Title: Epidural Analgesia for Pain Management in Labour

Date: May 03, 2007

Context and policy issues:
Balancing pain control with unwanted maternal and neonatal effects remains a hotly debated topic for the different techniques of analgesia available today. Epidural analgesia involves the injection of a local anesthetic into the lower region of the spine close to the nerves that transmit painful stimuli from the contracting uterus and birth canal. Blocking painful impulses from the nerves as they cross the epidural space results in analgesia within 10 to 20 minutes of administration. When a continuous epidural infusion of local anesthetic is selected, an opioid is often added to reduce the concentration of local anesthetic, improve quality of analgesia, and minimize motor block. A study conducted in Alberta found that organizational factors (including physician specialty providing the service and number of yearly deliveries per hospital) are extremely important in determining the use of epidural analgesia. Of 90,991 vaginal deliveries taking place from 1997 to 2000, the overall provincial use of epidural analgesia was 30%. However, after controlling for other factors (including previous live births, newborn birth weight, newborn prematurity, newborn breech presentation, and maternal reproductive system comorbidity) the chance of receiving epidural analgesia was twenty-five times greater comparing the largest metropolitan hospitals with the smallest rural hospitals. Results from a survey published in 1995 reported that 55% of approximately 600 Canadian hospitals nationwide had epidural analgesia available for pain control. Epidural analgesia was available 24 hours a day in 61% of these hospitals and the mean proportion of women who actually used it during labor was 25%. Results varied among provinces from a low of 12% in Newfoundland to a high of 35% in New Brunswick.

When the resources to perform epidural are available, important clinical effects of epidural analgesia should be considered. Hypotension is a common side effect of local...
anesthetics administered by epidural.\textsuperscript{6} Using lower doses of local anesthetics in combination with opioids helps to reduce the risk for hypotension.\textsuperscript{6} Pharmacological effects of the opioid analgesics include pruritus, nausea and vomiting and maternal and fetal respiratory depression. These side effects are optimally managed by administering small doses of an opioid antagonist such as naloxone.\textsuperscript{6} There is also evidence that epidural analgesia is associated with an increased risk for maternal fever (\(>38^\circ C\)), although the mechanism for this outcome is not well understood.\textsuperscript{6} Epidural induced fever may result in unnecessary assessments for neonatal sepsis (even though there is no evidence epidural analgesia increases infection in mothers or infants).\textsuperscript{3} A variety of other side effects have been attributed to regional analgesic technique such as increased duration of labor, increased caesarean delivery as a consequence of low fetal heart rate or dystocia (abnormal or difficult labor), increased risk for fetal malposition, requirement for labor augmentation with oxytocin, increased rate of instrumental delivery (using forceps or vacuum), and long-term backache.\textsuperscript{1} Instrumental delivery may lead to perineal trauma and anal sphincter damage thereby increasing the risk for postnatal urinary incontinence, bowel problems, and sexual dysfunction.\textsuperscript{1} Post dural puncture headache (due to the leakage of cerebrospinal fluid) is a rare complication.\textsuperscript{6} There is also concern that epidural analgesia may adversely affect neonatal outcomes by causing respiratory depression, reduced fetal heart rate, and long-term problems with breastfeeding.\textsuperscript{6} Apgar scores and umbilical pH are used to help practitioners assess the health of the baby at birth. In recent years, anesthesiologists have introduced various changes to epidural administration in an effort to reduce the adverse effects. These include modifications in timing, dosing, and the use of combined spinal-epidural analgesia (involving an injection of an analgesic and/or local anesthetic drug into the intrathecal space immediately before or after epidural catheter placement).\textsuperscript{1}

Although there is evidence that an association exists between epidural analgesia and these various outcomes, the risks and benefits should be established in order to make informed decisions regarding the safety of labor pain management. This report will present the evidence for efficacy of analgesia as well as maternal and fetal outcomes associated with various modalities of epidural analgesia when compared with other forms of analgesia during labor.

**Research questions:**
What is the clinical effectiveness of using epidurals versus other forms of pain control in laboring women? What is the cost-effectiveness of using epidurals to manage pain in laboring women?

