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EFFECTS OF GENERAL AND SPINAL ANESTHESIA ON NEUTROPHIL TO LYMPHOCYTE RATIO IN PATIENTS

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Abstract:
Objective: *To assess the association between the neutrophil to lymphocyte ratio of the blood and methods of anaesthesia in the females who had to face the caesarean section.*
Methodology: *In this research work, 80 patients were undergoing caesarean section with the utilization of spinal or general anaesthesia were all together were checked for neutrophil to lymphocyte ratio.*
Results: *Traits of demography of groups, rates of the bleeding, haemoglobin amounts before the operation, the count of the platelets, and neutrophil to lymphocyte ratio were same in the both groups of general & spinal anaesthesia. But significant disparities were assessed with regard to amounts of neutrophil to lymphocyte ratio in the duration after the operation.*
Conclusion: *After operation neutrophil to lymphocyte ratio in the patients who have to face caesarean section under spinal anaesthesia was presented significantly smaller as compared to the patients of general anaesthesia.*
Keywords: *Neutrophil to Lymphocyte Ratio, Haemoglobin, Caesarean Section, Spinal.*

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INTRODUCTION:

Neutrophil to lymphocyte ratio is in use as a factor in the blood giving data about the association between inflammatory surroundings and stress on physiology [1]. Recently, neutrophil to lymphocyte ratio is used as a factor describing the great neutrophil count shimmering AIR (acute inflammatory response) & less lymphocyte amount describing the PSS (physiological stress response) [2]. The counts of the neutrophil & lymphocyte are influenced by different hormones, trauma and cytokines. The anaesthesia procedure also affects the according to the conclusions [3]. The response of the stress to the amalgamation of anaesthesia & stress of surgery is the reason of the changes in the metabolic and endocrine [4].

At the time of anaesthesia & operation, there are alterations at every stage of the immunity system. Some other factors as the age of the patient, medication history and some past disease history are also involved [5]. It is concluded that the high amount of vulnerability to infection is because of the development of the lymphopenia after the operation [6]. Therefore, as a conclusion after the neutrophil to lymphocyte ratio calculations are useful procedures to assess any abnormality, infection & inflammatory response [7]. General anaesthesia & regional methods for anaesthesia for the caesarean section are in use. Regional anaesthesia is widely selected due to some benefits as on the request of the patient, knowledge of the patient, no aspiration risk, & no depression of respiratory in neonates [8]. In this research work, the main aim was to check the impacts of both types of anaesthesia for caesarean section on neutrophil to lymphocyte ratio.

METHODOLOGY:

This study was carried out at PIMS hospital Islamabad and the duration of this study was from January 2019 to February 2020. The patients with some difficulties and complications were not the part of this research work. The patients taken to surgical rooms were checked for ECG, SPO2 (peripheral oxygen saturation) & BP. In the patients of group G, propofol & rocuronium managed for induction 2 and 0.6 mg/kg respectively. They got oxygen through mask. After two minutes, intubation was carried out with the help of the endotracheal tube. For maintaining the anaesthesia, ventilation with 2% sevoflurane in 50% air and 50% oxygen at 6 L/ min was provided. Some other important medication carried out with particular patients with the help of some special medicines. The recovery of patient started after extubation.

For the method of spinal anaesthesia, patients have to lie on their side and 26 G spinal needle was utilized in between the intervertebral gap. When flow of the free cerebrospinal liquid was identified, 0.5% hyperbaric bupivacaine injection slowly was completed in this anaesthesia. After the injection in the spine, patients were laid in supine; with rise in head position & left until block of the sensory reached at the level of T5. Pinprick method was in use for the verification of the sensory blocks with the help of twenty-two-gauge needle. When the block of sensation touched the level of T5, the surgery began. The height of the block at its maximum value was also recorded. BP was calculated before spinal anaesthesia, after every two minutes in thirty minutes of spinal anaesthesia and every five minutes after this procedure. If the systolic BP decreased 20% from the value in the start, hypotension was considered and ten mg ephedrine IV was managed to tackle this matter of BP. The block level was evaluated in the recovery room after the surgery.

SPSS software version 15.1 was in use for the statistical analysis of the information. Chi square method was in use to evaluate the difference between the patients of both groups. The analysis of the parameters of neutrophil to lymphocyte ratio carried out with the help of the Mann Whitney U-test.

RESULTS:

According to traits of the demographical data, there was no important disparity between the members of both groups as described in Table-1. The amount of the loss of blood & the time required for the operation was also analogous in the patients of the both groups as mentioned in Table-1.

