Title: EFFECT OF CHANGES IN LABOR ANALGESIC PRACTICE ON LABOR OUTCOME

Authors: Naulty JS*, Smith R, Ross R

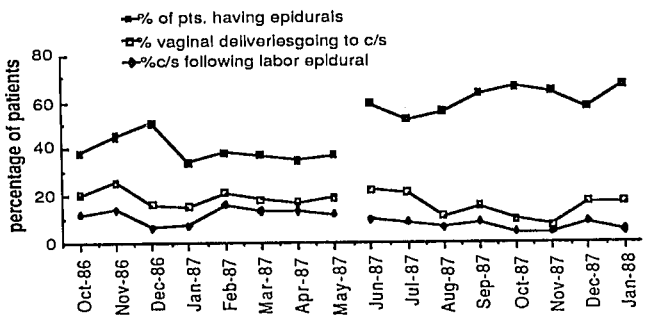
Affiliation: Departments of Anesthesiology, Nursing, and Obstetrics, George Washington University Medical Center Washington, DC

Introduction. It is common practice in many centers to discontinue epidural analgesia following complete cervical dilation in an attempt to shorten the second stage and decrease the frequency of surgical intervention. However, there is conflicting evidence whether analgesia during ththis period of labor in fact increases the duration of the second stage and the incidence of instrumental and cesarean deliveries[1,2]. This practice is associated with significant patient dissatisfaction, and is capable of producing many problems for anesthesiologists. Under normal circumstances, it is difficult to randomize or control studies of these effects of analgesia, particularly epidural analgesia, on the outcome and process of labor and delivery. If,however, an alteration in technique is introduced into a steady state system over a short period of time, it is possible to use "catastrophe" theory and statistical methods.to infer the effects on outcome of the change, or "perturbation". We have therefore examined a steady-state system (a labor floor, with an unvarying population of nurses and obstetricians, practicing under controlled protocols) and observed the effects of an abrupt change in analgesic techniques for the second stage of labor .

Methods. The protocol was approved by the hospital's Committee for the Protection of Human Subjects from Research Risks The labor records of 1787 patients who were admitted with the expectation of vaginal delivery have been retrospectively reviewed. Of these patients, 827 were admitted from October 1 1986 to May 31 1987,prior to the "perturbation" (Group 1) , and the remaining 960 were admitted between June 1,1987 and Jan 31,1988, after the "perturbation" (Group 2). In group 1, lumbar epidural anesthesia was administered using an initial loading dose of 1.5% lidocaine with epinephrine 1/200,000 to achieve approximately a T_{10} sensory level, and then maintained until complete dilation with intermittent injections of 1.5% lidocaine or .25-.5% bupivacaine. In 92% of these patients,no further injections were performed from the attainment of complete cervical dilation until delivery. Group2 had epidural analgesia initiated with 10 ml .25% bupivacaine with 5 μg/ml fentanyl, and then the block was maintained with .125-.25% bupivacaine with 2μg/ml fentanyl until delivery. This modification in epidural technique and a subsequent increase in the number of patients receiving epidural analgesia for labor were the only major variations in practice that occurred during the study period.Results were analyzed for statistical significance using analysis of variance.

Results. (See figure 1) In June, 1987, immediately following the change in technique, there was a significant increase ($p < .01$) in the percentage of patients receiving epidural analgesia for vaginal delivery (% of pts. having epidurals) . There was a statistically significant decrease in the percentage of patients admitted for labor who eventually underwent cesarean delivery (% vaginal deliveries going to c/s) . In group 1, 19.6% of patients in labor underwent cesarean delivery, while in group 2, 15.1% required cesarean delivery ($p<.05$). There was a statistically significant decrease ($p<.01$) in the percentage of patients who underwent cesarean delivery following epidural analgesia for labor (%cs following labor epidural). The incidence of forceps deliveries decreased from a mean of 17.3 ± 3.5% prior to the perturbation to 6.3± 4.3% following, $p<.05$.

Figure 1- percentages of patients expecting vaginal delivery who received epidural analgesia, who underwent cesarean delivery, and who underwent cesarean delivery following epidural analgesia for labor



Discussion. The utilization of "catastrophe" modeling techniques and statistical methods allows us to conclude that a single, isolated change in epidural technique on one labor and delivery unit was associated with decreased cesarean deliveries in laboring patients, particularly in those who received epidural analgesia, despite an increase in the number and percentage of patients who received epidural analgesia for vaginal delivery. This phenomena occurred in a very short time frame, with no other changes in the obstetric milieu, and was also associated with a significantly decreased incidence of forceps deliveries. We conclude from this evidence that increasing the percentage of patients who receive epidural analgesia was not associated with increases in operative deliveries, and that continuation of epidural analgesia throughout the second stage of labor was associated with a decreased number of cesarean and forceps deliveries. Catastrophe modeling of abrupt changes in clinical practice can be used to evaluate the effects of changes in anesthetic practice on outcome in a variety of clinical settings

[1] Chestnut DH Vandewalker GE Owen CL Bates JN Choi WW The influence of continuous epidural bupivacaine analgesia on the second stage of labor and method of delivery in nulliparous women. ANESTHESIOLOGY 66(6):774-80

[2] Phillips G et al:Second stage of labour with or without extradural analgesia.ANAESTHESIA 38(10):972-6