**Methods:**
A literature search was conducted on key health technology assessment resources, including PubMed, The Cochrane Library (Issue 1, 2007), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI’s HTAIS, EuroScan, international HTA agencies, and a focused Internet search. Results include English language publications from 2002 to date. Links to online full-text or abstracts are provided when available. Bibliographies of reports were scanned to identify other relevant evidence.
Summary of findings:
No health technology assessments were retrieved. Several systematic reviews and meta-analyses have been published on this topic. Details of the meta-analyses are provided in table 1.

Two large systematic reviews examined the maternal and fetal outcomes of epidural analgesia in comparison to parenteral opioids.\(^7,8\) There are key differences in the methodologies and interpretations from the two systematic reviews. Leighton \textit{et al.} limited their review to randomized controlled trials except when examining two outcomes for which only observational studies were available: breastfeeding success and urinary incontinence. In contrast, due to difficulty examining less reported outcomes including breastfeeding success, urinary incontinence, and maternal fever, the systematic review by Lieberman \textit{et al.} included both randomized controlled trials and better quality observational studies (although the authors did not state how these trials were assessed for quality). The total number of studies included in the review by Lieberman \textit{et al.} was not reported.

Different approaches to the analysis of the data in the two systematic reviews resulted in differences in interpretation of information from the same studies. Due to trial heterogeneity in study design, Lieberman \textit{et al.} did not perform a meta-analysis. Both reviewers agreed that epidural analgesia provided significantly better pain relief then parenteral opioids, without increased risk for adverse neonatal outcomes. Both reviews also concluded that epidural analgesia increased the likelihood of longer second stage labor, rates of instrumental delivery and maternal fever. Neither review demonstrated that the use of epidural analgesia increased rates of cesarean delivery compared with use of parenteral opioids, although Lieberman and colleagues cautioned that the data may not be sufficient to rule out a possible association.\(^7,8\)

The authors cited weaknesses in several randomized controlled trials, including a 30% to 50% crossover rate (usually from parenteral opioid to epidural group), making it difficult to interpret risk for cesarean delivery. In addition, some studies reported lower cesarean delivery rates as a result of enrolling only women who were in active labor (3 to 5 cm dilation) and younger populations, weakening the generalizability of these findings.

The two reviews also came to different conclusions about effects of epidural analgesia on length of first stage labor, breastfeeding success, and urinary incontinence. Leighton \textit{et al.}, concluded that there was no significant difference for these outcomes based on statistical analysis while Lieberman \textit{et al.} concluded that there was a possible association for all these outcomes but the data was insufficient to make a definitive determination.\(^7,8\) While alterations in epidural timing (discontinuing earlier in labor, delaying until greater cervical dilation), technique (using combined spinal-epidural analgesia), and dosing (using lower concentrations of local anesthetic) are widely believed to have resolved many adverse outcomes, Lieberman \textit{et al.} indicated that these changes either did not have the desired effect or there was insufficient evidence to show any effect.\(^8\)
Recently, three meta-analyses (all using a systematic approach for study inclusion) have addressed the effect of modifications in the administration of epidural analgesia on delivery outcomes.\(^9-11\) Hughes \textit{et al}. examined the maternal and fetal outcomes of combined spinal-epidural (CSE) analgesia versus epidural analgesia during labor.\(^9\) Proposed benefits of CSE analgesia include increased mobility, faster onset of pain relief, and more reliable analgesia.\(^9\) However, CSE may also carry a slightly greater risk than epidural analgesia in neurological sequelae.\(^12\) While results showed that CSE provided faster pain relief than epidural, no significant differences were observed for maternal mobility. Furthermore, CSE significantly increased the incidence of pruritus. No significant differences were reported for other outcomes including post dural puncture headache, mode of delivery, hypotension, drowsiness, urinary retention, or neonatal outcomes.\(^9\) Liu \textit{et al}. examined whether using low concentrations of bupivacaine (0.0625%-0.125%) in nulliparous women would affect rates of caesarean section and instrumental vaginal delivery when compared with opioid analgesia.\(^10\) Results revealed that epidural analgesia using low concentrations of bupivacaine is unlikely to increase the risk of caesarean section in comparison with parenteral opioid analgesia, but may increase the risk of instrumental vaginal delivery. The authors concluded that although women given epidural analgesia had a longer duration of second stage of labor, there were no significant differences in neonatal outcomes.\(^10\) Some obstetricians prefer to discontinue epidural analgesia late in labor in the hope of decreasing the likelihood of instrumental delivery. A systematic review by Torvaldsen \textit{et al}. found insufficient evidence to support this practice, but did show that discontinuing epidural analgesia increases the rate of inadequate pain relief in the second stage of labor.\(^11\) The authors noted that due to the limited number of trials included in the analysis, larger studies would be required to confirm the possibility of a clinically relevant reduction in instrumental delivery.

