REGIONAL ANESTHESIA CONTINUOUS BRACHIAL PLEXUS BLOCK WITH ULTRASONOGRAPHY GUIDANCE

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Background: Regional anesthesia has an anti-inflammatory effect that blockade the C-fiber hence reduced cytokine production and blocked the activity of the sympathetic nerve fibers. Postoperative pain caused primarily by tissue inflammation and activity of the C-fibers in the manner of reduced the production of cytokines, regional anesthesia may limit the inflammatory response after surgery and severity of postoperative pain. **Methods:** This study is a clinical experimental study with randomized pre and post test control group design. A total of 24 samples were recruited in this study divided into two groups each consisting of 12 samples. The first group was given regional anesthesia method of continuous brachial plexus block with ultrasound guidance and the second group with general anesthesia method. T-test or Mann-Whitney continued multivariate linear regression analysis was performed to analyze the differences in treatment and not because of differences in the initial values with significance level of $p < 0.05$. **Results:** This study reports that the mean decreased levels of IL-6 postoperatively in 1st group is 29.8 lower than in 2nd group and it is statistically significant $p < 0.05$. There was an increase of IL-10 mean levels from preoperative to postoperatively with significance level of $p < 0.05$ in both groups. Declined in the mean levels of PAF postoperatively in 1st group 1.3 lower than 2nd group and it was statistically significant $p < 0.05$. The declined of postoperative VAS in 1st group is 3.1 lower than 2nd group and it is statistically significant $p < 0.05$, and it also contained the pure effect of PAF levels against value of VAS that any increased 1ng/ml levels of PAF then an increase in the value of 0.18 cm VAS and this was statistically significant $p < 0.05$. Selection of this anesthesia technique in orthopedic antebrachii surgery provides better inflammatory response and improved clinical outcomes.

Keywords: regional; anesthesia ; brachial; plexus; block; general

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INTRODUCTION

Regional anesthesia has an anti-inflammatory effect that blockade the C-fibershence reduce cytokine production and block the activity of the sympathetic nerve fibers. At the time of surgery will cause tissue injury that can cause systemic andnociception reactions were accompanied by increased production of proinflammatory cytokines such as interleukin (IL)[1], especially in orthopedic surgery in related such as bone tissue, muscle, tendon , nerves and blood vessels.General anesthesia has been suspected as a cause of the disruption of the function of the immune system, either directly, namely by interfering with the function of immunocompetent cells or indirectly ie by

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modulating the stress response so that errors regulation of the inflammatory process will cause post-operative complications such as increasing susceptibility to infection, stress reactions inadequate and hipercatabolic.[2]Regional anesthesia showed promising evidence for the benefit of patients compared with general anesthesia, especially in post-operative analgesia is still very superior to those based analgesia with morphine. Peripheral nerve blocks with local anesthetics have adverse effects on cardiovascular disorders and lung most minimal compared with general anesthesia. With the ultrasound to guide peripheral nerve block, the total volume of local anesthetic can be dramatically reduced so as to limit the risk of toxic side effects due to the drug.[3-6] The aim of this study is to determine the effectiveness of these two techniques, so that a more effective technique can be used for anesthesia superior extremity orthopedic surgery or can be used as an alternative option, and the authors believe that the particular regional anesthesia regional anesthesia is to

minimize the inflammatory process that occurs as a result of actions surgery.

PATIENTS AND METHODS

This study is a clinical experimental study with randomized control group pre and post test design. A total of 24 samples were used in this study were divided into two groups each consisting of 12 samples. With the written consent from the patients for the author. Group I was given treatment measures of regional anesthesia method of continuous brachial plexus block with ultrasound guidance and control group II or general anesthesia method. T-test or Mann-Whitney continued multivariate linear regression analysis to analyze the differences in treatment and not because of differences in the initial values with significance level of $p<0.05$.

RESULTS

From April 2014 to September 2014, 24 patients fulfilling inclusion criteria were enrolled. They were divided into two groups, regional anesthesia methods group (12 patients) and general anesthesia methods group (12 patients). Characteristic data of patients were presented in Table 1.

Table 1
Subjects Characteristics Based on Age, Sex and ASA Score.

| Variables | Group | | p^* |
	1	2	
Age (y.o)	30.4 ±10.1	34.3±12.1	0.398
Sex			
Male	7(58.3%)	8(66.7%)	
			0.673
Female	5(41.7%)	4(33.3 %)	
ASA			
1	7(58.3%)	6(50%)	
			0.682
2	5(41.7%)	6(50%)	

Remarks:
Group 1 = regional anesthesia methods
Group 2 = general anesthesia methods
ASA = American Society of Anesthesiology
y.o = years old
*Normally distributed p>0.05

Clinical characteristics of the study subjects shown in Table1, there were no differences between the two groups in terms of age, gender, ASA status p> 0.05. For 1st group had a mean age of 30.4 years old, 2nd group had a mean age of 34.3 years old; male sex 7(62.5%) and female 5(41.7%) for 1st group, 2nd group male 8(66.7%) and female 4(33.3%); 1st group ASA 17(58.3%), ASA 2 5(41.7%) and 2nd group ASA 1 6(50%), ASA 2 6(50%). Both groups were homogenous.

