Cost effectiveness of a medical vigilance system to reduce patient falls

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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 examine the cost-effectiveness of the LG1 Intelligent Medical Vigilance™ System, for fall prevention in hospitalised patients at high risk of a fall, after neurosurgery. The authors concluded that the system reduced the rate of patient falls, but at higher costs. It was potentially cost saving due to unmeasured costs. The study was well presented, but had some methodological limitations. Further studies are required to corroborate the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to examine the cost-effectiveness of the LG1 Intelligent Medical Vigilance™ System, a fall prevention strategy for hospitalised patients at high risk of a fall, after neurosurgery.

Interventions
The LG1 system was a passive sensor array placed under the patient in a hospital bed and a bedside unit that connected to the nurse call system that was already in place at the hospital. The LG1 system was compared against the usual care, which consisted of patient sitters and other practices, such as a fall-risk assessment, assistance with walking, moving the patient closer to the nurses’ station, and the use of bed rails.

Location/setting
USA/hospital.

Methods
Analytical approach:
This economic evaluation was based on a decision analytic model, with data from a single study. A short-term horizon was considered, which was the hospital length of stay. The authors did not explicitly state the perspective taken.

Effectiveness data:
The clinical data were derived from a non-randomised controlled trial, which enrolled 103 patients in the LG1 group and 464 patients in the control group between February and April 2006 at the post-neurosurgery unit of the St. Joseph’s Hospital and Medical Center in Phoenix. The patients were followed-up until hospital discharge. No further patient characteristics were given. The key clinical endpoint was the fall rate.

Monetary benefit and utility valuations:
Not included.

Measure of benefit:
The summary benefit measure was the fall prevention rate, which was derived directly from the clinical trial.

Cost data:
The economic analysis included the cost of the LG1 system (including the device and nurse time spent responding to alerts), patient sitters, and treatment for a fall (including computed tomography scan). The resource quantities were derived from the clinical trial and the costs were derived from the hospital accounting system, but this was not explicitly stated. All costs were in US dollars ($) and the price year was not reported.
Analysis of uncertainty:
A Monte Carlo simulation was undertaken by assigning probability distributions to the model inputs. Deterministic one- and two-way sensitivity analyses were also carried out by varying the key model inputs, such as the length of stay (LOS), daily hospital cost, and use of patient sitters.

Results
The average cost per patient was $22,467 in the control group and $22,543 in the LG1 group. The fall prevention rate was 0.9677 in the control group and 0.9806 in the LG1 group.

The incremental cost per prevented fall with LG1 over usual care was $5,958.86. This figure rose slightly to $6,300.78 in the Monte Carlo simulation.

The sensitivity analysis showed that the LG1 system was dominant, which means it was both less expensive and more effective, if the LOS after a fall increased by four days, or if the hospital's cost per day for sitters was increased.

Authors' conclusions
The authors concluded that the vigilance system reduced the rate of patient falls at higher costs, but it was potentially cost saving due to unmeasured costs, such as lawsuits and savings from other problems identified by the system.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear as the proposed system was compared with the usual care in the institution. A clear description of the two interventions was given. The authors stated that a comparison with other devices for fall prevention was beyond the scope of their analysis.

Effectiveness/benefits:
The prospective study was a valid source of data. The authors explained their reasons for the lack of random allocation of patients to study groups and their decision to assign the most severe patients to the LG1 group biased the analysis against the new system. They acknowledged that the main limitation of the clinical analysis was the small sample size. The baseline comparability of the study groups was not reported. The evidence came from a single institution and caution will be required if extrapolating the findings to other medical centres. The use of a disease-specific benefit measure further reduces the external validity.

Costs:
The categories of costs suggest the adoption of a hospital viewpoint. Some key details of the unit costs and resource quantities were reported separately. The patterns of resource consumption were derived from the sample of patients in the clinical study. The authors noted that the inclusion of other costs such as the pain and suffering associated with falls, the expenses due to lawsuits, and lost revenues because patients prefer safer hospitals, might favour the LG1 strategy. Changes in the costs and resource use were investigated in sensitivity analyses, which showed the substantial impact of these inputs.

Analysis and results:
The costs and benefits were appropriately analysed in an incremental approach and the results were clearly presented. The sensitivity analysis appropriately investigated the issue of uncertainty. The generalisability of the findings appears to be limited and the results should be considered specific to the authors’ institution.

Concluding remarks:
Although well presented, the study had some methodological limitations. Further studies are required to corroborate the authors’ conclusions.

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