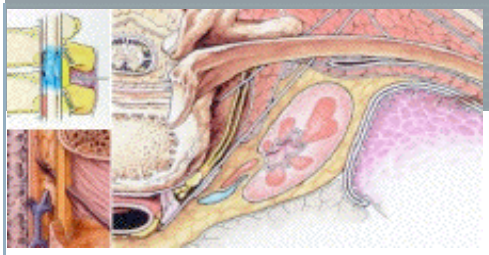
AnesthesiaDotCalm



News You Can Use

Insights Into Clinical Practice

(Editorial)

Suppplemental Oxygen During C-Sections

Although the practice of anesthesia should be evidence-based, it is not uncommon for anesthesia practitioners to insert some magical thinking into their practice. This bit of voodoo of supplementing maternal Fi02 to ward off fetal hypoxia is based on the asumption, that during periods of hypotension or during periods of prolonged uterine incisioin-to-delivery time, the fetus is better protected if maternal arterial oxygen content is increased. As logical as this sounds, there really is no evidence to support the practice of administering supplemental oxygen. Researchers have failed to demonstrate any significant differences in umbilical arterial or venous partial pressure of oxygen, carbon dioxide or pH, when parturients are allowed to breath either air or 40% oxygen by mask or if oxygen is insufflated at 2 liters per minute via nasal canula(1,2). By the way, the practice of administering oxygen by nasal cannula really doesn’t enrich the Fi02 by very much. In fact at 2 liters per minute, oxygen given through a nasal canula only increases the inspired oxygen content by only 8% (3).This is based on the observation that inspired ambient air actually dilutes the the oxygen administered through a nasal canula so that for every liter of oxgen delivered the inspired oxygen content only increases by 4%.

I suppose it could be argued that if it doesn't hurt anything, oxygen may be beneficial during those periods when the anesthesia practitioner is busy supporting the patient's blood pressure or during other periods of hemodynamic compromise. Unfortunately, administering high oxygen concentrations to the parturient may not be as innocuous as once thought. In a study involving forty-four healthy parturients who were randomized to breathe either 21% (air group) or 60% oxygen (oxygen group) intraoperatively via a ventimask, Khaw and colleagues(4) found that breathing high FIO2 modestly increased fetal oxygenation while concomitantly increasing oxygen free radical activity in both mother and fetus (they found increased levels of lipid peroxidation: 8-isoprostane, malondialdehyde (MDA), hydroperoxide (OHP) and purine metabolites). Admittedly, I am not sure of the significance of these findings. In the uncompromised fetus the products of oxygen free radicals probably do not cause any deleterious affects. Although from a theoretical perspective the potential for cellular damage is ever present if one considers that free radicals cause depletion of intrinsic antioxidant systems and could weaken the infant's ability to withstand any subsequent neonatal insult. MDA, a product of lipid peroxidation, is toxic because of its ability to form disulphide bridges across nucleotide or amino acid chains,(6) and also causes immunosuppression by inhibiting lymphocytic activity(4).

(***note: Isoprostanes, formed by non-enzymatic oxygenation of arachidonic acid in membrane phospholipids, are highly specific as markers for in vivo oxidative stress.(5) The best-characterized isoprostane is 8-isoprostaglandin F2 (8-isoprostane), which is abundant in plasma and urine. MDAand OHP concentrations are less specific, and can be influenced by the extent of prostaglandin metabolism as well as by free radical activity).**

References:

1. Cogliano MS, Graham AC, Clark VA. Supplementary oxygen administration for elective Caesarean section under spinal anaesthesia. Anaesthesia. 2002 Jan;57(1):66-69.

2. Khaw KS, Ngan Kee WD, Lee A, Wang CC, Wong AS, Ng F, Rogers MS. Supplementary oxygen for elective Caesarean section under spinal anaesthesia: useful in prolonged uterine incision-to-delivery interval? Br J Anaesth. 2004 Apr;92(4):518-22.

3. ACLS Provider Manual, Updated 2003. Richard O. Cummins, MD,MPH,MSc(ed)p.20.

4. Khaw KS, Wang CC, Ngan Kee WD, Pang CP, Rogers MS. Effects of

high inspired oxygen fraction during elective caesarean section under spinal anaesthesia on maternal and fetal oxygenation and lipid peroxidation. Br J Anaesth. 2002 Jan;88(1):18-23.

5. Morrow JD, Hill KE, Burk RF, Nammour TM, Badr KF, Roberts LJ. A series of prostaglandin F2-like compounds are produced in vivo in humans by anon-cyclooxygenase, free radical-catalyzed mechanism. Proc Natl Acad Sci USA 1990;87: 9383–7

6. Ward RJ, Peters TJ. Free radicals. In: Marshall WJ, Bangert SK, eds. Clinical Biochemistry: Metabolic and Clinical Aspects. New York: Churchill Livingstone, 1995; 765–77.