Table 2
Shapiro-wilk test results for normality study data

| Outcome | p^* | |
	1	2
IL-6 preop	0.352	0.036
IL-6 postop	0.101	0.005
IL-10 preop	0.274	0.184
IL-10 postop	0.000	0.000
PAF preop	0.000	0.186
PAF postop	0.002	0.024
VAS preop	0.082	0.181
VAS postop	0.011	0.045

Remarks:
IL= interleukin
PAF= platelet activating factor
Preop= preoperative
Postop=postoperative

Normality of data distribution was tested with the Shapiro-Wilk test at significance level α=0.05. From the test results showed that the majority of studies that examined outcomes data is not normally distributed with a probability value of p<0.05, except for the data of IL-10 preoperatively

Table 3
Lavene's test result for homogeneity of variance

Outcome	p^*
IL-10 preop	0.470

Homogeneity of variance of the data of research outcomes between groups 1 and 2 were analyzed by Levene's test with significance level α=0.05. Results of the analysis showed that almost all of the data outcomes studied variant homogeneous between both groups with p> 0.05, except for the data of IL-10 preoperative.

Table 4
Results of linear regression analysis of IL- 6, IL-10, PAF, VAS postoperative compared with preoperative within 1st and 2nd group

Variables	Coef.	95% CI	p^*
IL-6	-29.81±7.48	-44.76-(-14.87)	<0.001
IL-10	-3.10±4.33	-11.74-5.54	0.476
PAF	-1.35±0.47	-2.29- (-0.41)	0.005
VAS	-3.08±0,69	-4.46–(-1.71)	<0.001
PAF-VAS	0.18±0.79	0.02 – 0.33	0.028

There are different grades of IL-6 in the 1st group 29.8 lower than 2nd group, PAF in the 1st group 1.3 lower than 2nd group and VAS in the 1st group 3.1 lower than 2nd group all of these are statistically significant with p<0.05 nevertheless IL-10 in the 1st group 3,1 lower than 2nd group but not statistically significant p>0.05.In addition there is pure effect of PAF level against the VAS that each increase 1ng/ml PAF levels then an increase in the value of

0.18 cm VAS and this was statistically significant with p<0.05

Table 5
Mean differences of IL-10 pre and postoperatively between the 1st and 2nd groups

Observation	Mean diff (pg/ml)		$p*$
	1	2	
Preop	9.27±3.04	8.80± 2.82	0.286
Postop	12.25±8.27	14.88± 13.62	0.013

There was increase mean level of IL-10 in the both group with statistically significant in the manner of p<0.05.

DISCUSSION

In this study, characteristics of the subjects included age, gender, ASA from both groups were no significant difference (p> 0.05) so that the two groups can be compared (Table 4.1). In this study, patient age in the group RAM was 30,4 ± 10,06 year and the GAM group was 34,33 ± 12,08 year with the age range 17-65 years in both groups, statistical analysis was not significantly different (p>0.05). Patient sex in RAM group concecutively men and women 7 (58.3%) and 5 (41.7%), while the GAM group was 8(66.7%) and 4 (33.3%). Gender differences do not affect the immune response, in this study showed that the statistical analysis is not significantly different between the sexes in both groups (p>0.05). ASA physical status RAM group concecutively 1 and 2 were 7 (58.3%) and 5 (41.7%), while the GAM group is 6 (50%) and 6 (50.00%). ASA status differences do not affect the immune response, in this study showed that the statistical analysis was not significantly different between the two groups ASA status (p>0.05). Based on the results of the multivariate linear regression analysis we found there are different grade of IL-6, PAF, VAS pre and postoperatively (p<0.05); with the pure effect of PAF level against VAS (p<0.05). The mean value of serum IL-10 measured 1 h postoperatively increased significantly in both RAM and GAM group when compared with preoperative IL-10 with p<0.05. It shows there is a possibility of regional anesthesia anti-inflammatory effects due to blockade of C fibers,[7] thereby reducing the production of cytokines[8] and block the activity of the sympathetic nerve fibers.[9-10]Therefore, postoperative pain caused primarily by tissue inflammation and activation of C-fibers by reducing the production of cytokines that may limit the inflammatory response after surgery and postoperative pain severity.[17,18,19] In research Yasukawa found that IL-6 induces the formation of an anti-inflammatory cytokine IL-10[11] thus with suppressed IL-6 in the RAM group cause lowered levels of increased in IL-10 compared with GAM group. So indeed an increase in levels of IL-10 1 hour postoperative RAM group but lower than the GAM group. Where it is demonstrated on a regional anesthetic technique is thought to inhibit activation of PAF that affect blood coagulation this is responsible for the effect antitrombus.[12] Margetic's study also mentions that there is a close relationship between inflammation and hemostasis is a condition where the inflammation will increase pro-coagulant activity through increased activity of pro-inflammatory mediators and inhibit the anticoagulant and fibrinolytic activity.[13] According to Biffi's study IL-6 stimulates the formation of PAF.[14] The PAF has an important role in the formation of a thrombus.[15]Therefore, postoperative pain caused primarily by tissue inflammation and activation of C-fibers by reducing the production of cytokines that may limit the inflammatory response after surgery and postoperative pain severity.[16-20] So it is true that a significant decrease of VAS.

CONCLUSSION

Regional anesthesia continuous supra clavicular brachial plexus block with ultrasound guidance be able to lowering levels of IL-6 and PAF as well as increasing the levels of IL-10 and improve clinical outcomes compared with general anesthesia in orthopedic surgery antebrachii and this technique can be performed by the anesthesiologist with more conviction in the same case.

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