The utility of bladder catheterization in total hip arthroplasty

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
Universal, preoperative, indwelling bladder catheterisation was compared with postoperative catheterisation on an as-needed basis in patients undergoing total hip arthroplasty (THA).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients undergoing THA.

Setting
The setting was a hospital. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness and resource use data were gathered from 1993 to 1999. Some of the prices used referred to 1999.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was carried out retrospectively on the same sample of patients as that used in the clinical study.

Study sample
A power analysis was carried out to determine the possibility of a Type II error in association with the incidence of UTI. A sample of 719 patients who had undergone THA was identified from a retrospective review of the patients' charts. There were 340 patients in the universal catheterisation group and 379 patients in the as-needed catheterisation group. The proportions of women were 52.6% (universal group) and 53.3% (as-needed group), respectively. The mean age of the patients was 68.1 years (range: 30 - 92) in the universal catheterisation group and 66.9 years (range: 27 - 93) in the as-needed catheterisation group.

Study design
This was a retrospective cohort study carried out at a single institution. The choice of treatment allocation was based on
surgeons’ preferences, with one surgeon using the catheter as a necessary protocol and two surgeons using the universal catheterisation protocol. The length of follow-up was not stated. It would appear that no patient was lost to the follow-up assessment.

**Analysis of effectiveness**

All of the patients included in the initial study sample were accounted for in the analysis of effectiveness. The primary outcome measures were:

- the proportion of patients catheterised in the as-needed catheterisation group,
- the average length of stay (LOS),
- the incidence of UTI, and
- the frequency of deep hip infections.

The two groups of patients were comparable at baseline in their age, gender and the type of anaesthesia received.

**Effectiveness results**

In the as-needed catheterisation group, 295 patients (77.8%) were catheterised.

The average LOS was 4.8 days (range: 3 - 25) in the universal catheterisation group and 4.5 days (range: 3 - 15) in the as-needed catheterisation group, (p=0.1349).

The incidence of UTI was 1.8% (n=6; all females) in the universal catheterisation group and 2.4% (n=9; 7 females) in the as-needed catheterisation group, (p=0.428).

UTIs in both groups were 83% more common in women than in men, (p=0.005). Further, increasing age was correlated with incidence of UTI, which increased by 8% with each additional year of age, (p=0.006).

No deep hip infections were observed in either group.

**Clinical conclusions**

The effectiveness analysis showed that the two interventions (universal and as-needed catheterisation) were comparable in terms of the incidence of complications and the LOS.

**Measure of benefits used in the economic analysis**

No summary benefit measure was used in the economic evaluation because no statistically significant difference in costs was observed. In effect, a cost-minimisation analysis was carried out.

**Direct costs**

Discounting was not relevant since the costs were incurred during a short timeframe. The unit costs were presented separately from the quantities of resources used. The economic analysis considered actual catheter costs and average daily hospitalisation costs. The cost items included in the analysis of catheter-related costs comprised indwelling catheter kit, urinometer, straight intermittent catheterisation kit, operating room time and LOS. Nursing care was common to both approaches and was not considered. The cost/resource boundary of the study was unclear. The hospital costs were estimated using the hospital accounting system. The resource use data came from the same sample of patients as that used in the clinical study. The price year appears to have been 1999.

**Statistical analysis of costs**
The costs were presented as mean values +/- standard deviations. Statistical analyses were carried out to test the statistical significance of differences in costs between the groups.

Indirect Costs
The indirect costs were not included in the economic evaluation.

Currency
US dollars ($).

Sensitivity analysis
Sensitivity analyses were not performed.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The total costs were $9,265 (range: 4,936 - 23,195) with universal catheterisation and $8,675 (range: 4,907 - 21,403) with as-needed catheterisation, (p<0.001). The difference in costs was $590.

The difference in hospital costs attributable to the bladder catheterisation protocol (including savings in operating room, catheters and LOS) was $268.48 (1999 values) in favour of as-needed catheterisation, (p=0.131).

Synthesis of costs and benefits
A synthesis of the costs and benefits was not relevant since a cost-minimisation analysis was carried out.

Authors' conclusions
Routine preoperative indwelling bladder catheterisation was not a cost-effective strategy in comparison with as-needed catheterisation for patients undergoing total hip arthroplasty (THA). A similar rate of urinary tract infection (UTI) was observed with both treatments, but lower costs were associated with as-needed catheterisation.

CRD COMMENTARY - Selection of comparators
The selection of the comparators reflected the two possible approaches for catheterisation in patients undergoing THA. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness evidence came from a cohort study. The retrospective design could represent a weakness of the analysis. The lack of random allocation of patients to the treatment arms could have introduced selection bias, thus the impact of confounding factors cannot be completely ruled out, as the authors pointed out. The sample size was justified only with respect to one of the outcome measures. Further, details on sample selection and patient follow-up were not reported clearly. It was not explicitly stated whether the patients were identified from a single institution (NB: since this abstract was written the authors have confirmed that all patients in the study were from a single institute, specifically the Lahey Clinic in Burlington, MA, USA). These issues tend to limit the validity of the clinical evidence. In general, the study groups were well matched at baseline. The analysis of the clinical study considered all patients included in the study.
Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis because a cost-minimisation analysis was conducted. Please refer to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The authors did not state which perspective was adopted in the study and only hospital costs were included in the economic evaluation. Some costs common to both strategies were not included. Both the unit costs and quantities of resources used were reported, which enhances the possibility of replicating the analysis in other settings. The source of the data was reported. The costs were specific to the study setting. The price year was implicitly stated, which aids deflation exercises.

Other issues
The authors reported extensively the results of other studies that analysed the incidence of UTI, and observed consistent results. The issue of the generalisability of the study results to other settings was not addressed and sensitivity analyses were not carried out. Thus, the external validity of the analysis was low. The study referred to patients undergoing THA and this was reflected in the authors' conclusions.

Implications of the study
The authors recommend that urinary retention developing postoperatively should be treated with straight intermittent catheterisation to avoid UTI.

Since this abstract was written the authors have informed us that their institution has “abandoned routine urinary catheterization after THA in favor of the as-needed protocol”.

Source of funding
None stated.

Bibliographic details

PubMedID
15738815

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Age Distribution; Aged; Aged, 80 and over; Anesthesia /statistics & numerical data; Arthroplasty, Replacement, Hip /statistics & numerical data; Cohort Studies; Female; Hospital Costs /statistics & numerical data; Humans; Incidence; Length of Stay /statistics & numerical data; Male; Massachusetts /epidemiology; Middle Aged; Retrospective Studies; Sex Distribution; Urinary Catheterization /utilization; Urinary Tract Infections /epidemiology