TITLE: IMPACT OF A POSTOPERATIVE EPIDURAL BUPIVACAINE INFUSION ON INTRAVASCULAR AND EXTRACELLULAR FLUID COMPARTMENTS

AUTHORS: F.W. Burgess, PhD, MD, D.E. Brooks, BS, C.E. Wade, PhD, D Perkins, MD, W.G. Rodkey, DVM

AFFILIATION: Letterman Army Medical Center and the Letterman Army Institute of Research, Presidio of S.F., CA 94129

INTRODUCTION: Postoperative epidural analgesia following major abdominal operations includes infusions of narcotic, local anesthetic, or combinations of the two. Although epidural local anesthetics provide profound analgesia, they may be associated with a persistent sympathectomy. Perioperative fluid shifts have not been carefully examined in this setting. The purpose of this study was to develop an animal model to evaluate the impact of a 24 hour epidural local anesthetic infusion on the intravascular and extracellular fluid compartments after abdominal surgery.

METHODS: Eleven immature swine (20-38kg) were randomly assigned into 2 groups. On day 1 all animals underwent general anesthesia (halothane) for cutdown placement of a carotid arterial catheter, an internal jugular pulmonary artery catheter, and a T14-L1 epidural catheter. All catheters were tunnelled to exit at the animals dorsum and secured. All animals underwent a splenectomy via a midline incision. Upon emergence from anesthesia the epidural catheters were injected with 7 ml of solution unknown to the investigator, either 0.9% NaCl or 0.125% bupivacaine in normal saline. Continuous epidural infusions at 5 ml/hr of the same solution were initiated following the bolus injection. Hemodynamic and vital sign measurements were obtained at time=0, 1, 6, 12, 18, and 24 hours after the epidural injection. Hematocrit and total protein determinations were performed at each time point. Arterial blood gases were obtained at time=0 and 24 hours. At 24 hours plasma volume determinations were made by the Evans blue dye dilution technique and extracellular fluid compartment measured with the 51Cr-EDTA dilution method.

RESULTS: The animals receiving the local anesthetic were readily distinguished by their increased activity in the early postoperative period, and the development of motor weakness during the latter phase (>12 hours) of the study. There were no differences between groups for heart rate, blood pressure, cardiac output, urine output, fluid requirements or hematocrits. PaO2 values tended to be higher in the anesthetic treated group at 24 hours, 85 ± 4 vs 81 ± 6 mmHg ($p<0.17$). The extracellular fluid compartment was significantly ($p<0.02$) increased in the anesthetic group, 290 ± 10 vs. 264 ± 20 ml/kg. Plasma volumes were not significantly different between the anesthetic treated and saline control group, 56 ± 6 and 53 ± 12 ml/kg respectively.

CONCLUSIONS: Postoperative epidural bupivacaine infusion for analgesia contributed to increased fluid sequestration following surgical trauma in our model.

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TITLE: WHERE EPIDURAL CATHETERS GO.

AUTHORS: S Jain MD, N Shah MD, R Bedford MD.

AFFILIATION: Memorial Sloan-Kettering Cornell University Medical College, NY, NY 10021

INTRODUCTION: Dysfunction of epidural catheters (EPI CA's) is not uncommon, although little is known regarding the incidence of dysfunction caused by malplacement. As part of a Quality Assurance review, the placement of EPI CA's used for both short and long-term pain treatment was examined radiologically.

METHODS: 126 consenting adult patients underwent EPI CA placement in the prone position on a fluoroscopy table using standard sterile loss of resistance technique with a 17 g needle. EPI CA's were advanced at least 3-4 cm and, if possible, to the desired vertebral level. 2 ml of radiopaque dye was injected through the catheter and tip position was recorded. On subsequent days, if the EPI CA ceased to function, the tip position was reassessed in the same fashion and the results were tabulated.

RESULTS: Our findings on initial EPI CA placement are summarized in the table. In 13 of these patients the EPI CA became dysfunctional several days after successful initial placement and their location was reconfirmed. 4 migrated intravascularly, evidenced by aspiration of blood; 3 went subdural and 6 were found to be at locations different from where they had been placed initially.

DISCUSSION: This study reveals that there is a high incidence of malplacement of EPI CA's despite apparently easy initial placement. If a neurolytic block is planned, it is crucial that the EPI CA tip position be confirmed radiographically before neurolysis is undertaken. Furthermore, after initial placement, the position should be reconfirmed if there is any doubt regarding its function. Migration of the tip is a common occurrence with long-term EPI CA placement.

INCIDENCE	%
PLACEMENT AT DESIRED VERTEBRAL LEVEL	60
CATHETER CURLED IN EPIDURAL SPACE	28
DIFFICULTY IN THREADING CA > 4 CMS	12
TIP AGAINST NERVE ROOT	11
TIP ADVANCED OUT NEURAL FORAMINA	3
INTRAVASCULAR PLACEMENT	1
OBLITERATED EPIDURAL SPACE: CA NOT PLACED	11