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REVIEW ARTICLE

BENEFITS VERSUS RISKS OF EPIDURALS FOR PAINLESS DELIVERY

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INTRODUCTION:

Most women experience severe pain during labor and childbirth, and majority of them want and expect to receive some form of pharmacological pain relief in a hospital setting. Epidural analgesia is the most effective method of pain relief. The term "epidural" is used in reference to both analgesia (diminishment or total relief of pain) and anesthesia (total absence of sensation) that is produced by injecting local anesthetics and/or opioids (natural or synthetic narcotics) into the epidural space surrounding the spinal column. Narcotic solutions may also be injected into the intrathecal space. Analgesia, rather than anesthesia, is the objective of epidurals during labor.

THE METHOD:

Epidural analgesia is accomplished by introducing a relatively large bore needle into the epidural or peridural space between the spines of lumbar vertebrae and pushing a catheter through the needle into the epidural space. The large bore needle is then withdrawn over the catheter, and the catheter is left in situ. Local anesthetic solution is administered through the catheter, either as an initial dose with injection of additional medication as needed / at regular intervals, or by the use of an infusion pump that provides a slow continuous infusion throughout labor, or through use of equipment by which the parturient controls the dose she receives, with safeguards to prevent too frequent doses. It is commonly referred to as PCEA or patient controlled epidural analgesia. During initial insertion of the needle and catheter the woman is assisted to curl her body forward while she is either sitting up or lying on her side. The area is cleansed with antiseptic solution and numbed with local anesthetic injected with a small needle before the large needle is introduced. The initial insertion procedure is uncomfortable. Both the effectiveness and side effects vary depending on the specific drugs and dosages, where and how the drugs are injected, and the timing of both

the first and last doses in relation to the progress of the labor. Many different local anesthetics have been used, sometimes in combination with dilute solutions of narcotics. During nearly 40 years of increasing use of epidurals for labor, American and Canadian anesthesiologists have experimented with these variables in an effort to increase the effectiveness and reduce the side effects. There has been an overall trend towards lower dosages resulting in considerable reduction in at least some of the side effects.

The anesthetics act primarily by interfering with transmission of neural stimulation through the sympathetic, sensory, and motor nerve fibers that emerge from the spinal cord in the lumbar area. The desired analgesic effect results from the action of the drugs on the sensory nerve fibers; the undesirable side effects result from the action of the drugs on the sympathetic and motor nerve fibers. Combining narcotics with lower doses of anesthetics makes it possible to reduce the anesthetic concentrations and total doses of drugs, thus providing an equivalent or better analgesia while reducing the degree of motor block¹.

BENEFITS:

An epidural obliterates most if not all of the pain for some women, and the negative effects on the newborn are less than with effective doses of opioids that are administered systemically. More than 90 percent of women receive significant pain relief; most becoming free of all or almost all of their pain. This allows the woman to maintain a sense of self-control, avoid panic, and think and converse as usual. Many women relax and enjoy labor after their pain disappears. Epidurals do not result in satisfactory pain relief in every case however, and pregnant women and midwives must be prepared for this. The epidural space is filled with fatty tissue, blood vessels, and randomly placed septa-tissues that can block the flow of fluids injected into the space and thus interfere with the effectiveness of an

epidural. Inadequate analgesia occurs in 5 to 20 percent of obstetric epidurals². An epidural may provide benefits in addition to pain relief in several situations. Although epidurals are more likely to slow down labor, especially during the second stage, an epidural may be an effective treatment when the contractions have become dysfunctional due to a high level of epinephrine released in response to extreme pain, and may allow a woman who has become exhausted during prolonged labor to sleep for a few hours. Her cervix may dilate while she sleeps, and she may awake with renewed energy and spirit for the labor still ahead. An epidural may be beneficial for a woman with pre-eclampsia, because it lowers blood pressure. Good pain control may make it possible to avoid an emergency cesarean section during the delivery of twins. An epidural may be particularly helpful for a woman who needs oxytocin augmentation, forceps or vacuum extraction, an episiotomy, or other painful procedures. When a woman with epidural analgesia needs a cesarean section, the dose of anesthetic can be increased to provide anesthesia for the surgery.

