Einmal versus wiederverwendbare Instrumente in der laparoskopischen Chirurgie: eine kontrollierte Untersuchung [Disposable versus reusable instruments in laparoscopic surgery: a controlled study]

Paolucci V, Schaeff B, Gutt C, Morawe G, Encke A

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
Disposable and reusable instruments in laparoscopic cholecystectomy.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Adults scheduled for laparoscopic surgery.

Setting
Hospital. The economic study was carried out at the Johann-Wolfgang-Goethe University, Frankfurt am Main, Germany.

Dates to which data relate
Effectiveness and resource data were collected between 1993 and 1994. Prices related to the same period.

Source of effectiveness data
Single study.

Link between effectiveness and cost data
The costing was undertaken prospectively alongside the clinical study.

Study sample
158 Patients were randomly assigned to two groups:

(1) Laparoscopic cholecystectomy with reusable instruments (n = 80) and

(2) Laparoscopic cholecystectomy using disposable instruments (n = 78).

The two groups were comparable in age distribution, sex and weight.
Study design
Single-centre, randomized, controlled trial. The duration of the study was the thirteen month trial period. There was no loss to follow up.

Analysis of effectiveness
Analysis of the clinical study was implicitly based on intention to treat. The primary health outcome was the number of intra and post-operative events, measured according to Troidl's 5 classes of operative problems.

Effectiveness results
44 (55%) of the group which received surgery with reusable instruments had problem-free operations compared to 60 (77%) in the disposable instruments' group (p<0.05). Two-thirds of the problems in both groups were technical matters which did not disadvantage the patient. There was no significant difference in the secondary parameters with the exception of pre/post operative time, which was significantly shorter for the disposable instrument group.

Clinical conclusions
The use of disposable instruments leads to more problem-free operations with a shorter time required for preparation. There was no statistically significant difference in the patients' final outcome regardless of which types of instruments were used.

Measure of benefits used in the economic analysis
Number of intra and post-operative events (primary and secondary parameters).

Direct costs
All costs for surgery were calculated separately for the two groups. Specifically, these costs included instruments, theatre charges, sterilisation, personnel costs and repair and maintenance costs. The costs of reusable instruments were calculated during the thirteen month period the study lasted, after purchase of new sets at the beginning of the study. Disposable instruments were costed as they were bought during the period. The costs of converting to open surgery due to instrument problems were also calculated. 1993/1994 prices were used.

Currency
German Marks (DM).

Sensitivity analysis
Not stated.

Estimated benefits used in the economic analysis
44 (55%) of the group which received surgery with reusable instruments had problem free operations compared to 60 (77%) in the disposable instruments group (p<0.05). Two-thirds of the problems in both groups were technical matters which did not disadvantage the patient. There was no significant difference in the secondary parameters with the exception of pre/post operative time, which was significantly shorter for the disposable instrument group.

Cost results
Laparoscopic cholecystectomy with reusable instruments cost on average 108 DM (1122.94 DM with disposable instruments). No post operation costs were stated.
Synthesis of costs and benefits
The cost of laparoscopic cholecystectomy was 1014.94 DM less, per intervention, with reusable instruments than with disposable instruments. The cost of preventing a conversion to open surgery was assumed to be 27,000 DM.

Authors’ conclusions
Reusable instrument laparoscopic surgery was less expensive than disposable instrument laparoscopic surgery and did not have any significant effect on patients' final outcomes. Disposable instruments did have significantly fewer problems in surgery and their use did lead to significantly shorter pre/post operative preparation time. The authors assumed that the cost of preventing conversion to open surgery was far more expensive than the surgery itself.

CRD Commentary
The authors themselves stated that the study sample size was not sufficient to test the statistical significance of conversion to open surgery, hence their estimates of the costs of preventing open surgery are open to question (no power calculation performed). The authors do not describe any blinding, which may lead to bias if it was not included in the randomisation process. The authors themselves stated that they did consider the non-monetary benefits of disposable instrumentation. The study did not provide the costs of post hospitalisation or the level of re-hospitalisation that might occur as a result of laparoscopic surgery. Discounting of costs was not stated. The group selected for surgery was heavily biased to females and perhaps different results would have been found with more male participants. No sensitivity analysis was performed on the cost data. Full currency conversions (to dollars or pounds sterling) would have been useful.

Implications of the study
An economic evaluation using cost utility analysis is required to properly evaluate the benefits of disposable instruments.

Source of funding
None stated.

Bibliographic details

PubMedID
7887039

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Adult; Aged; Cholecystectomy, Laparoscopic /economics /instrumentation; Cost-Benefit Analysis; Disposable Equipment /economics; Equipment Reuse /economics; Female; Germany;  Humans; Laparoscopes; Laparoscopy /economics; Length of Stay /economics; Male; Middle Aged; Patient Satisfaction /economics; Postoperative Complications /economics; Prospective Studies; Surgical Instruments /economics