A systematic review by Mayberry \textit{et al}. of 19 randomized controlled trials provides an overview of the side effects and co-interventions associated with the use of epidural analgesia during labor.\(^13\) Many of the trials compared a wide variety of drugs and protocols, so data could not combined for a quantitative meta-analysis. Common side effects included hypotension, impaired mobility, and the need for urinary catheterization.\(^13\) Uncommon side effects (occurring in <10% of women) included pruritus, nausea and vomiting, and sedation. The review concluded that although serious complications of epidural analgesia are rare, several common outcomes such as hypotension require monitoring and other interventions by hospital staff. The review also studied the use of delayed pushing as a labor management strategy in women using epidurals. Results showed that in nulliparous women receiving epidural analgesia, delayed pushing (waiting 1-3 hours after complete dilation) reduced the risk of difficult operative vaginal or caesarean deliveries. Neonatal morbidity rates were similar except for an abnormal umbilical artery pH which was more common in infants born after delayed pushing.\(^13\)

The most recent meta-analysis by Anim-Somuah \textit{et al}. compared the effects of epidural analgesia with parenteral opioids or no analgesia in labor.\(^2\) Similar to previous reviews,
results showed that epidurals relieve pain significantly better than forms of analgesia. However, epidural analgesia was associated with a significantly increased risk for instrumental delivery, longer second stage labor, hypotension, motor blockade, urinary retention, maternal fever, and the requirement for labor augmentation with oxytocin. Interestingly, the meta-analysis did not demonstrate a significant difference in caesarean delivery rates. There was also no evidence for increased risk of adverse neonatal outcomes soon after birth. No long-term studies looking at morbidity and breastfeeding success were included in the analysis.²

In summary, there is considerable heterogeneity among studies examining the effects of epidural analgesia on maternal and neonatal outcomes. Many of these studies pose many limitations to data interpretation (including loss of randomization due to significant crossover rates, not enough power to detect rare outcomes, lack of long-term morbidity data, and other methodology issues). Additional research is required to confirm the association of epidural analgesia with various outcomes including risk for caesarean delivery, risk for serious side effects, breastfeeding success, and long-term morbidity. Larger trials are also needed to further assess benefit for modifications in epidural procedure. Randomizing women during pregnancy would make participants more representative in terms of the difficulty of labor, allowing for better generalizability of study findings.
Table 1: Evidence from meta-analyses examining epidural analgesia for maternal and neonatal outcomes