SAFETY AND COMPLICATIONS OF THE PROCEDURE:

Injecting anesthetics into the area surrounding the spinal cord carries a small but a definite risk of neurological injury and other serious, even life-threatening complications due to either human error (over-dosing or misplacement of the medication) or allergic reactions to the anesthetic³⁻⁶. Because of these risks, epidurals should only be used in settings in which the mother's condition can be closely monitored and there is rapid access to resuscitation and other emergency treatment. Rare life-threatening complications from systemic toxic reactions to the medications, especially following accidental intravascular injections, can result in cardiac arrest, convulsions, and permanent neurologic damage or death of the mother and/or the baby. Perforation of the dura and other tissues surrounding the spinal cord can result in an injection or infusion of anesthetic into the subarachnoid space and may lead to a "high block", in which the anesthetic affects the part of the spinal cord that innervates the lungs; when that occurs, the woman may not be able to breathe. Because of rare life-threatening complications, an anesthesiologist or a nurse-anesthetist should be in the hospital throughout the duration of the labor, once an epidural has been started⁷. Severe, persistent 'spinal' or 'dural puncture' headaches are less serious but a much more frequent complication. Although not life-threatening, a severe headache can complicate the initial postpartum period and make it more difficult for the mother and her newborn

to interact. To reduce the headache, the new mother may need to lie flat on her back or be treated with an epidural blood patch. In this procedure, some of her blood is injected into the epidural space, causing a clot that stops the leakage of cerebrospinal fluid. The blood patch treatment is very effective and immediate. If not treated, the headache may persist for five to seven days. The incidence of dural puncture during obstetric epidurals varies from 0.4 percent to 6 percent⁸.

OTHER UNINTENDED EFFECTS:

Any treatment that is powerful enough to obliterate the pain of labor is too powerful to have no other effects. Several studies have concluded that epidurals have a direct adverse affect on uterine function, perhaps as a consequence of reduced levels of endogenous prostaglandins and oxytocin. Epidural analgesia is associated with prolonged labors, greater use of oxytocin to prevent or treat dystocia, and an increased rate of operative vaginal deliveries, i.e., deliveries assisted by forceps or vacuum extraction. The increase in operative deliveries is related to an increased incidence of malposition (failure of the fetal head to rotate into an optimal position for birth), which is probably due to effects of the epidural on the muscles of the pelvic floor. An increased risk of third or fourth degree lacerations in nulliparous women using epidural analgesia is secondary to the greater need for episiotomies and forceps or vacuum extraction¹⁴. Several studies have found reduced/ or even no effect of epidurals on malposition and the need of forceps or vacuum if the epidural medication was allowed to dissipate prior to the second stage of labor⁴. Some studies have also found an association between epidurals and increased use of cesarean sections. Other studies have not found this association. The issue remains highly controversial. The earlier in labor the epidural is started/ the greater the likelihood that the woman would ultimately have a cesarean. The cesarean section rate was 50 percent if the epidural was started when the cervix was dilated to only 2 centimeters, decreased to 33 percent for women whose epidurals were started when the cervix had dilated to 3 centimeters, and to 26 percent if the epidural was started when the cervix was dilated to 4 centimeters. There was no effect on the cesarean section rate if the epidural was started after 4 centimeters dilation. A 1994 meta-analysis of pooled data from six studies determined that the cesarean delivery rate was 10 percent higher for women with epidurals, 16 percent as compared to 6 percent for those without epidurals. The difference was even greater when the analysis was limited to randomized trials, 21 percent versus 7 percent. But two later meta-analyses did not find a statistically significant

association between use of epidurals and cesarean sections. Uncertainty about the effects of selection bias compromises the value of the non-randomized studies; women who get epidurals may be inherently different from those who don't because they have longer, more difficult labors, which causes them to request and receive epidurals and could account for the findings regarding prolonged labors, cesarean sections, and operative vaginal deliveries. In addition, some studies may not have been able to differentiate between epidurals given for labor pain and epidurals given as anesthesia for C-sections⁹⁻¹³. In that case, one would certainly expect the data to reflect a strong association between epidurals and C-sections! On the other hand, the randomized controlled trials, and a meta-analysis based on findings from randomized trials, are problematic on several counts. The currently available data are insufficient to determine whether epidural analgesia leads to increased rates of cesarean delivery. Additional well-designed randomized studies are needed before this controversy can be resolved. However, epidurals have been clearly shown to increase use of oxytocin augmentation during labor. Epidurals cause vasodilation, which leads to an increase in the incidence of maternal hypotension during labor. Maternal hypotension can be a significant threat to the fetus, because the mother's response to hypotension is vasoconstriction of major arterioles, including the uterine artery. As a result, the mother's blood pressure as measured in her arm may seem normal, even though perfusion of the placenta and thus the supply of oxygen to the fetus is being compromised. The first clue to a troublesome hypotension may be a decrease in the fetal heart rate. Epidurals should be used very judiciously in the presence of non-reassuring fetal heart rate tracings or in conditions that predispose to uteroplacental insufficiency. However, for most women, the hypotension caused by epidurals is easily prevented or treated. Women who are having epidurals are more likely than other women to develop a high body temperature (fever) during labor. As a result of fever in their mothers, many infants are subjected to a diagnostic work-up (which requires drawing blood and may require a lumbar puncture), as well as antibiotic treatment and longer hospitalization. The mother may have to leave her baby behind when she goes home from the hospital. It is not clear whether the increase in temperature among women with epidurals is due to infection, longer labor, reduced ability to dissipate heat, or, perhaps due to shivering, which is a common side effect. But high maternal body temperature may be detrimental to the fetus regardless of the cause; higher body temperatures increase the need for oxygen and thus increase the extent of brain damage resulting from inadequate oxygenation. Maternal fever has been found to be