Table 1: Demographic Characteristics of the Group

Parameter	Group G	Group S	P Value
	Mean ± SD	Mean ± SD	
Patients' Age in Years	30.4 ± 5.30	29.70± 4.80	
Patients' Height (cm)	161.90± 5.70	157.80± 8.30	
Patients' Weight (Kg)	80.90± 17.30	80.10± 15.80	> 0.0500

Bleeding (ml)	620.00± 20.00	590.00± 30.00	
Surgery Duration (min)	66.50± 22.70	64.20± 12.50	

In all groups, there was not any important statistical disparity between the amounts of the platelets & haemoglobin before the surgery and after the surgery. The neutrophil to lymphocyte ratio in the groups of general anaesthesia & spinal anaesthesia were same prior from the surgery as described in Table-2. On the other hand, in the after-surgery duration while neutrophil to lymphocyte ratio was 15.63±11.1 in the group G, it was found 10.58±4.3 In the group S as briefly described in Table-3.

Table 2: The Preoperative and Postoperative Hemoglobin and Platelet Values of Both Groups

Parameters	Group G		P	Group S		P
	Pre-Operation	Post Operation		Pre-Operation	Post Operation	
Hemoglobin (g/dL)	11.60 ± 1.30	10.30 ± 1.30	0.470	11.40 ± 1.30	10.10 ± 1.40	0.750
Platelets (/mm^3)	211.00 ± 65.00	198.00 ± 62.00	0.880	210.00 ± 61.00	183.00 ± 51.00	0.330

Table 3: The Preoperative and Postoperative Neutrophil to Lymphocyte Ratio Values of Both Groups

Parameters	Group G		Group S	
	Mean	SD	Mean	SD
NLR (preoperative)	4.440	± 2.30	4.410	± 2.50
NLR (postoperative)	15.630	± 11.10*	10.580	± 4.30*
P	0.02*			

DISCUSSION:

In this study, it was checked that the comparison of general anaesthesia with the spinal anaesthesia for caesarean section, the patients of the group S had low values of neutrophil to lymphocyte ratio. The research works on the depression caused by trauma of the surgery have concluded a repression of cellular hindrance & vulnerability to inflammation. The increase in the values of leukocyte after operation and decrease in the values of lymphocyte heighten the propensity of infection [9]. The case studies have described that the count of the total leukocyte and alterations in the subtypes of leukocyte are vital identifiers for morbidity & mortality in the patients of cancer, patients with renal failure and patients of cardiovascular diseases [10]. The activation of the neuroendocrine system carried out after or at the time of operation. The hormones of neuroendocrine system & cytokines are released associated to depression of the surgery.

The impacts of selected anaesthesia surgery have been described by the may case works of the past [2]. Regional anaesthesia restrains the activity of the neuroendocrine associated to the method of surgery with compassionate blockage. In an outcome of this, while the levels of cortisol do not alter, the production of the cytokine decreases [11]. This effect can be interpreted at high level but it is very hard to be observed on low or at desired levels. The calculation of the neutrophil to lymphocyte ratio in peripheral blood is neither a costly nor a complicated procedure [4]. To find out the impacts of the anaesthetics on the system of immunity multi modal anaesthetic methods are available. The case works with the management of TIVA concluded very minor impact on the response of the adrenergic & immunity in the period of after surgery as compared to the method of general anaesthetics.

We found no research work on the effects on the neutrophil to lymphocyte ratio of general

anaesthesia & spinal anaesthesia. Some research works while comparing spinal anaesthesia with the general anaesthesia Found with neutrophil to lymphocyte ratio showed the decrease in the response of the neuroendocrine to operation as a benefit. A research work concluded that TIVA (total intravenous anaesthesia) decreased the hormones of depression, cytokines & mediators of immunity as compared to the general anaesthesia [5]. The importance of these methods is very important for the mother and the new-born baby. Leucocytosis is a supposed condition during the period of delivery, the amount of the leukocyte may be about 16,000 per mcgL. In the pregnancies which are normal, leucocytosis is established as an identifier of rising inflammatory response.

CONCLUSİON:

The outcome shows that spinal anaesthesia is mostly chosen for the caesarean operations, which is linked with the low increase in the neutrophil to lymphocyte ratio after two hours of the surgery period than the patients of the general anaesthesia. This subject is in requirement of many studies on large quantity of patients and for a longer period of assessments.

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