Oral oxycodone offers equivalent analgesia to intravenous patient-controlled analgesia after total hip replacement: a randomized, single-centre, non-blinded, non-inferiority study

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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.

CRD summary
The objective was to establish whether oral oxycodone could provide equivalent postoperative analgesia and a similar safety profile to intravenous patient-controlled analgesia with morphine for patients undergoing elective primary total hip replacement under spinal anaesthesia. An analysis of the economic impact of the two strategies was a secondary aim. Oral analgesia with oxycodone was an excellent alternative to morphine, with both logistic and cost advantages. The clinical trial was well designed and reported, but the economic analysis was weak.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to establish whether oral oxycodone could provide equivalent postoperative analgesia and a similar safety profile to intravenous morphine, for patients undergoing elective primary total hip replacement under spinal anaesthesia. An analysis of the economic impact of the two strategies was a secondary aim.

Interventions
The two interventions were oral controlled-release oxycodone 20mg every 12 hours for three days, with immediate-release oxycodone 10mg up to every four hours if required, versus intravenous patient-controlled analgesia with morphine until the dose was under 1mg per hour. In both strategies, patients received regular co-analgesia and antiemetics.

Location/setting
UK/hospital.

Methods
Analytical approach:
The analysis was based on one study and the time horizon was three days. The authors did not explicitly state the perspective adopted.

Effectiveness data:
The analysis was based on a randomised controlled trial (RCT), carried out at one institution. Randomisation was by sealed envelope, which was opened before surgery, after a successful spinal block was achieved. Of the 170 patients assessed for eligibility, 114 were included in the trial, with 57 in each analgesia group. Two participants in each group discontinued treatment due to severe postoperative nausea and vomiting. The final groups consisted of 55 participants, whose mean age was 72 years (26 men) for oral oxycodone and 71 years (24 men) for morphine. The three primary endpoints were postoperative pain at rest and upon movement, and the nausea score. These were recorded every 12 hours from when the patient was transferred to the ward until 72 hours later. Power calculations were performed in the preliminary phase of the trial.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
No summary benefit measure was used. The three primary outcomes of the clinical analysis were postoperative pain at rest and upon movement, and the nausea score.

Cost data:
The economic analysis included only the costs of oral oxycodone and morphine. The other drug costs were assumed to be the same for both groups. The resource quantities were from the clinical trial and the unit costs were from the hospital's accounting system. All costs were in UK pounds sterling (£).

Analysis of uncertainty:
In total, 1,000 bootstrap samples were used to estimate the confidence interval for the clinical efficacy.

Results
The differences between groups for the primary and secondary clinical outcomes were not statistically significant.

**Pain at rest**: The mean score was 1.65 with oral oxycodone and 1.73 with patient-controlled morphine, in the first 24 hours; 0.47 with oral oxycodone and 0.77 with morphine, in the second 24 hours; and 0.36 with oral oxycodone and 0.47 with morphine, in the third 24 hours.

**Pain upon movement**: The mean score was 2.40 with oral oxycodone and 2.77 with morphine, in the first 24 hours; 1.39 with oral oxycodone and 2.19 with morphine, in the second 24 hours; and 1.17 with oral oxycodone and 2.00 with morphine, in the third 24 hours.

**Nausea**: The mean score was 0.59 with oral oxycodone and 0.70 with morphine, in the first 24 hours; 0.46 with oral oxycodone and 0.42 with morphine, in the second 24 hours; and 0.34 with oral oxycodone and 0.15 with morphine, in the third 24 hours.

**Costs**: The cost of providing analgesia was £4.12 with oral oxycodone and £14.39 with morphine.

Authors’ conclusions
The authors concluded that oral analgesia with oxycodone, after total hip replacement, was an excellent alternative to intravenous patient-controlled analgesia, with logistic advantages, and it might be more cost-effective.

CRD commentary
Interventions:
The selection of the comparators was appropriate as the two available analgesics were considered. A clear description of the two strategies was given.

Effectiveness/benefits:
The clinical analysis was based on a well-conducted trial. The inclusion and exclusion criteria were clearly reported, as were other methods. The randomisation should have ensured the validity of the clinical comparison and minimised potential selection bias. Four participants withdrew from the trial early and the intention-to-treat principle could not be used to analyse the outcomes, but the authors stated that the effect of these withdrawals was likely to be negligible. The clinical outcomes were appropriately selected to assess the direct impact of the interventions on the patients’ health. The sample size was appropriate for detecting statistically significant differences in the primary outcomes.

Costs:
The economic analysis only included a comparison of the drug costs and it was unclear which perspective was adopted. The authors acknowledged that the inclusion of hospital stay costs would have been useful to establish whether the two options led to differences in these costs. The resource use was appropriately taken from the clinical trial. The price year was not reported and no sensitivity analysis of the costs was conducted. The economic analysis was a secondary objective of the study and was not presented in detail.

Analysis and results:
The results were extensively presented. The economic and clinical outcomes were not synthesised and a cost-
consequences analysis was reported. The uncertainty was investigated, using statistical analyses that were based on the nonparametric distributions of the clinical inputs. No sensitivity analyses of the economic results were performed. The clinical results might be transferred to similar populations, but the economic results should be considered to be specific to the authors’ institution.

Concluding remarks:
The clinical trial was well designed and reported, but the economic analysis was weak.

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