Postoperative radiographs after total knee arthroplasty: a cost-containment strategy

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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.

Health technology
Postoperative radiographs after total knee arthroplasty (TKA).

Type of intervention
Postoperative patient management after total knee arthroplasty.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing total knee arthroplasty (TKA).

Setting
Secondary care (outpatient orthopaedic centre). The economic study was conducted in Virginia, USA.

Dates to which data relate
Effectiveness data were collected between December 1987 and December 1993. Cost dates were not specifically stated.

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

Link between effectiveness and cost data
Costing was undertaken retrospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
A total of 646 consecutive TKAs were performed in 514 patients (156 men and 358 women). 132 patients underwent bilateral TKA. The preoperative mean weight was 181 lb (range: 94 - 300 lb), mean height was 66 inches (range: 51 - 76 inches) and mean age was 64 years (range: 22 - 95 years). Of the 646 arthroplasties, 589 were primary and 57 were revision TKAs, including 5 knees in which only one component was revised. Radiographs were obtained during the index hospitalisation for 12 knees (2%) and delayed until the initial postoperative office visit for the remaining 634 knees (98%). The mean follow-up was 4.3 years, with the first radiograph scheduled within 2 to 6 weeks postoperatively and subsequent radiographs obtained at 6 months and then at yearly follow-up office visits. Only 5 patients were lost to follow-up.

Study design
Analysis of effectiveness
The main health outcome used in the analysis was the complication rate attributable to not obtaining earlier postoperative radiographs.

Effectiveness results
At the first office visit 2 to 6 weeks postoperatively, no patient experienced any complication that was considered to be attributable to not obtaining radiographs during the index hospitalisation. Long-term follow-up on 96% of the knees at a mean of 4.3 years confirmed this observation. 3 patients experienced late fractures and 7 patients developed perioperative soft tissue complications or infections. None of these cases were adversely affected by delaying the initial postoperative radiographs. The mean preoperative Hospital for Special Surgery Knee Score was 48 (range: 21 - 81) for primary TKA and 44 (range: 26 - 67) for revision TKA. Postoperatively, this improved to a mean score of at least 89 (range: 11 - 100) for primary TKA and 85 (range: 54 - 99) for revision TKA.

Clinical conclusions
The surgical exposure for primary and revision TKA offers near complete visualisation of the bony surfaces for prosthetic implantation so that complications potentially affecting patient care can be identified visually.

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

Direct costs
Direct costs considered included: labour, time for the procedure and radiographic equipment and film. These were calculated by consulting the administration and accounting departments of the hospital. Cost dates were not given. Other costs included: associated administration, engineering and physical plant costs, as well as uncollectables.

Indirect costs
Indirect costs were not included.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

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

Cost results
Eliminating in-hospital radiographs with radiologist interpretation resulted in potential savings of $246 in hospital charges, $198 in private insurance reimbursements and $65 in hospital costs per TKA.

Synthesis of costs and benefits
Authors' conclusions
The findings of the study indicate that radiographs following TKA can be delayed in most cases until the first postoperative office visit without compromising patient care.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparators (routine in-hospital radiograph versus later outpatient radiograph) is clear, as both patient management strategies were 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 study would have been enhanced by a measure of benefit. However, it is appreciated that the focus of the study is on costs.

Validity of estimate of costs
The costing exercise was sound and well-presented. No information seems to have been omitted on costs and charges. The reader is able to track how unit costs in the study were derived since detail was provided on sources and methodology. However, the costs may not be generalisable to other settings or countries because of the US cost structure in the study.

Other issues
Retrospective research designs are prone to a number of biases, but it is appreciated that there are practical, resource and timing circumstances that can make it difficult to use designs with stronger internal (and external) validity. The study reviewed the experiences of a single surgeon. Although the authors came to the conclusion that radiographs may be delayed until the initial postoperative visit (and this finding is not in dispute), caution should be exercised since practice variations between surgeons and hospitals can exist. Factors such as learning-curve effects, caseloads and technology may have a bearing on the conclusions and hence affect the generalisability of the results.

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