Effectiveness of clinical pathways for total knee and total hip arthroplasty: literature review

CRD summary
This review examined the effects of clinical pathways for total knee arthroplasty and total hip arthroplasty. Clinical pathways appeared successful in reducing costs and length of acute care hospital stay with no compromise in patient outcomes. However, the authors’ appropriately highlighted the substantial methodological limitations of the included evidence, and as such the conclusions should be viewed with caution.

Authors’ objectives
To investigate the effects of clinical pathways for total knee arthroplasty (TKA) and total hip arthroplasty (THA).

Searching
MEDLINE (from 1966 to July 2001) and HealthSTAR (from 1975 to June 2001) were searched; the keywords were reported in the paper. Only English language articles were eligible for inclusion.

Study selection
Study designs of evaluations included in the review
Prospective and retrospective studies were eligible for inclusion. All of the included studies compared the results of clinical pathways with a control group. Some of the included studies used historical controls, some concurrent controls, or a mixture.

Specific interventions included in the review
Studies that compared the outcomes for patients whose TKA and THA care was managed with and without the use of clinical pathways were eligible for inclusion.

Participants included in the review
Patients undergoing TKA or THA were considered; further information was not reported.

Outcomes assessed in the review
The following outcomes were considered: length of acute hospitalisation, hospital cost, complications and functional status. The studies had to provide data on at least one of these to be eligible for the review.

In the included studies, the length of hospitalisation was measured from admission or surgery until discharge from the primary hospital. Complications were counted when they required readmission or variation from the clinical pathway. Functional status was assessed using a standardised physician-administered scoring system (Knee Society Clinical Rating System for TKA; Harris Hip Score for THA) or a patient-reported questionnaire.

How were decisions on the relevance of primary studies made?
Two reviewers independently screened the titles and abstracts of articles identified from the searches, and also reviewed retrieved articles.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Two reviewers extracted the data independently. The design, type of control, study outcomes, and association between clinical pathways and length of stay, cost, complications and patient-reported outcomes, were noted. The time between
the control and the study period was measured in studies that used historical controls. Descriptive statistics were used to describe the associations between the time intervals and the changes in length of stay.

**Methods of synthesis**
How were the studies combined?
The studies were presented in a narrative synthesis and summarised in tabular format. The median was calculated for length of stay and the median percentage reduction in the costs across studies was identified.

How were differences between studies investigated?
Some differences were pointed out in the text.

**Results of the review**
Eleven studies, including one randomised controlled trial (RCT, n=163), were eligible for the review. The individual studies comprised 3,995 participants in total.

Length of stay.
All 11 studies addressed the length of stay and showed reductions in acute hospital lengths of stay when referring to a clinical pathway. The reduction ranged from 1.5 to 6.2 days for TKA and from 1.5 to 4.3 days for THA. The median reduction was 30% fewer days in hospital.

Complications.
Of the 10 studies that assessed complications, four reported reductions in the number of complications with clinical pathway implementation, five showed no difference and one showed an increase in complications.

Functional status.
Four studies reported on functional outcomes. One of the studies showed no difference between the two management strategies. The review stated that 2 studies showed no difference when using the standardised scoring systems but reported improved function with TKA, presumably after the implementation of the clinical pathway. The RCT showed that the patients were able to walk an average of 1.4 days earlier than those treated without a clinical pathway (P=0.02).

**Cost information**
Cost was assessed in the individual studies; the cost of acute hospitalisation, excluding physician fees, was calculated. The costs were adjusted for inflation in studies with historical controls.

Six studies that reported the costs showed a reduction with the introduction of clinical pathways. The mean cost reductions per case ranged from $764 to $7,375. The median percentage reduction was 11%, ranging from 8 to 38% (6 studies, seven comparisons).

**Authors' conclusions**
Clinical pathways appear to have been successful in reducing the costs and length of stay in acute care hospitals, without compromising patient outcomes. The studies had substantial methodological limitations, i.e. the use of historical controls and failure to account for length of stay in rehabilitation facilities.

**CRD commentary**
This was a review that discussed the limitations of the identified evidence thoroughly.

No attempts to identify unpublished evaluations were made and non-English papers were excluded. These publication and language restrictions can bias the results of the review, possibly overestimating the advantages of clinical pathway
management strategies. The review would have benefited from an updated search closer to the publication date.

There was considerable variation within the studies which could have been investigated in a more systematic way.

The authors addressed several methodological limitations of the individual studies: i.e. through the use of historical controls, secular trends in cost and resource use could possibly be misinterpreted as effects of the use of clinical pathways; the review results may have differed if the length of stay in rehabilitation facilities could have been added; other confounders were discussed.

Overall, the authors’ conclusions in conjunction with the note on the limitations of the evidence were justified.

**Implications of the review for practice and research**

**Practice:** The authors stated that if further research shows that clinical pathways reduce the length of stay and cost with no compromise in patient outcomes, these should be implemented worldwide. If not, clinicians, hospitals, patients and families should be spared the burden of complying with the restrictions imposed by their use.

**Research:** The authors stated that more studies on the effectiveness of clinical pathways should be performed. Such studies should avoid pitfalls such as the use of historic controls, the use of concurrent controls in the same institution, and the failure to account for length of stay and resource use in rehabilitation facilities.

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