Outcomes assessment of total hip and total knee arthroplasty: critical pathways, variance analysis, and continuous quality improvement

Wammack L, Mabrey J D

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
Total hip and knee arthroplasties (THA and TKA) after the implementation of an outcomes management system.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing elective total knee and total hip surgery.

Setting
Secondary care. The economic study was conducted in an academic health centre associated with the University of Texas Health Science Centre, San Antonio, USA.

Dates to which data relate
Data relate to 1994, 1995 and 1996. Data from 1994, before the introduction of the case/outcomes management programme, were collected retrospectively by chart audit and review of the Knee Society Clinical Rating System and Harris Hip scores. In January 1995 the case/outcomes management was introduced, but data collection began in the second quarter of 1995 to allow the critical pathways, variance analysis and CQI programme to mature. Data for 1995-1996 were gathered prospectively using the same hip and knee scores. The price year was 1995.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
Costing for groups K1 (knee) and H1 (hip) (before the introduction of the critical pathway) was performed retrospectively and for groups K2 and H2 (after the implementation of the clinical pathway) it was carried out prospectively. In both cases the patient sample was the same as that used in the effectiveness analysis.

Study sample
Group K1 contained 11 patients, H1 contained 24 patients, K2 had 24 patients and H2 had 31 patients. Because the groups were small and unequal in numbers, matching for age, diagnosis and comorbidity was impossible. However, the authors found no correlation for age, sex, race, diagnosis and comorbidity to cost or outcome.
Study design
This was a before-and-after study carried out in a single centre. Patients were followed up for 30 days. There was no loss to follow up.

Analysis of effectiveness
The main health outcomes used in the analysis were: number of complications, readmissions, morbidity/mortality and function, mobility and pain scores. The latter were measured using the Knee Society Clinical Rating System and Harris Hip scores. These scores measure mobility, stability, pain and function. Both scales have a maximum score of 100, which indicates normal function. Scores below 65 indicate significant impairment.

Effectiveness results
There were no deaths and no readmissions within 30 days for any of the patients. 64% of Group K1 patients experienced one or more complications compared with only 28% of the Group K2 patients (p<0.04, odds ratio=4.6, 95% confidence interval=1.1-20.1). Of the Group H1 patients, 21% experienced one or more complications, compared to 13% of the Group H2 patients; there was no statistically significant difference in complications between these hip groups. There was no statistically significant difference between the pre- or postoperative knee or hip outcome scores. Comorbidities in each group were recorded using the method of Charlson et al, a weighted index which classifies patients with risk for mortality from comorbid disease. There was no significant difference in the Charlson scores between the two groups studied.

Clinical conclusions
The most effective pathways are always 'home-grown' for the environment in which they are being used. CQI techniques aid in refining the pathways and identify deviations from the established algorithm of care. Deviations which are expensive in terms of material resources or personnel, and which have little value in terms of clinical outcome, are eliminated or modified.

Measure of benefits used in the economic analysis
The authors did not provide any measure of benefits.

Direct costs
Cost was derived as an inflation-adjusted cost-to-charge ratio obtained through the hospital's accounting office. It is not clear what cost elements were included, but the cost of the various rehabilitation facilities and professional costs were not included due to difficulties in obtaining/calculating them. Home health and outpatient physical therapy were not included. Costs were not discounted because of the short time frame of the study. The price year was 1995.

Statistical analysis of costs
A t-test for independent samples was used to compare continuous variables between Group 1 and 2. For all analyses, an alpha of 0.05 was used.

Indirect Costs
Not considered.

Currency
US dollars ($).
Estimated benefits used in the economic analysis
Not applicable.

Cost results
Although cost savings per case for neither hips nor knees were statistically significant, the hospital accrued net savings of $260,715 during the second phase of the study, after the introduction of the case/outcomes management system.

Synthesis of costs and benefits
Not applicable.

Authors' conclusions
The programme resulted in insignificant savings without affecting overall clinical outcome and in a significant decrease of complications.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparators (THA and TKA before and after the introduction of the outcomes management system) is clear, as both patient management alternatives are widely used in the authors' setting. You, as a database user, should consider if this applies to your own setting.

Validity of estimate of measure of benefit
The size of the study sample was small and patients in both groups were not comparable in some of their baseline characteristics. The before-and-after design of the study implied a retrospective collection of data and thus might be prone to biases. As acknowledged by the authors, assessment of the quality of care from the patients' perspective would have been useful.

Validity of estimate of costs
It is not clear what cost items were included in the cost calculation (a few of the important cost items appear to be missing from the cost composition), therefore, it is difficult to judge whether important costs were omitted from the analysis. Cost-to-charge ratios were used in the estimation of costs.

Other issues
Costs may not be generalisable to other settings and countries.

Implications of the study
Home health and outpatient physical therapy charges will be the object of a future study.

Source of funding
None stated.

Bibliographic details

PubMedID
9633333
Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Aged; Analysis of Variance; Arthroplasty, Replacement, Hip /standards; Arthroplasty, Replacement, Knee /standards; Case Management /organization & administration; Cost Savings; Critical Pathways /organization & administration; Female; Humans; Length of Stay /statistics & numerical data; Male; Middle Aged; Outcome Assessment (Health Care) /organization & administration; Retrospective Studies; Total Quality Management /organization & administration

AccessionNumber
21998006760

Date bibliographic record published
30/06/2000

Date abstract record published
30/06/2000