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<td>Leighton et al., 2002</td>
<td><strong>Comparison:</strong> Epidural analgesia (continuous infusion, PCEA, CSE) vs. Parenteral opioids (IM, IV, PCA)</td>
<td><strong>Maternal outcomes:</strong> Significantly lower pain scores (100 mm VAS) with epidural analgesia First stage 40 mm lower (p&lt;0.0001) Second stage labor 29 mm (p&lt;0.001)</td>
<td>Epidural analgesia provides statistically better pain relief than parenteral opioids in labor. Epidural analgesia significantly increases the length of second stage labor, the risk of hypotension, oxytocin use, instrumental vaginal delivery, and maternal fever. Women should not avoid epidural analgesia for fear of neonatal harm, breastfeeding difficulties, caesarean delivery, long-term pain or long-term urinary incontinence.</td>
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<td>Medications: <strong>Epidural:</strong> Bupivacaine (8 trials) Bupivacaine + Fentanyl (6 trials) Bupivacaine + Meperidine (1 trial) Bupivacaine + Fentanyl/ Sufentanil (1 trial)</td>
<td>Significantly increased length of second stage of labor with epidural analgesia 15 minutes (p&lt;0.05)</td>
<td><strong>Study Limitations:</strong> Existing RCTs were small or did not allow clear interpretation of the data because of problems with protocol noncompliance (either a high proportion of women in the parenteral opioid group received an epidural or a high proportion of women in the epidural group did not receive an epidural.)</td>
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<td><strong>Parenteral Opioids:</strong> Meperidine (11 trials) Fentanyl (2 trials) Butorphanol (1 trial) Nalbuphine/meperidine/ morphine (1 trial) Not stated (1 trial)</td>
<td>Significantly increased risk of hypotension with epidural analgesia OR 74.2 (95% CI: 4.0, 1375; p&lt;0.001)</td>
<td>Only two prospective cohort studies evaluating breastfeeding success and urinary incontinence were retrieved. Significant heterogeneity between trials assessing instrumented vaginal delivery rate.</td>
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| | **Included Studies:** 14 RCTs (n=4,324) 2 prospective cohort studies (n=397) for outcomes (breastfeeding success and urinary incontinence) not studied in RCTs (descriptive results, not included in meta-analysis) | Significantly increased use of oxytocin after epidural analgesia OR 2.80 (95% CI: 1.89, 4.16; p<0.05) | |}
<p>| | Mixed parity | Significantly increased use of oxytocin after epidural analgesia OR 2.80 (95% CI: 1.89, 4.16; p&lt;0.05) | | |
| | | <strong>Neonatal outcomes:</strong> Significantly lower incidence of low (&lt;7) Apgar scores at 1 minute with epidural analgesia OR 0.54 (95% CI: 0.35, 0.82; p&lt;0.05) | | |
| | | Significantly lower need for neonatal naloxone with epidural analgesia OR 0.20 (95% CI: 0.10, 0.44; p&lt;0.01) | | |
| | | No statistical difference in low 5-minute Apgar score, fetal heart rate abnormalities, intrapartum meconium, low umbilical cord pH, severe asphyxia, or success of breastfeeding at 6 weeks | | |</p>
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| Hughes et al., 2003<sup>9</sup> | **Comparison:** Combined spinal-epidural analgesia vs. Epidural analgesia | **Maternal Outcomes:** Significantly reduced time from first injection to effective maternal analgesia with CSE  
WMD -5.50 minutes  
(95% CI: -6.67, -4.52; p<0.001)  
Significant increase of maternal satisfaction with CSE  
OR 4.69 (95% CI: 1.27, 17.29; p=0.02)  
Increased incidence of pruritus with CSE  
OR 2.79 (95% CI: 1.87, 4.18; p<0.001).  
No statistical difference was found between CSE and epidural techniques with regards to maternal mobility, rescue analgesia requirements, drowsiness, incidence of post dural puncture headache or blood patch, hypotension, urinary retention, mode of delivery, or labor augmentation with oxytocin | **Neonatal Outcomes:**  
No statistical difference was found for admission of the baby to the neonatal unit, low umbilical pH, or low Apgar scores.  
Compared with epidural analgesia, CSE provides faster onset of effective pain relief from the time of injection and increases the incidence of maternal satisfaction. However CSE causes more pruritus.  
There is no difference between CSE and epidural techniques with respect to the mode of delivery, maternal ability to ambulate, post dural puncture headache, caesarean section rates, hypotension, drowsiness, urinary retention, or neonatal outcomes.  
**Study Limitations:**  
Significant heterogeneity between trials used for first injection to effective analgesia and pruritus. No data on long-term neurological outcomes. No conclusions can be drawn regarding rare complications such as nerve injury, respiratory depression, and meningitis. |
|  | **Included Studies:**  
14 RCTs (n=2,047)  
Mixed parity |  |  |
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<td>Liu et al., 2004&lt;sup&gt;10&lt;/sup&gt;</td>
<td><strong>Comparison:</strong> Epidural analgesia with low concentration Bupivacaine (0.0625%-0.125%) (continuous infusion, PCEA) vs. Parenteral opioids (IV, IM, PCA) <strong>Medications:</strong> Epidural: Bupivacaine (2 trials) Bupivacaine + Fentanyl (5 trials)</td>
<td><strong>Maternal Outcomes:</strong> Epidural analgesia significantly increased risk for total operative delivery (including caesarean section, forceps, and vacuum) OR 1.63 (95% CI: 1.09, 2.42) Epidural analgesia resulted in a statistically significant longer second stage of labor WMD 15.2 minutes (95% CI: 2.1, 28.2) Significantly fewer women randomized to epidural changed to parenteral opioids than did women from opioids to epidural OR 0.1 (95% CI: 0.5, 0.22) No statistically significant differences in rate of caesarean section or instrumental vaginal delivery (risk was higher with epidural analgesia but did not reach statistical significance when trials using elective forceps, forceps for training, or induced labor were excluded).</td>
