Comparison of pH-stat and Alpha-stat Cardiopulmonary Bypass on Cerebral Oxygenation and Blood Flow in Relation to Hypothermic Circulatory Arrest in Piglets

To the Editor—We read with interest the study by Kurth and associates1 relating to the comparison of pH-stat and alpha-stat strategies for cardiopulmonary bypass on cerebral blood flow and oxygenation using near-infrared spectroscopy and laser Doppler flowmetry in piglets. Kurth et al1 concluded that the use of pH-stat acid-base management compared to alpha-stat improved cerebral physiologic recovery after deep hypothermic circulatory arrest.

There are significant differences between their experimental design and clinical protocols for pediatric cardiopulmonary bypass. Mean arterial pressures immediately before deep hypothermic circulatory arrest were 74 ± 11 mmHg and 72 ± 8 mmHg in the alpha-stat and pH-stat groups, respectively. These pressures are extremely high for 2- to 3-kg piglets at pre-deep hypothermic circulatory arrest. In the clinical setting, mean arterial pressures are typically kept below 40 mmHg.

A bubble oxygenator was used in their study. According to the 1994 pediatric survey, 95% of all pediatric centers use membrane oxygenators exclusively in the United States.2 Only 6.5% of all centers use membrane and bubble oxygenators. Bubble oxygenators are used only for short, uncomplicated cases, not with deep hypothermic circulatory arrest. It has been clearly documented that the use of membrane oxygenators significantly reduces gaseous and particulate microemboli.3,4

Despite these concerns, it is interesting that pH-stat management significantly improved cerebral recovery with high mean arterial pressures in their experimental setup.

Akif Ündar, Ph.D.
Congenital Heart Surgery Service
Texas Children’s Hospital
Houston, Texas
Cullen Cardiovascular Surgery Research Laboratories
Texas Heart Institute
Houston, Texas
Department of Surgery
Baylor College of Medicine
Houston, Texas
aundar@bcm.tmc.edu

Dean B. Andropoulos, M.D.
Departments of Pediatrics and Anesthesiology
Baylor College of Medicine
Houston, Texas
Charles D. Fraser, Jr., M.D.
Congenital Heart Surgery Service
Texas Children’s Hospital
Houston, Texas
Departments of Surgery and Pediatrics
Baylor College of Medicine
Houston, Texas

References


(Accepted for publication November 17, 1998.)

In Reply—Ündar et al point out two differences in cardiopulmonary bypass protocols between our laboratory study1 and current clinical practice. Arterial pressure during deep hypothermic cardiopulmonary bypass was high in our piglets compared with human neonates. There are several physiologic reasons for this. Normal arterial pressure in newborn pigs is higher than in newborn humans, and the hemodynamic response to deep hypothermic cardiopulmonary bypass in healthy piglets is robust compared with human newborns with cardiac disease. In addition, our cardiopulmonary bypass cooling protocol held flow rate constant, whereas some
Lugol’s Solution: A Potent Eye Irritant

To the Editor —In 1933, Schiller1 introduced a simple and inexpensive method of painting the cervix with a strong concentrated iodine solution, Lugol’s solution, to distinguish a normal from an abnormal cervical epithelium. Lugol’s solution is still commonly used during gynecologic surgical procedures. During the past 12 months, we encountered a particular problem that has influenced operating room personnel safety. During this time several reports of operating room (OR) staff complaints of burning eyes and nasal congestion have occurred during gynecologic surgical cases. After careful inspection of the reports, the one underlying theme was the gynecologist’s use of Lugol’s solution. We present one such case report representative of the problems encountered during this time.

A 65-kg, ASA status I, 24-year-old woman with high-grade cervical dysplasia was scheduled for cold-knife cone cervical biopsy. After anesthetic induction and positioning, the patient was placed in the lithotomy position. After preparing the patient, the surgeon saturated a large cotton swab with Lugol’s solution, which had been poured into a stainless steel basin by the OR circulating nurse. The surgeon painted the cervix with Lugol’s solution and discarded the cotton swab into the garbage can. The basin of Lugol’s solution remained uncovered and exposed to room air on the back table. Twenty minutes after induction of general anesthesia, and immediately after painting the cervix with Lugol’s solution, the surgical scrub nurse and surgeon began complaining of burning eyes and nasal congestion, which worsened throughout the short case. Ten minutes later, the nurse anesthetist and OR circulator began noting similar symptoms. No odor was detected. The hospital safety office was notified. By the time the safety representative arrived in the OR, the case was completed and the patient had