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Research Article

**ANALYSIS OF LEVELS OF ANTIOXIDANTS IN THE BLOOD
WITH THE USE OF ROPIVACAINE FOR GENERAL
ANESTHESIA****Dr Samra Gull¹, Dr Waqas Anjum¹, Dr Abdul Hannan Javaid¹**
¹Nishtar Hospital, Multan.**Abstract:**

Introduction: There are a variety of studies investigated the differences between general anesthesia (GA) and spinal anesthesia (SA) concerning different aspects such as patient satisfaction, cost-effectiveness, postoperative hospital stay, postoperative pain scores and analgesic requirements, acid-base status, as well as their effects on serum concentration of pro-inflammatory and anti-inflammatory cytokines.

Objectives of the study: The main objective of this study is to find the level of antioxidants in blood with the use of Ropivacaine for General Anesthesia.

Materials and methods: This cross sectional study was conducted at Nishtar Hospital, Multan during October 2018 December 2018. 50 patients were selected to study the effect of ropivacaine. 5.0 ml blood sample was taken to measure the levels of lipid peroxidation (MDA), glutathione (GSH), SOD and Catalases before anaesthesia (0 min), and at 5, 30 and 60 minute after anaesthesia. Commercially available enzymatic kits of Randox were used.

Results: Mean values of investigated parameters and differences in the values between, before and after anaesthesia are represented in the table 01. The values are expressed in terms of mean±SD. According to the analysis, the level of SOD, MDA and GSH increase as compared to normal level. But the level of catalases decreased with the value of 0.43±0.39 (after 5 minutes of anaesthesia).

Conclusion: In conclusion, we found that while spinally injection of ropivacaine increased free radical levels in the blood.

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INTRODUCTION:

There are a variety of studies investigated the differences between general anesthesia (GA) and spinal anesthesia (SA) concerning different aspects such as patient satisfaction, cost-effectiveness, postoperative hospital stay, postoperative pain scores and analgesic requirements, acid-base status, as well as their effects on serum concentration of pro-inflammatory and anti-inflammatory cytokines [1]. General anesthetics agents' effect on the ion channels and neurotransmitter receptor subtypes [2]. They even affect actin-based motility in dendritic spines. Anesthesiologists frequently discuss the actions of many drugs counting opioids, muscle relaxants and anticoagulants. However, emergence of general anesthesia is still treated as a passive process, dictated by the pharmacokinetics of anesthetic drug clearance [3].

Even though there has been active research onto the mechanisms of general anesthesia for over a century but still there is no commonly accepted or fully suitable definition of general anesthesia itself³. The critical effectors sites that cause general anesthesia may be moderately different from those primary target sites where anesthetic molecules actually bind. For example, it is generally thought that changes in the properties of neuronal ion channels cause general anaesthesia, but this could result when anaesthetic molecules interact with any of the following primary sites: a) the channel proteins, b) channel regulatory proteins (e.g., by phosphorylating them), or c) the surrounding lipid bilayer [4]. Anaesthetic agents are mostly hydrophobic in nature and usually behave like polar ions. Intravenous anaesthetic agents used for induction and for short surgical procedure and they can produce apnoea and hypotension. They are contraindicated if the anaesthetist is not confident of being able to maintain an airway. Any muscle relaxant must be given before intubation and the requirement for Individual varies considerably [5].

Oxidative stress is a redox perturbation which results from the imbalance between oxidants and antioxidants in favor of the former [6]. Human body is always exposed to oxidizing effects of free radicals and oxidants, which originate both endogenously and

exogenously. On the other hand, since a reduced intracellular environment is essential for cell survival, human body is equipped with a number of antioxidants, which maintain and keep the redox homeostasis [7]. Based on the fact that oxidative stress can oxidize and damage cellular proteins, lipids and nucleic acids, there are a lot of evidences which approve the role of oxidative stress in pathogenesis of a number of diseases including cancers, autoimmune diseases, neurodegenerative disorders and cardiovascular diseases such as myocardial infarction and atherosclerosis [8].

