



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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| Name(s) Amanda G. Berry | Project Number S1403 |
| Project Title What Is the Optimal Dose of NaHCO(3) in a Bupivacaine Intrathecal Labor Anesthetic? Preparing for a Clinical Trial | |
| <p style="text-align: center;">Abstract</p> <p>Objectives/Goals The chemical properties of the local anesthetic bupivacaine (a weak base), the physiology of NaHCO₃ in the CSF and the clinical literature all suggest adding bicarbonate to the cerebral spinal fluid (CSF) concurrent with the administration of intrathecal bupivacaine will significantly increase the duration of the anesthetic, an important advantage for labor analgesia. The objective of the project is to estimate the dose of NaHCO(3) needed to be used in a clinical study to answer the question, can NaHCO(3) significantly increase the duration of analgesia in an intrathecal bupivacaine anesthetic.</p> <p>Methods/Materials The relevant CSF volume was estimated to be 20mls and the optimal ph was assumed to be 7.45. The Henderson Hasselbalch equation predicts the unionized form of bupivacaine (the active form) will increase by 37% if the pH is raised from the normal CSF pH of 7.3 to 7.45. Using a synthetic CSF and a pH adjusted CSF a pH titration assay using a blood gas analyzer was done with 8.4% NaHCO(3).</p> <p>Results The volume of NaHCO(3) required to raise the CSF pH to 7.45 was .175ml and .17ml respectively.</p> <p>Conclusions/Discussion These volumes can be used as a starting point for a clinical trial where analgesia duration and CSF pH changes can be measured.</p> | |
| Summary Statement What is the optimal volume of 8.4% NaHCO(3) to be added to the subachnoid space to test the hypothesis: can NaHCO(3) be used to increase the duration of analgesia in an intrathecal bupivacaine anesthetic used for labor. | |
| Help Received I used the lab equipment at Salinas Valley Memorial Hospital and consulted with the Pathology, Neurology, and Anesthesia departments. | |