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Cusum Analysis To Evaluate Anesthesia Resident Competency At Insertion Of Labor Epidurals

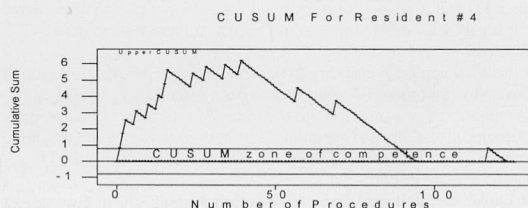
V. Naik MD; I. Devito MD; S. H. Halpern MD

Department of Anesthesia, Mount Sinai Hospital, Sunnybrook and Women's College Health Sciences Centre, University of Toronto, Toronto, Ontario

Introduction: Cusum (cumulative sum) analysis is an objective graphical tool that examines trends for sequential events over time. It can determine proficiency in practical procedures.¹ Previous studies recommended greater than 90 lumbar epidural attempts to declare competency.² We used Cusum to determine the number of labor epidural attempts for competency in our training program.

Methods: Informed consent was obtained. Residents unfamiliar with epidural anesthesia during a six month rotation at Mount Sinai Hospital kept a log recording their labour epidural success and failures. Failure was defined as dural puncture or relinquishing to staff. Cusum analysis was performed for an acceptable failure rate of 5%. Residents were deemed competent when their graphical trend fell and remained below the calculated acceptable Cusum value.

Interim Results: The number of epidural attempts over six months for the first 3 residents ranged from 75 to 125. These residents attained competency by Cusum at 63, 92, and 89 attempts respectively. Sample graph below.



Discussion: After a period of training, residents are expected to perform the skill of labor epidural insertion independently. This study illustrates that a minimum of 92 attempts are required to achieve competency in our program. Training programs could consider using Cusum to track the progress of their residents' technical skills and ensure an adequate experience. Future studies may compare different teaching techniques to observe their effect on competency.

References: 1. Br J Anaesth 1995; 75: 805-9. 2. Anesth Analg 1998; 86:635-9.

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Epidural Analgesia and Cesarean Section: Two Meta-Analyses Adjusting for Utilization of Labor Analgesia.

S. G. Baker, Sc.D.; K. S. Lindeman, M.D. N.I.H., Rockville, MD and Johns Hopkins University, Baltimore, MD

Although randomized trials have been published, controversy persists regarding the effect of labor epidural analgesia on the incidence of cesarean section. In some studies, many subjects randomized to opioid analgesia received epidural analgesia. Consequently, previous meta-analyses of randomized trials, which were based on intent-to-treat, did not yield good estimates of the effect of receiving epidural analgesia. To obtain a better estimate, we performed a meta-analysis of 8 randomized trials adjusting for the fraction of subjects who received epidural analgesia. The 95% confidence interval for the effect of epidural analgesia on the probability of cesarean section was -2% to 12%. We then attempted to obtain a narrower confidence interval by performing an additional meta-analysis of 11 studies of medical practices that experienced a change in the utilization of epidural analgesia over time. These studies are not subject to the selection bias of concurrent retrospective studies because the comparisons involve all subjects before and after increases in availability of epidural analgesia. Although there could be changes over time unrelated to epidural analgesia, the meta-analysis averages the effect of random changes over time. Importantly, we also made an adjustment to estimate the effect of receiving epidural analgesia. Two advantages of the second meta-analysis are the greater number of eligible studies and the generally larger study sizes. For the second meta-analysis the 95% confidence interval for the effect of epidural analgesia on the probability of cesarean section was -6% to 5%. In conclusion, it is unlikely that more than one pregnancy in twenty would result in a cesarean section as a consequence of labor epidural analgesia.

