COMPARISON BETWEEN THE EFFECTS OF THIOPENTAL SODIUM AND PROPOFOL ON MATERNAL HEMODYNAMICS DURING CESAREAN SECTION UNDER GENERAL ANESTHESIA AND APGAR SCORE OF THE NEWBORNS

Thesis

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ABG..... Arterial blood gases.

AHA ..... American Heart Association.

ALT ..... Alanine Aminotransferase.

ASA ..... American Society of Anesthesiology.

AST ..... Aspartate Aminotransferase.

BMI ..... Body mass index.

CMRO2... Cerebral metabolic oxygen consumption rate.

CMV..... Controlled mechanical ventilation.

CPAP..... Continous positive airway pressure.

ECG..... Electrocardiogram.

EEG..... Electroencephalogram.

FEV1 ..... Forced expiratory volume in first second.

GFR..... Glomerular filtration rate.

GI ..... Gastrointestinal.

hpL ..... Human placental lactogen.

ILCOR .... International liaison Committee On Resuscitation.

IVC..... Inferior vena cava.

LDL..... Low density lipoproteins.

LES..... Lower esophageal sphincter.

MAP..... Mean arterial pressure.

NRP..... Neonatal resuscitation program.

PCO2..... Partial pressure of carbon dioxide.

PCWP ..... Pulmonary capillary wedge pressure.

PEFR..... Peak expiratory flow rate.

PGI2..... Prostaglandin I2.

PO2..... Partial pressure of Oxygen.

PVR..... Pulmonary vascular resistance.

SD..... Standard deviation.

SVR..... Systemic vascular resistance.

TBG..... Thyroid binding globulin.

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INTRODUCTION

Regional anesthesia is generally preferred during cesarean section, but general anesthesia may be the only option under certain circumstances such as patient preference, back deformities not amenable to spinal anesthesia, failed spinal anesthesia, intracranial hypertension, maternal coagulopathy, and certain neurologic diseases. A safe induction agent for obstetrics should, among other agents, provide a smooth, quick induction, maintain maternal hemodynamic function and exert minimal to no effect on the Apgar score **(Mamidi and Shiva Prasad, 2016)**.

Sodium thiopental has been routinely used as an anesthetic induction agent for cesarean section since the1930s and is the standard against which all new agents are compared. However, it has several disadvantages, including decreased maternal arterial pressure, which, when coupled with a long induction time, can reduce the Apgar score of the newborn **(Tumukunde et al., 2015).**

Propofol is widely used for induction and maintenance of anesthesia in other surgeries but not in obstetric procedures. It has a short induction time and blunts airway reflexes during laryngoscopy; compared with thiopental, patients emerge faster from propofol anesthesia. However,

propofol also crosses the placenta and thus, can depress the fetal central nervous system, resulting in a low Apgar score at birth **(Tajchman and Bruno, 2010).**

Apgar score (Appearance, Pulse, Grimace, Activity, and Respiration) is the first test done to newborn after delivery by cesarian section or normal vaginal delivery to evaluate newborn physical condition after delivery. Determination of the Apgar scores of newborns 1, 5, and 10 minutes after birth is one of the methods employed in evaluating their status. Newborns' Apgar scores immediately after birth are one of the determining factors in their mortality rate after birth, and the type of drug used for anesthetizing pregnant women is one of the factors influencing the newborn's Apgar score. The Apgar score 1 minute after birth determines whether there is an urgent need for resuscitation. The Apgar score 5 minutes after birth, and especially the change in Apgar score between the first and fifth minute after birth, is an important index for the efficacy of resuscitation **(Khanjani et al., 2014)**

AIM OF THE WORK

The aim of this study is to compare the effect of sodium thiopental induction versus propofol induction on hemodynamics of mothers undergoing elective cesarean section under general anesthesia and their effect on Apgar score of their newborns via assessment of acid base state and lactate level.

PHYSIOLOGICAL CHANGES DURING PREGNANCY

Respiratory:

There is a significant increase in oxygen demand during normal pregnancy. This is due to a 15% increase in the metabolic rate and a 20% increased consumption of oxygen. There is a 40–50% increase in minute ventilation, mostly due to an increase in tidal volume, rather than in the respiratory rate. This maternal hyperventilation causes arterial partial pressure of oxygen (pO2) to increase and arterial partial pressure of carbon dioxide (pCO2) to fall, with a compensatory fall in serum bicarbonate to 18–22 mmol/l. A mild fully compensated respiratory alkalosis is therefore normal in pregnancy (pH 7.44) **(Jacqueline et al., 2014).**

Diaphragmatic elevation in late pregnancy results in decreased functional residual capacity but diaphragmatic excursion and therefore vital capacity remain unaltered. Inspiratory reserve volume is reduced early in pregnancy, as a result of increased tidal volume, but increases in the third trimester, as a result of reduced functional residual capacity. Peak expiratory flow rate (PEFR) and forced expiratory

volume in one second (FEV1) are unaffected by pregnancy **(LoMauro and Aliverti, 2015).**

Pregnancy may also be accompanied by a subjective feeling of breathlessness without hypoxia. This is physiological and is most common in the third trimester but may start at any time during gestation. Classically, the breathlessness is present at rest or while talking and may paradoxically improve during mild activity **(Priya et al., 2016)**.

Cardiac changes:

Changes in the cardiovascular system in pregnancy are profound and begin early in pregnancy, such that by eight weeks' gestation, the cardiac output has already increased by 20%. The primary event is probably peripheral vasodilatation. This is mediated by endothelium-dependent factors, including nitric oxide synthesis, up regulated by oestradiol and possibly vasodilatory prostaglandins (PGI2). Peripheral vasodilatation leads to a 25–30% fall in systemic vascular resistance, and to compensate for this, cardiac output increases by around 40% during pregnancy. This is achieved predominantly via an increase in stroke volume, but also to a lesser extent, an increase in heart rate. The maximum cardiac output is found at about 20–28 weeks'