associated with a higher incidence of low one-minute Apgar scores, increased need for bag and mask resuscitation, and seizures, although the study was too small to be definitive in regard to seizures. Long-term concerns include possible associations between epidural analgesia and maternal-infant bonding, breastfeeding, neonatal behavioral changes, and headaches and later urinary stress incontinence in women. There has been inadequate research to assess possible associations between epidurals and these side-effects. Some of the concerns about epidurals have been adequately assessed and ruled out. Some are well documented but are easily treated and rarely result in serious pathology. Some, such as nausea and itching, are relatively common and make the woman uncomfortable, but are not medically serious and are more common when particular drugs and combinations of drugs are used. Others are well documented and clinically significant. The World Health Organization (WHO) classifies pain control by epidural analgesia as a practice that is frequently used inappropriately. The 1995 Guide to Effective Care in Pregnancy and Childbirth categorizes it as a form of care with a trade-off between beneficial and adverse effects.

IMPACTS OF EPIDURALS ON THE CARE WOMEN NEED DURING LABOR AND DELIVERY:

The care required by a woman who has had an epidural is radically different from the care needed by a woman having normal labor. The woman who has had a successful epidural will have greatly reduced or even absent pain, greatly reduced or absent mobility, and greatly reduced or absent perception of contractions and thus ability to know when to push* She is likely to be unable to empty her bladder, so the midwife must be alert to the possibility of development of urinary distention. Depending upon the medications used, the laboring woman may or may not be able to stand or take a few steps; but even if she can, she will be unstable on her feet and should not attempt to walk without close assistance. In many cases her inability to move and control her lower body may result in an inability to maintain certain positions without assistance. She is vulnerable to hypotension and thus requires close monitoring of her blood pressure and pulse, as well as close monitoring of the fetal heart rate. She is particularly vulnerable to aortocaval compression and should be assisted to maintain a side-lying or semi-upright position. These differences have direct implications for the kinds of direct, bed-side care needed by women who are laboring with an epidural. Although women with epidurals may need relatively little care and support to comfort

them and assist them to tolerate pain while the epidural is in effect, they will still need this kind of care during the period before an epidural can be placed and before it becomes effective, and they need support during the discomfort associated with the initial placement of the epidural catheter. Some physicians and women may prefer to allow the epidural to wear off during the second stage of labor in order to reduce the likelihood of an operative delivery. However, a woman who has had a relatively pain-free first stage of labor may be very poorly prepared to deal with an unanesthetized birth. Women who have epidurals often need additional procedures, treatments and other elements of care to deal with the unintended effects of epidurals, including oxytocin to strengthen labor, an intravenous infusion (to prevent hypovolemia and hypotension), urinary catheters, continuous electronic fetal monitoring, and forceps or vacuum to deliver the baby. Depending on which drugs are used, the women may need medications and personal care and support to deal with itching, nausea, vomiting, and shivering. The woman's temperature should be taken regularly, and she may need care to prevent or reduce fever. Some American nurses and physicians have developed specific innovations in the management of second-stage labor for women having epidurals in an effort to reduce complications and to increase the rate of spontaneous vaginal births. These include rapid intravenous infusions in order to expand the blood volume and avoid hypotension, early aggressive use of oxytocin to prevent dystocia, decreasing the acceptable time limits for second-stage labor, and use of upright postures and delayed initiation of directed pushing until the baby's head is crowning. Some babies may be affected by anesthetics and opioid drugs administered to their mothers epidurally. Although these effects are less than for babies whose mothers receive opioids intravenously or intramuscularly, babies whose mothers had epidurals may be somewhat groggy for some period after their births, and their mothers may need additional help with breastfeeding¹⁵.

SUMMARY

There has been a dramatic increase in the popularity of epidural analgesia during labor and birth. Although not without risk, epidurals are generally safe and are the most effective method to relieve the pain of labor. The common complications are not usually serious; and serious, permanent, and life-threatening complications are rare. Although epidurals are associated with significant economic costs, most women should have access to this form of pain relief, so long as they understand the risks and benefits and have access to other methods also.

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