Is prophylactic fixation a cost-effective method to prevent a future contralateral fragility hip fracture?

Faucett SC, Genuario JW, Tosteson AN, Koval KJ

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 hip fixation as a preventive measure for the contralateral hip of 79-year-old women undergoing a fragility hip fracture repair, compared with hip pad prevention or no prevention. The authors concluded that prophylactic fixation was not cost-effective for the average older patient, but it might be cost-effective for younger patients or those at high risk. The methods were satisfactory, with a few limitations, and the results were reported well, the conclusions appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The aim was to evaluate the cost-effectiveness of hip fixation performed as a preventive measure on the contralateral, unfractured hip of patients undergoing a fragility hip fracture repair, compared with hip pad prevention or no prevention. The average patient was a 79-year-old woman who had sustained either a femoral neck or an intertrochanteric hip fracture.

Interventions
Three alternative preventative strategies were compared. The standard care was no prevention, comprising of a fracture repair alone. This was compared with fracture repair plus a contralateral prophylactic hip fixation, performed at the same time, and with fracture repair plus hip pad protection for the contralateral hip.

Location/setting
USA/secondary care.

Methods
Analytical approach:
A state-transition Markov model was used to combine the cost and effectiveness data from the literature. The time horizon was the remaining life expectancy of a cohort of 79-year-old women. The authors did not report the study perspective.

Effectiveness data:
The effectiveness data were mainly from a selection of published studies. The relative risks of hip fractures with hip pad protectors and with prophylactic fixation strategies, and the age- and sex-specific risks of a contralateral hip fracture were from a published meta-analysis. The mortality estimates were from the 2001 US life tables. The main effectiveness parameter was the number of hip fractures and complications related to hip fracture.

Monetary benefit and utility valuations:
The utility values were age and sex specific and were from the Agency for Healthcare Research and Quality’s Medical Expenditure Panel Survey, Household component, for the US population. These values were estimated using the European Quality of life (EQ-5D) questionnaire. The disutilities were estimated from the published literature and clinical judgement, and were then subtracted from the utility values.

Measure of benefit:
The primary measure of benefit was the number of quality-adjusted life-years (QALYs) gained. These were discounted at 3% per annum.

Cost data:
The direct medical cost categories were the costs of surgery, treatment, and rehabilitation and those costs associated with complications. The cost estimates were from a number of published sources. Some operating costs were from the authors’ institution and clinical judgement. The costs were presented in 2006 US dollars ($) and, where they were inflated, the medical care component of the consumer price index was used. They were discounted at 3% per annum.

Analysis of uncertainty:
One-way and two-way sensitivity analyses were performed to assess the impact of parameter uncertainty on the results. The results of the sensitivity analyses were presented in bar and line graphs.

Results
The total treatment cost was $37,900 with the use of hip pad protectors, compared with $39,900 with unilateral fixation (standard care) and $42,400 with contralateral prophylactic fixation. The number of QALYs was 3.6 with hip pad protection, 3.52 with standard care, and 3.63 with prophylactic fixation.

Standard care was dominated by hip pad protectors, as it was more costly and less effective. Compared with hip pad protectors, the incremental cost per QALY gained with prophylactic fixation was $142,795, which was above the commonly accepted cost-effectiveness threshold of $50,000.

The results were sensitive to variations in the key parameters, such as the relative risk of fracture with the treatments, the costs of the treatments, and the relative risk of complications with the treatments. The age of the patient at initial fracture was found to significantly affect the results; the younger the individual, the greater the effectiveness gained. When the age was varied, prophylactic fixation was cost-effective for women between 50 and 69 years old. For patients who were over 70 years old, it was not cost-effective, except for those with a high risk of contralateral fractures, where it was cost-effective up to the age of 75 years.

Authors' conclusions
The authors concluded that prophylactic fixation was not cost-effective for the average older woman with a hip fracture, but it might be cost-effective for younger patients or those at high risk.

CRD commentary
Interventions:
The authors described the alternative interventions sufficiently. They included no prevention or unilateral fixation, which was the standard care in the study setting. It is likely that these alternatives were relevant to other settings.

Effectiveness/benefits:
The effectiveness data were from a number of published sources. They were summarised in tables with the relevant reference. The method of identifying these sources was not described, so it is unclear whether the best evidence was used. Some estimates were based on clinical judgement and the process was inadequately described. The derivation of the utility estimates for the QALY's was well described and appears to have been appropriate.

Costs:
The authors did not state the study perspective, but the cost data reflected a payer perspective, as only the direct medical costs were included. The cost data were from a number of sources and were presented in a table with references, aiding the replication of the analysis for other settings. The authors reported the cost year and appropriate adjustment methods were used. The authors discounted the data appropriately.

Analysis and results:
An incremental analysis was appropriate for assessing the relative cost-effectiveness of the three treatment options. The authors assessed the impact of parameter uncertainty in one- and two-way sensitivity analyses, but a probabilistic analysis would have more fully captured the overall parameter uncertainty. The reporting was adequate for the base-
case estimates of cost and effectiveness outcomes, as well as the incremental analysis. The authors discussed some key limitations to their study.

Concluding remarks:
The methods were satisfactory, but there were a few limitations to the study. The results were reported well and the conclusions appear to be appropriate.

Funding
Supported by the National Institutes of Health.

Bibliographic details

PubMedID
20101129

DOI
10.1097/BOT.0b013e3181b01dce

Original Paper URL
http://journals.lww.com/jorthotrauma/Abstract/2010/02000/Is__Prophylactic__Fixation___a__Cost__Effective__.aspx

Indexing Status
Subject indexing assigned by NLM

MeSH
Age Factors; Aged; Aged, 80 and over; Bone Nails /economics; Cost-Benefit Analysis; Female; Fracture Fixation, Internal /economics; Hip Fractures /economics /prevention & control; Humans; Male; Markov Chains; Middle Aged; Primary Prevention /economics; Protective Clothing /economics; Quality-Adjusted Life Years; Sex Factors

AccessionNumber
22010000804

Date bibliographic record published
11/08/2010

Date abstract record published
16/02/2011