Objectives of the study

The main objective of this study is to find the level of antioxidants in blood with the use of Ropivacaine for General Anesthesia.

MATERIALS AND METHODS:

This cross-sectional study was conducted at Nishtar Hospital, Multan during October 2018 December 2018. 50 patients were selected to study the effect of ropivacaine. 5.0 ml blood sample was taken to measure the levels of lipid peroxidation (MDA), glutathione (GSH), SOD and Catalases before anaesthesia (0 min), and at 5, 30 and 60 minute after anaesthesia. Commercially available enzymatic kits of Randox were used.

STATISTICAL ANALYSIS:

Statistical analysis (Anova Test and Post Hoc) was performed using the SPSS software program (17.0). All results were expressed as the mean \pm standard deviation (SD). As P value <0.05 was considered to be statistically significant.

RESULTS:

Mean values of investigated parameters and differences in the values between, before and after anaesthesia are represented in the table 01. The values are expressed in terms of mean \pm SD. According to the analysis, the level of SOD, MDA and GSH increase as compared to normal level. But the level of catalases decreased with the value of 0.43 ± 0.39 (after 5 minutes of anaesthesia). All the data are explained in table 01.

Table 01: Analysis of parameters

No.of Observation	Analysis of blood	Normal $\mu\text{g/mL}$	Before treatment $\mu\text{g/mL}$	After treatment(5min) $\mu\text{g/mL}$	After treatment(15min) $\mu\text{g/mL}$	After treatment(60min) $\mu\text{g/mL}$
01	SOD	0.32 \pm 0.00	0.33 \pm 0.23	0.39 \pm 0.00	0.45 \pm 0.19	0.51 \pm 0.21
02	CAT	4.16 \pm 0.00	0.90 \pm 0.00	0.43 \pm 0.39	0.30 \pm 0.24	0.19 \pm 0.18
03	GSH	1.89 \pm 0.00	2.48 \pm 1.29	3.23 \pm 0.03	4.92 \pm 0.57	5.64 \pm 0.55
04	MDA	2.35 \pm 0.00	4.26 \pm 0.00	4.95 \pm 0.97	5.13 \pm 1.06	6.58 \pm 0.00

Effects of spinal injection of Ropivacaine on the levels of MDA in spinal fluid indicated in Fig. 1. The levels of MDA slightly increased at 5 min after spinal injection of ropivacaine and this increase continued throughout anesthesia ($P < 0.001$).

DISCUSSION:

The results of this study show that spinally injected ropivacaine has an effect on change the lipid peroxidation and antioxidant enzymes in the blood. Lipid peroxidation is one of the prominent revealed of oxidative stress [9]. Reactive oxygen species are induced oxidation and peroxidation of membrane phospholipids, thereby causing damage to the phospholipid molecule as well as to other molecules in the cells [8]. Polyunsaturated fatty acids are found in abundance in mammalian membrane lipids and are the most likely targets of Reactive Oxygen Species (ROS). Activities of enzymatic antioxidants like catalase, superoxide dismutase and glutathione peroxidase significantly decrease in prostate cancer patients compared to normal subjects [10]. Oxidative stress plays an important role for the initiation of DNA damage. In the present study, we observed an increase in MDA levels and increase in SOD and GSH levels and decrease in catalases level [11]. Increased levels of lipid hydroxyl peroxides and hydroxyl phospholipids have been associated with oxidative stress and membrane injury that occur in pathological conditions such as spinal cord injury¹². Increased levels of anti-oxidants and decreased activities of catalases can be correlated to enhanced lipid peroxidation and subsequent neoplastic transformation [12]. Antioxidant enzymes which catalyze the conversion of reactive oxygen species to water include catalase (CAT), manganese containing

superoxide dismutase (Mn-SOD) and copper and zinc containing superoxide dismutase, a mitochondrial enzyme that plays a key role in protecting the cell from oxidative damage [11].

CONCLUSION:

In conclusion, we found that while spinally injection of ropivacaine increased free radical levels in the blood. According to our study levels of free radicals will increase in the blood and it may be supported antioxidant environment of spinal fluid during anesthesia.

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