Selective spinal anesthesia versus desflurane anesthesia in short duration outpatient gynecological laparoscopy: a pharmacoeconomic comparison

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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
Two anaesthetic techniques for short-duration laparoscopic procedures were examined. The techniques were selective spinal anaesthesia (SSA) and desflurane-based general anaesthesia (DES).

Type of intervention
Other: Anaesthesia.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised women undergoing short-duration outpatient gynaecological laparoscopic procedures.

Setting
The setting was an outpatient department. The economic study was carried out in Canada.

Dates to which data relate
The dates to which the effectiveness and resource use data related were not reported. The price year was 2000.

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

Link between effectiveness and cost data
The costing was conducted prospectively on the same sample of patients as that used in the effectiveness study.

Study sample
Power calculations were conducted. These suggested that, with 10 patients per group, the study would have 80% power to show a difference of 1.0 in anaesthesia costs on the basis of the anticipated standard deviation of 0.3 in each group. The methods used to select the sample were not reported. The study sample contained 10 patients in each group. The mean age was 35 (+/- 7) years in the SSA group and 34 (+/- 4) years in the DES group.

Study design
This was a randomised clinical trial that was conducted at a single centre, the Vancouver General Hospital at the University of British Columbia. The method of randomisation was not reported. The authors stated that this was part of
a prospective, randomised controlled trial, the details of which were not provided. The patients were followed until discharged (i.e. the same day of the intervention). Therefore, no patient was lost to the follow-up assessment. The authors stated that blinding was not possible. Nurses and anaesthetic staff who were not intimately involved with the study objectives evaluated the patients. The authors stressed that anaesthetic, surgical and nursing staff, as well as discharge criteria and nursing protocols, remained the same over the timeframe of the study.

**Analysis of effectiveness**
Since no patient was lost to follow-up and no conversion to other anaesthetic approaches was required, the analysis of the clinical study was conducted on an intention to treat basis, although this was not explicitly stated. The primary outcome measures were:

- anaesthesia time,
- time in the post-anaesthesia care unit (PACU),
- postoperative pain (percentage of patients requiring postoperative analgesia), and
- the frequency of postoperative nausea and vomiting (PONV).

The study groups were well balanced at baseline in terms of demographic characteristics (age, weight, height and type of surgery).

**Effectiveness results**
Anaesthesia time was 6.6 (+/- 2.3) minutes in the SSA group versus 6.6 (+/- 1.8) minutes in the DES group, (p>0.05).

PACU time was 112 (+/- 45) minutes in the SSA group versus 101 (+/- 23) minutes in the DES group, (p>0.05).

Postoperative pain was observed in 0% of the patients in the SSA group versus 50% in the DES group, (p<0.01).

The frequency of PONV was 30% in the SSA group versus 0% in the DES group, (p>0.05).

**Clinical conclusions**
The effectiveness study showed that the clinical outcomes were generally comparable between DES and SSA, but significantly fewer SSA patients experienced postoperative pain.

**Measure of benefits used in the economic analysis**
The health outcomes were left disaggregated and no summary benefit measure was used in the economic evaluation. In effect, a cost-consequences analysis was carried out.

**Direct costs**
Discounting was not relevant since the costs were incurred during a short timeframe. The unit costs were not reported separately from the quantities of resources used. Only the dosage of medications used in the anaesthesia procedures were reported. The health services included in the economic evaluation were related to anaesthesia (including supplies/sterilisation and drugs/gases) and recovery (including supplies/drugs and nursing time). The cost/resource boundary of the study was that of the hospital. Resource consumption was derived from actual data that referred to the sample of patients included in the effectiveness study. Some assumptions about resource usage were also made.

The costs were estimated based on actual costs incurred by the hospital and not on charges paid by the patients. The costs were generally obtained from the hospital financial department, while the cost of DES was calculated using a published formula. Capital equipment depreciation was not considered as all machines were available for both groups. The cost of nursing time in the operating room was not considered because it depended on surgical rather than
anaesthetic factors. Likewise, physician reimbursement, maintenance of the centre, and additional patient supplies were not included. The price year was 2000.

Statistical analysis of costs
The costs were presented as mean values plus or minus the standard deviations. The chi-squared test was used to test the statistical significance of differences between the groups in the estimated costs.

Indirect Costs
The indirect costs were not considered in the economic analysis.

Currency
Canadian dollars (Can$).

Sensitivity analysis
Sensitivity analyses were not conducted.

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

Cost results
The anaesthesia costs were Can$62.31 (+/- 0.92) in the SSA group and Can$92.31 (+/- 0.37) in the DES group, (p<0.01).

The recovery costs were Can$17.51 (+/- 0.92) in the SSA group and Can$15.58 (+/- 3) in the DES group, (p>0.05).

The total costs were Can$79.83 (+/- 6.10) in the SSA group and Can$107.88 (+/- 3.22) in the DES group, (p<0.01).

Synthesis of costs and benefits
Not relevant due to the cost-consequences approach taken.

Authors' conclusions
The use of selective spinal anaesthesia (SSA) for short-duration outpatient gynaecological laparoscopy was associated with lower costs and comparable effectiveness relative to a desflurane-based general anaesthetic (DES).

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparators was clear. The authors stated that SSA was widely used at their own centre, while it is clear that DES represented a more routine approach for patients undergoing short-duration laparoscopic procedures. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The basis of the effectiveness analysis was a randomised trial, which was appropriate for the study question. However, the authors noted that this was part of larger trial, the details of which were not reported. It was unclear whether the patient sample was representative of the study population. No follow-up after hospital discharge was carried out. All the outcomes represented intermediate measures. The use of an outcome more directly related to patient health would have been useful. The two groups were comparable at baseline and the authors stated that a blind assessment of the outcomes
was not feasible. Surgical and nursing characteristics did not vary during the study timeframe, thereby limiting the potential role played by confounding factors. However, the major threat to the validity of the study was the small sample size, for which no justification was provided. In fact, power calculations were performed to show statistical differences in the cost analysis. This reduces the internal validity of the effectiveness analysis.

**Validity of estimate of measure of benefit**
No summary benefit measure was used because a cost-consequences analysis was conducted.

**Validity of estimate of costs**
In their discussion, the authors stated the perspective which was adopted in the study. Although a breakdown of the cost items was reported, some categories of costs were not included. A justification for the exclusion of only some items, which were common to both strategies, was provided. Information on the unit costs and resource use was not provided, which reduces the possibility of replicating the study. The price year was reported, which would facilitate reflation exercises in other settings. However, the cost estimates were specific to the study setting and no sensitivity analyses were conducted. In particular, the authors stressed that the difference in costs between the two techniques was mainly due to the use of Bispectral Index electroencephalography for DES which, although specific to the authors’ institution, was not standard care in other settings. Standard statistical tests were performed during the cost comparison. A strength of the cost analysis was the performance of power calculations, which ensured that the study sample was adequate for the detection of statistically significant differences in the costs. Some assumptions about resource usage were made, thus introducing some uncertainty into the cost analysis.

**Other issues**
The authors did not compare their findings with those from other studies, but they did discuss a study that had been carried out at their institution, although this referred only to costs. The issue of the generalisability of the study results to other settings was not addressed. The authors stated only that the cost-savings associated with SSA could be observed in other centres if the same procedures were used. All of the data came from a single centre and sensitivity analyses were not used to explore variability in the data. Therefore, the external validity of the analysis was low.

**Implications of the study**
The study results suggested that SSA represents an effective and cheap anaesthetic option for patients undergoing short-duration outpatient gynaecological laparoscopy.

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None stated.

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**Other publications of related interest**
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