Labor epidural catheter reactivation or spinal anesthesia for delayed postpartum tubal ligation: a cost 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
Epidural catheter placed during labour versus spinal anaesthesia for postpartum tubal ligation.

Type of intervention
Treatment: Anaesthesia.

Economic study type
Cost-effectiveness analysis.

Study population
Women undergoing PPTL after vaginal delivery.

Setting
University hospital and delivery centre. The study was carried out at Burlington, Vermont, USA.

Dates to which data relate
Both effectiveness analysis data and resources data were from the period between June 1991 and December 1993. The prices used were not dated.

Source of effectiveness data
The effectiveness data were derived from a single study and a review of literature.

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that for the effectiveness study and was based on a prospective measurement of resources used.

Study sample
Power calculations were not explicitly stated to determine the sample size. The sample comprised 120 consecutive patients who were divided into three groups, depending on their anaesthetic management. One group (reactivation of epidural catheter, 45 subjects) was composed of those for who had had well functioning epidural catheters during labour and for whom epidural catheter reactivation was attempted for PPTL; if the attempt failed spinal anaesthesia was then given. The second group (20 subjects) consisted of those who had spinal anaesthesia following epidural catheter during labour. The third group (55 subjects) consisted of those who had spinal anaesthesia and who had not had an epidural catheter. The second and third groups in effect formed 1 comparator group for costs and benefits.
Study design
Group 1 formed a retrospective case series study to determine the success rate of reactivating an epidural catheter following its successful use during labour. All groups formed a case series study for the timing of procedures and to compare the risk of headache. The study was based in a single centre. Duration of follow up was from delivery until completion of PPTL (up to approximately 16 hours). The reasons for failure of epidural reactivation were investigated but the methods were not reported.

Analysis of effectiveness
The analysis was based on intention to treat. The primary health outcome measured was the percentage success rate of reactivating the epidural in the group in which it was attempted. The number of post-dural headaches was noted.

Effectiveness results
Reactivation of the epidural catheter was successful in 78% of cases (35 of 45 patients). One patient in each group had a post-dural puncture headache.

Clinical conclusions
Approximately 25% of patients had inadequate epidural anaesthesia and needed subsequent spinal anaesthesia. The only factor investigated that may have influenced success was a shorter than 4 hour interval between delivery and PPLT, but statistical significance was not achieved (p = 0.08%).

Outcomes assessed in the review
Risk of post-dural puncture headache was assessed by means of a review of the literature.

Study designs and other criteria for inclusion in the review
Previously published studies assuming the use of 25-gauge Whitacre needles were included in the review.

Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Two studies were included in the review.

Methods of combining primary studies
Not described.

Investigation of differences between primary studies
Not stated.
Results of the review
The risk of headache was reported as "about 2%".

Measure of benefits used in the economic analysis
The measure of benefits were the percentage of successful epidural reactivations and the percentage of post-dural puncture headaches.

Direct costs
Quantities and costs were analysed separately. The quantities measured were operating room (OR) and anesthesia times. The costs described were hospital charges and the cost boundary was therefore the purchaser. The estimation of costs was based on given institution-specific prices (single observations). The costs considered were those of OR occupancy and anesthesia professional charges. The sources of quantity data were the institution's own records. The quantities were measured between June 1991 and December 1993. The prices were not dated. Since surgical time did not differ between groups, the 'surgeon professional charges' cost component was not included in the analysis.

Currency
US dollars ($).

Estimated benefits used in the economic analysis
The risk of headache in group 1 was 0.5% (the failure rate of reactivation (25%) multiplied by the rate of headache following spinal anaesthesia (2%). The risk of headache in the other groups was 2%. The difference in risk rates of post-dural puncture headaches was 1.5%.

Cost results
Patients in the reactivation of catheter group had a higher mean PPTL charge of $176.00 than the patients in the spinal anesthesia group. OR occupancy was billed at $11.7 per minute and anesthesia professional charges at $3.00 per minute. Total operating room time in group 1 was 73 minutes (SD +/- 14) and for the other 2 groups combined was 61 minutes (SD +/- 14), (significant, p = 0.001). Total costs for groups were not given.

Synthesis of costs and benefits
The cost of a headache avoidance was calculated to be $11,733 ($176.00/0.015).

Authors' conclusions
Spinal anesthesia for postpartum tubal ligation was associated with lower anesthesia professional fees and OR charges compared with attempted reactivation of epidural catheters placed during labour. Anesthesiologists should weight the cost advantages of spinal anesthesia against the small, but increased probability of headache after dural puncture.

CRD COMMENTARY - Selection of comparators
The comparator groups 2 and 3 are combined in some tables so that methods and results were unclear.

Validity of estimate of measure of benefit
The measure of benefit (success of epidural reactivation) was based on a sample which was too small to show statistical significance, and the investigation of factors influencing success was not fully described. The literature survey conducted to obtain the estimate for risk of headache was not adequately explained. The results came from two previously published studies, assuming a specific technology for carrying out the dural puncture which was not explained. The estimate of benefits used in the economic evaluation was too approximate.
Validity of estimate of costs
No price date was given. Other than a brief discussion of the relevant parameters (risk rate of post-dural puncture headache, operating room time), no sensitivity analysis was carried out. Costs were not adequately described; no costs were given for treatment of headache and total costs were not given. Groups 2 and 3 were combined for resource use.

Other issues
The authors noted that a "narrow interpretation" of the cost-benefit result is "that epidural reactivation should be performed only if the sum cost of the complication [post-dural puncture headache] exceeds $11,733".

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