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POSTER SESSION IV

A37

TITLE: FLUMAZENIL IMPROVES MIDAZOLAM IMPAIRED COGNITIVE FUNCTION

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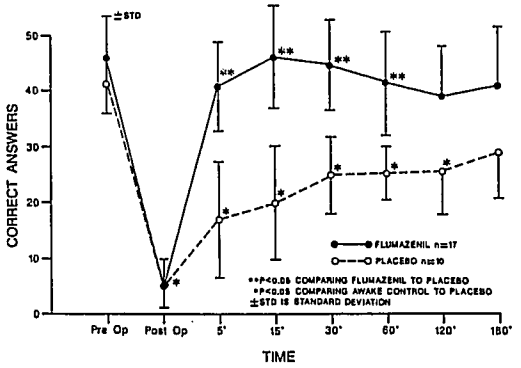
Patients sedated with intravenous midazolam have impaired cognitive function.[1] This study evaluates the effect of flumazenil on midazolam impaired cognitive function.

Twenty seven unpremedicated ASA class 1 and 2 male patients scheduled for elective surgery under regional anesthesia and IV sedation consented to participate in this IRB approved study. Before surgery a baseline cognitive function test [Digit-Symbol Substitution Test (DSST)][1] was performed. Following regional anesthesia all patients received heavy midazolam sedation which was maintained with repeated doses until the end of surgery. On arrival in the recovery room all patients were deeply sedated and pain free. DSST was repeated. Patients were then given test drug, flumazenil or placebo, in a randomized double-blind fashion until they were awake or had received 10 cc of test drug. At 5, 15, 30, 60, 120,and 180 minutes after test drug the DSST was repeated. DSST results were tested for statistical significance by analysis of variance for repeated measurements, and multiple pair-wise comparisons were made between groups with the Bonferroni t-test. $p<0.05$ was considered significant.

The 2 groups were demographically similar. There was no relationship between the dose of midazolam, the time during which it was given, and the dose of flumazenil required to reverse midazolam. Before test drug was given all patients had severe impairment of their cognitive function. Five minutes after test drug the flumazenil group's DSST scores statistically recovered for the rest of the study. The control group's scores remained significantly depressed for three hours.

In 5 minutes flumazenil restores midazolam impaired cognitive function to the normal state. It takes 3 hours for midazolam sedated patients to recover cognitive function.

References: 1. Anesth Analg 68:249-254,1989



A38

TITLE: BACTERIAL CONTAMINATION OF STERILE SOLUTIONS IN GLASS AMPULES

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Drug solutions are frequently packaged in glass ampules. Although the contamination of these solutions with glass has been demonstrated[1], little consideration has been given to the possibility of bacterial contamination. Of particular interest is the drug propofol which is packaged in glass ampules and has been inplicated in instances of patient infection[2]. We have studied wether solutions can become bacterially contaminated just by the act of opening glass ampules.

Methods: Sixteen ampules of propofol and sixteen ampules of lidocaine were each swabbed at the neck with a solution of *Staphylococcus epidermidus* in a concentration of approximately 10^7 per ml. Eight ampules of the propofol and eight of the lidocaine ampules were cleaned with alcohol swabs prior to opening. Each ampule was opened by grasping it above the neck with a sterile 4x4 gauze pad and snapping opened. One half ml of each of the drug solutions was pipetted into nutrient broth and incubated overnight. Calibrated 100 microliter loops were used to plate the incubated broth onto agar plates. The study was blinded and the resultant growth on the plates was read. Chi-square analysis of the results was performed. Significance was determined at the $p<.05$ level.

Results: Three of the eight lidocaine ampules which had not been cleaned with alcohol demonstrated bacterial contamination by heavy growth of *S. epidermidus* on the agar plates and six of the eight propofol which had not been cleaned ampules demonstrated contamination, also confirmed to be *S. epidermidus* . None of the ampules which were cleaned with alcohol prior to opening demonstrated contamination. The difference in the rate of contamination between the cleaned and non-cleaned propofol was significant ($p=.0019$) and the difference between the cleaned and non-cleaned lidocaine was not significant ($p=.054$)

Conclusion: We conclude that a drug solution contained within a glass ampule can not be considered sterile after opening in the usual fashion unless the outside of the glass ampule is sterile. We further conclude that cleaning the neck of the ampule with an alcohol swab can reduce the incidence of contamination. We feel the most important aspect of potential contamination is the possibility of contamination of drug solutions which are administrated in the subarachnoid and epidural space such as preservative free morphine for spinal analgesia. At the very least the neck of ampules of solutions to be administered spinally should be cleaned with alcohol. It may be preferable for the ampules to be sterile as they are on prepackaged spinal and epidural tray.

REFERENCES:
1) Furgang FA: Glass particles in ampules. Anesthesiology 41:525, 1974

2) Carr S, Waterman S, Rutherford G, Martin R, Francis B, Altamirano J, Hall W, Robinson B, Shah S, Wilcox R: Postsurgical infections associated with an extrinsically contaminated intravenous anesthetic agent - California, Illinois, Maine, and Michigan, 1990. MMWR 39:426-427,433, 1990.