Recent Anesthetic Effects on Fetus & Newborn

Essay
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2D	two-dimensional
NACS	Neurological and adaptive capacity score
EXIT	Extrautero intrapartum treatment
FHR	Fetal heart rate
FiO2	Fraction of inspired oxygen
SpO2	Arterial oxygen saturation
MVC	Motor vehicle collision
NSAID	Non-steroidal anti-inflammatory drugs
NMDA	N- methyl- D- aspartate
GAS	General anesthetic study
NEPSY	Neuro- psychological assessment
PANDA	Pediatric anesthesia and neuro-development assessment
ASA	American society of Anesthesia
CTG	Cardio tocogram
CSE	Combined spinal epidural
GA	General Anesthesia
RA	Regional Anesthesia
MAP	Mean arterial blood pressure
EBL	Estimated blood loss

INTRODUCTION

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Surgery during pregnancy is complicated by the need to balance the requirements of two patients. Under usual circumstances, surgery is only conducted during pregnancy when it is absolutely necessary for the wellbeing of the mother, fetus, or both.Obstetric anesthesia is remarkably safe. Modern regional anesthetic techniques are much safer than such anachronistic techniques as paracervical block or twilight sleep (parenteral morphine and scopolamine) ***(Hawkins et al., 2008).***

Obstetric anesthesiologists have enjoyed such success in reducing maternal and neonatal mortality and morbidity over the preceding few decades that we may have developed a sense of confidence (that unfortunately may border on arrogance) that obstetric anesthetic interventions cause no adverse effects on the baby. Nonetheless, there are several areas of ongoing concern regarding the effects of anesthetics on the fetus and newborn.

It is estimated that 1 to 2% of all pregnant women will undergo nonobstetric surgery during gestation. ***(Goodman 2002).***

Unlike the other major organs and structures of the fetus, which form in the first few weeks of gestation, the brain continues to develop throughout gestation and after birth. ***(Loepke and Soriame, 2008)***

Enduring change in behavior without obvious structural abnormalities has been termed behavioral teratogenicity. ***(Brockhurst et al., 2000)***.

In ***(1982, Amiel-Tison et al)***. proposed a new scoring system for newborn neurological status, the Neurological and Adaptive Capacity Score (NACS), which they hoped would be a simpler way to test for the effects of medications used in the puerperium than the widely used (at that time) Scanlon Early Neonatal Neurobehavioral Scale and Brazelton Neonatal Behavioral Assessment Scale**. *(Brockhurst et al., 2000)***.

The newborn is an infant in the first 24 hours of life, while the neonatal period is defined as the first 30 days of extra uterine life***(Berry,2007)***..While the infantile period is defined as the period between (1-12months of age) ***(Morgan et al.,2006).***

Once newborn is separated from the placenta he must function independently to adapt to the new environment .This adaptation involves anatomic, physiologic and pharmacologic changes to maintain homeostasis and ensure the infant's survival. ***(Melissa, 2003)***.

Exposure to prolonged or severe painful stimuli may increase neonatal morbidity and adversely affect subsequent response to painful events. The endocrine response that mediates

these adverse outcomes can be suppressed by opioids or inhaled anesthetics. The challenge in administrating anesthesia to the neonate as compared to the older child or adult is the immaturity of the organ systems and the resultant altered pharmacology and physiology ***(Melissa 2003).***

Inhalation anesthetics, induction agents, opioids, and neuromuscular blocking drugs are all considered free of teratogenic effect.Of course, a newborn exposed in utero to most anesthetics immediately before delivery may be transiently depressed and require respiratory support for a brief period. ***(Berry, 2007).***

AIM OF WORK

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This essay evaluates the recent effects of Anesthesia on the fetus and newborn and discusses Anesthetic management of the pregnant women.

RISK ASSESSMENT OF PREGNANT WOMEN FOR NON OBSTETRIC AND OBSTETRIC ANESTHESIA

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Ideal anesthetic consideration for pregnant women undergoing surgery should include maternal safety**,**fetal well-being**,** and continuation of pregnancy**,** so understanding of physiological changes during pregnancy is very important.

A.Physiological changes during pregnancy

Normal Pregnancy involves major Physiological and anatomical adaptation by maternal organs. It is important that anesthetists involved in the care of the pregnant woman to understand these changes, to provide safe maternal anesthetic care which is compatible with safe delivery of the baby. Pregnancy affects virtually every organ system. Many of these Physiological changes appear to be adaptive and useful to the mother in tolerating the stresses of pregnancy, labor and delivery ***(Morgan and Mikhail 2013).***

1) Homeostatic changes

Maternal blood volume expands during pregnancy to allow adequate perfusion of vital organs, including the uteroplacental unit and fetus, and to prepare for the blood loss associated with delivery ***(Whittaker et al., 2006)***.

Total body water increases from 6. 5 L to 8. 5 L by the end of gestation. Changes in osmoregulation and the renin-angiotensin system result in active sodium reabsorption in renal tubules and water retention. The water content of the fetus, placenta, and amniotic fluid accounts for approximately 3. 5 L of total body water, The remainder of total body water is comprised of the expansion of maternal blood volume by 1500mL to 1600mL, plasma volume of 1200mL to 1300mL, and a 20 %to 30 % increase in erythrocyte volume from 300mL to 400mL **.**

The pregnant patient can hemorrhage up to 2000mL of blood before she manifests changes in heart rate or blood pressure. The rapid expansion of blood volume begins at 6 to 8 weeks' gestation and plateaus at approximately 32 to 34 weeks' gestation. The expanded extracellular fluid volume accounts for 6 to 8 kg of weight gain ***(Yanamandra and Chandraharan,2012)***

2) Cardiovascular changes

Cardiovascular physiologic adaptations allow optimal oxygen delivery to maternal and fetal tissues.

The heart is displaced cephalad and is rotated leftward as a result of the enlarging uterus and elevation of the diaphragm. The heart itself undergoes significant remodeling during pregnancy. All four chambers enlarge, particularly the left atrium ***(Fujitani and Baldisseri., 2005).***