were specific to the study setting. As in the analysis of the effectiveness measure, the authors made a key assumption on resource use, which was not varied in the sensitivity analysis.

Other issues

The authors did not compare their findings with those from other studies. They also did not address the issue of the generalisability of the study results to other settings. Sensitivity analyses were not carried out and all estimates were specific to the study setting. This affected the external validity of the analysis. The authors noted some limitations to the validity of their analysis. First, data coming, in part, from a retrospective study being used. Second, the inclusion of sumatriptan as first-line treatment.

Implications of the study

The authors noted that future prospective studies should be conducted to quantitatively assess the economic benefits of early treatment of migraine with sumatriptan.

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Bibliographic details

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Other publications of related interest
Pfaffenrath V, Cunin G, Sjonell G, et al. Efficacy and safety of sumatriptan tablets (25 mg, 50 mg, and 100 mg) in the acute treatment of migraine: defining the optimum doses of oral sumatriptan. Headache 1998;38:184-90.

Cady RK, Sheftell F, Lipton RB, et al. Effect of early intervention with sumatriptan on migraine pain: retrospective analyses of data from three clinical trials. Clinical Therapeutics 2000;22:1035-48.

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