Spinal versus epidural anesthesia for cesarean section: a comparison of time efficiency, costs, charges, and complications

Riley E T, Cohen S E, Macario A, Desai J B, Ratner E F

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
Spinal and epidural anaesthesia for caesarian section.

Type of intervention
Anaesthesia.

Economic study type
Cost-effectiveness analysis.

Study population
Patients who had received epidural or spinal anaesthesia for nonemergent caesarian section.

Setting
The setting was a hospital in the USA.

Dates to which data relate
Effectiveness data was extracted from patient records for those treated between 1990 and 1992. Resources were estimated using data from 1990 to 1992. 1992 prices were used.

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

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

Study sample
One hundred patients were randomly selected, although the randomisation method was not stated. The author does not justify the choice of sample size and no power calculations were derived. Fifty patients were chosen for the intervention group and 50 for the control group. 6% were excluded from the initial sample of 100 because they had received nonstandard anaesthetic management. The paper stated that certain patients, for example obese women, were excluded from the study before the sample of 100 was chosen, but did not give numbers.

Study design
Nonrandomised trial with historical controls. The treatment cohort was observed during the period of hospitalization. No patients were lost to follow up since effectiveness was derived from patient records.

**Analysis of effectiveness**
The analysis was based on treatment completers only. Primary health outcomes were proxied by:

1) the time elapsed after entering the operating room (OR) until surgical incision;
2) total time spent in the operating room;
3) total time spent in post anaesthetic care unit (PACU);
4) anaesthetic complication;
and 5) use of intraoperative and postoperative analgesia.

Groups were similar with respect to maternal age, weight, neonatal weight and Apgar scores.

**Effectiveness results**
The results for epidural and spinal (95% confidence intervals):

**OR - cut time (mins):**
- Epidural: 35-57; Spinal: 23-35 (p <0.001)

**Total OR time (mins):**
- Epidural: 81-121; Spinal: 67-99 (p <0.001)

**PACU time (mins):**
- Epidural: 52-136; Spinal: 64-140* (p value not given) * Not significantly different.

Needed analgesia intraoperatively: epidural: 38%; spinal: 17% (p= 0.04)
Needed postop pain relief: epidural: 15%; spinal:23% (p value not given)
Complications of anaesthesia: epidural: 13%; spinal: 0% (p value = 0.03)

**Clinical conclusions**
Spinal anaesthesia was faster to perform, patients were more comfortable and complication rates were lower.

**Measure of benefits used in the economic analysis**
Outcome measures were proxied by:

1) time saved from entering the operating room (OR) until surgical incision;
2) time saved in OR;
3) time saved in post anaesthetic care unit (PACU);
4) reduction in complication rates; and
5) reduction in use of intraoperative and postoperative analgesia.

**Direct costs**
Hospital and patient costs were considered. For hospital costs, quantities and costs were analysed separately. They included materials, drugs and nursing time. Quantities were based on actual data taken from patient records.
1990 and 1992. Costs were based on 1992 prices. Only those costs not common to both alternatives were used. Patient costs related to hospital charges for professional fees using 1992 prices. Only those costs not common to both alternatives were used. Neither hospital nor patient costs were discounted.

**Currency**
US dollars ($)

**Sensitivity analysis**
No sensitivity analysis was carried out.

**Estimated benefits used in the economic analysis**
Estimated benefits for epidural and spinal (95% confidence intervals):

- OR - cut time (mins): epidural: 35-57; spinal: 23-35 (p <0.001)
- Total OR time (mins): epidural: 81-121; spinal: 67-99 (p <0.001)
- PACU time (mins): epidural: 52-136; spinal: 64-140* (p value not given) * Not significantly different.
- Needed analgesia intraoperatively: epidural: 38%; spinal: 17%; (p = 0.04)
- Needed postop pain relief: epidural: 15%; spinal: 23%; (p value not given)
- Complications of anaesthesia: epidural: 13%; spinal: 0% (p = 0.03)

**Cost results**
Total intervention costs were $25.21 and $23.46 depending on type of needle used. Total comparator costs were $43.62. Costs of adverse effects were not dealt with in the costing. The paper did not give details of statistical analysis of costs.

**Synthesis of costs and benefits**
Estimated benefits and costs were not combined since it was unnecessary: spinal anaesthesia was the dominant strategy.

**Authors’ conclusions**
Spinal anaesthesia may be a better choice than epidural because it was faster to perform, patients were more comfortable, complication rates were lower, and it was more cost effective.

**CRD Commentary**
The authors could have provided more information about the randomisation method used and about selection criteria, i.e. the number of patients excluded before the initial sample of 100 was chosen. Some justification for sample size chosen would have been helpful. Hypotension which affects more spinal than epidural cases was not included as a complication, although it requires medical intervention and/or drugs when it occurs. This might have biased the results. No attempt was made to cost complications. Details of statistical analysis of costs would have been useful. An important absence in the paper is the lack of a sensitivity analysis.

**Bibliographic details**
comparison of time efficiency, costs, charges, and complications. Anesthesia and Analgesia 1995; 80(4): 709-712

PubMedID
7893022

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Anesthesia, Epidural /adverse effects /economics; Anesthesia, Obstetrical /adverse effects /economics; Anesthesia, Spinal /adverse effects /economics; Cesarean Section; Female; Hospital Charges; Hospital Costs; Humans; Pregnancy; Retrospective Studies

AccessionNumber
21995000509

Date bibliographic record published
17/05/1997

Date abstract record published
17/05/1997