<td>Epidural analgesia using low concentrations of bupivacaine is unlikely to increase the risk of caesarean section in comparison with parenteral opioid analgesia, but may increase the risk of instrumental vaginal delivery. Women given epidural analgesia had a longer duration of second stage of labor but neonatal outcomes did not differ between treatments. <strong>Study Limitations:</strong> Loss of randomization due to significant crossover in some of the studies.</td>
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<td><strong>Parenteral Opioids:</strong> Butorphanol (1 trial) Meperidine (Pethidine) (6 trials) <strong>Included Studies:</strong> 7 RCTs (n=2,962) Nulliparous women</td>
<td><strong>Neonatal Outcomes:</strong> No statistically significant differences in low Apgar scores, or low umbilical pH were found between treatments.</td>
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| Torvaldsen et al., 2004 | **Comparison:** Epidural analgesia for 1st stage labor only (continuous infusion) vs. Epidural analgesia maintained until birth (continuous infusion)  
**Medications:** Lidocaine (1 trial) Bupivacaine (3 trials) Bupivacaine + Fentanyl (1 trial)  
**Included Studies:** 5 RCTs (n=462) Nulliparous women | **Maternal Outcomes:** Statistically significant increase in inadequate pain relief during second stage of labor (22% when epidural discontinued versus 6% when epidural maintained until birth. RR 3.68 (95% CI: 1.99, 6.80; p=0.00003)  
No significant differences in rates of instrumental deliveries, caesarean delivery, spontaneous vaginal delivery, incontinence, and sexual problems. No significant differences in duration of second stage labor, fetal malpositions, and satisfaction with labor care.  
**Neonatal Outcomes:** No significant differences in rates of low Apgar scores, admission to neonatal intensive care unit, and low umbilical arterial pH. | There is insufficient evidence to support the hypothesis that discontinuing epidural analgesia late in labor reduces the rate of instrumental delivery or neonatal outcomes. There is evidence that there is a statistically significant increase in the rate of inadequate pain relief in the second stage of labor when epidural analgesia is discontinued during the second stage of labor.  
**Study Limitations:** Small sample size. Two of the included studies were of lower quality (not placebo controlled, method of randomization not described). None of the studies reported long-term outcomes (maternal satisfaction with labor care, postnatal urinary or fecal incontinence, and sexual problems). |
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<td>Anim-Somuah et al., 2005&lt;sup&gt;2&lt;/sup&gt;</td>
<td><strong>Comparison:</strong> Epidural analgesia (continuous infusion, PCEA, CSE) vs. Parenteral Opioids (IV, IM, PCA) (20 trials) No analgesia (1 trial)</td>
<td><strong>Maternal Outcomes:</strong> Epidural provides significantly better pain relief than non-epidural analgesia WMD -2.60 (95% CI: -3.82, -1.38; p&lt;0.001) Significantly less need for additional pain relief in women receiving epidural analgesia RR 0.05 (95% CI: 0.02, 0.17; p&lt;0.001) Epidural analgesia significantly increased the risk of instrumental vaginal birth RR 1.38 (95% CI: 1.24, 1.53; p&lt;0.001) Significantly longer second stage of labor with epidural analgesia WMD 15.55 minutes (95% CI: 7.46, 23.63; p&lt;0.001) Significantly increased risk in the use of oxytocin, hypotension, motor blockade, urinary retention, fever of at least 38°C in women receiving epidural analgesia (p&lt; 0.05 for all outcomes). There was no significant difference in the risk of caesarean delivery (although results for caesarean section for fetal distress was close to statistical significance), fetal malposition, length of first stage of labor, long-term backache, maternal satisfaction with pain relief, catheterization, nausea and vomiting, perineal trauma requiring suturing, surgical amniotomy, pruritus, drowsiness, or headache. <strong>Neonatal Outcomes:</strong> Significantly less risk of naloxone administration with epidural analgesia RR 0.13 (95% CI: 0.08, 0.21; p&lt; 0.001) Significantly less risk of umbilical pH &lt;7.2 with epidural analgesia RR 0.80 (95% CI 0.66, 0.96; p=0.02) There was no significant difference in admission to neonatal intensive care unit, neonatal Apgar score &lt;7 at five minutes, or meconium staining of liquor.</td>
<td>Epidural analgesia is significantly better in relieving labor pain than other forms of analgesia including parenteral opioids. Epidural analgesia significantly increases the risk for instrumental delivery, longer second stage labor, hypotension, motor blockade, urinary retention, fever, and need for oxytocin augmentation during labor. Epidural analgesia has no statistically significant impact on other maternal outcomes including the risk of caesarean delivery and long-term complications, or neonatal outcomes. <strong>Study Limitations:</strong> Data on women’s perception of pain relief in labor could only be included from one study (due to different reporting methods and incompatibility with software for analysis). Significant heterogeneity in trials (not attributable to trial quality) for hypotension and catheterization during labor. No studies reported rare, serious side effects of including respiratory failure, uterine rupture, venous thromboembolic events, post dural puncture headache requiring blood patch or long-term neonatal outcomes including breastfeeding failure.</td>
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<td><strong>Medications:</strong></td>
<td><strong>Parenteral Opioids:</strong> Meperidine (Pethidine) (15 trials) Fentanyl (2 trials) Butorphanol (1 trial) Phenoperidine (1 trial) Meperidine + Tramadol (1 trial)</td>
<td><strong>Included Studies:</strong> 21 RCTs (n=6,664) Mixed parity</td>
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<td><strong>Epidural:</strong> Bupivacaine (8 trials) Bupivacaine + Fentanyl (8 trials) Bupivacaine + Meperidine (1 trial) Lignocaine (1 trial) Ropivacaine (1 trial) Not stated (2 trials)</td>
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RCT=Randomized Controlled Trial, PCEA=Patient-Controlled Epidural Analgesia, CSE=Combined Spinal-Epidural IV=Intravenous, IM=Intramuscular, PCA=Patient-Controlled Analgesia, WMD=Weighted Mean Difference, OR=Odds Ratio, RR=Relative Risk, CI=Confidence Interval, VAS=Visual Analog Scale