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Oral Dextromethorphan and Intrathecal Morphine For Analgesia After Cesarean Section

D.M.A. Choi, FRCA; A.P. Kliffer, MD; M.J. Douglas, MD

Department of Anesthesiology, BC Women's Hospital, University of British Columbia, Vancouver, BC, Canada

Introduction: Intrathecal morphine (ITM) provides effective postCaesarean analgesia but pruritus and nausea/vomiting are common.¹ These side effects can be reduced by decreasing the dose of ITM, but at the cost of reduced analgesia. Recently there has been interest in dextromethorphan (DM) as a NMDA antagonist to prevent central sensitisation of pain.² The aims of this study are to determine if: oral DM reduces postoperative pain, a lower dose of ITM reduces side effects, and oral DM + low dose ITM provides equivalent analgesia to a higher dose of ITM.

Methods: This prospective randomised double blind trial has IRB approval. After informed consent, women having elective C/S under spinal anesthesia are randomised to one of six groups, to receive ITM (50µg, 100µg or 200µg) and oral DM 60mg or placebo. The oral study medication is given 1 hr preoperatively, and 6 and 12 hrs postoperatively. Rectal naproxen 500mg is given after surgery and 12 hrs postoperatively, and oral acetaminophen 300mg with codeine 30mg and caffeine 15mg (Tylenol No.3) on request. Pain at rest and movement is measured by VAS at 6, 12, 24, 36, 48 hrs, and first request for analgesia. Incidence and treatment of side effects is recorded at 24 and 48 hrs.

Analysis: The primary outcome is pain VAS at 48 hrs. With a factorial design a total sample size of 120 is needed to detect a 20 mm difference in pain VAS between groups with 80% power ($\alpha=0.0125$ for multiple hypothesis testing).

Results: Of 24 subjects studied to date, 2 needed rescue analgesia, 2 required antiemetics, and 7 received treatment for pruritus. The randomization code has not yet been broken.

Discussion: With very low doses of ITM for postCaesarean analgesia, parenteral opioids may be needed.³ DM has an established safety profile and its use as an analgesic adjunct warrants investigation. The combination of DM with ITM for analgesia after C/S under spinal anesthesia has not been studied.

References:

1. Uchiyama et al, Int Journal of Obstetric Anesthesia 1994; 3: 87-91
2. Henderson et al., Anesthesia and Analgesia 1999; 89: 399-402
3. Palmer et al., Anesthesiology 1999; 90: 437-444

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A Dose Response of Intrathecal Epinephrine Combined with Bupivacaine and Sufentanil for Labor Analgesia.

M Poss, MD, R D'Angelo, MD, L Harris, RN

Department of Anesthesiology, Wake Forest University, Winston-Salem, NC

Intro: Although intrathecal (IT) epinephrine 200µg significantly prolongs analgesia from IT bupivacaine 2.5mg and sufentanil 10µg, the incidence of motor block is also increased.¹ The purpose of this ongoing study is to determine the dose of IT epinephrine that prolongs analgesia but minimizes motor block.

Methods: Following IRB approval and informed consent, 20 of a planned 60 healthy, nulliparous parturients were randomized to receive IT bupivacaine 2.5mg and sufentanil 10µg plus either 0, 25, 75 or 200µg of epinephrine using a CSE technique and by double blinded design. Duration of analgesia, pain relief, and side effects were monitored from the time of study drug injection until the patient requested additional analgesia, at which time epidural lidocaine was administered. Data were analyzed by Anova and χ^2 . $P < 0.05$ significant.

Results: To date, IT epinephrine has no significant effect on any variable measured, however, the trends suggest IT epinephrine enhances the duration of analgesia and produces motor block from IT bupivacaine and sufentanil in a dose dependent manner (Table). Otherwise pain scores, nausea, pruritus, sedation, and maternal and fetal effects are similar between groups.

Discussion: Although the differences in duration of analgesia and the incidence of motor block between groups have not reached statistical significance, we predict a significant difference by study completion. Based on these preliminary findings, epinephrine 75µg is the dose which best enhances the duration of analgesia from IT bupivacaine and sufentanil while minimizing motor block.

Reference: Anesthesiology 1997; 86:525

Epi Dose (µg)	-n-	IT Analg (min)*	Motor Block (%)
0	4	115 ± 22	0
25	4	117 ± 34	25
75	6	123 ± 35	33
200	6	153 ± 39	83

* Overall $P=0.27$ ($P<0.001$ predicted with 20 patients/group).