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Economic Considerations:
No well designed randomized controlled trials have been conducted assessing duration of postpartum hospital stay, short-term readmission due to complications, overall costs of hospital stay, or follow-up in terms of long-term morbidity. One study used an economic model to compare costs associated with epidural versus intravenous analgesia from a societal perspective. Incidence rates of intrapartum complications (including instrumental delivery) and postpartum complications (including maternal and fetal outcomes) obtained from peer reviewed literature were incorporated into an incremental cost model. The full cost of providing epidural analgesia was calculated based on two components: a baseline-cost component, which captured the costs of hospital care to laboring women receiving intravenous analgesia; and an incremental-cost component which estimated the costs arising from incremental care due to complications arising from epidural analgesia. The estimated incremental cost per patient for epidural analgesia was calculated to be approximately US $339 (1998 values). This cost difference was primarily attributed to increased professional costs (and was particularly sensitive to the method used to estimate the cost of anesthesia professional services) and increased complication costs associated with epidural analgesia. The authors concluded that greater professional costs and greater costs related to complications make epidural analgesia a more costly option than intravenous analgesia. Many considerations preclude the generalizability of these results including variability in costs specific to different institutions, quality of trials used to estimate the incidence of complication rates, and other model assumptions.

Conclusions and implications for decision or policy making:
Available evidence indicates that epidural analgesia a more effective form of pain relief than parenteral opioids. However, its use is associated with longer labor and increased rates of instrumental vaginal delivery, maternal fever, hypotension, and labor augmentation with oxytocin. So far, results are inconclusive regarding the effect of epidural analgesia on rates of cesarean delivery and there is insufficient data for long-term outcomes for both the mother and baby. Although there is evidence for faster pain relief with CSE versus epidural analgesia, further research is required to evaluate whether other modifications in administration and technique may be beneficial for delivery outcomes.

In general, decisions regarding analgesia should be closely coordinated among the obstetrician, anesthesiologist, patient, and support staff. The choice of technique, agent, and dosage is based on many factors, including patient preference, obstetric risk factors, medical status, progress of labor, resources of the facility, and contraindications. Several guidelines have been developed for the management of labor pain. Each guideline recommends epidural analgesia as an acceptable option in the absence of medical contraindication provided sufficient resources (anesthesia and nursing staff) are present for monitoring and treating possible complications. Until more definite evidence is available, the risk of these potential unwanted effects must be weighed against the unparalleled pain relief this technique provides.
References:


