



EFFECTS INTRAVENA AMINOPHYLLINE TO ACCELERATE THE TIME OF RECOVERY ANESTHESI GENERAL IN LAPARATOMIC SURGICAL PATIENTS USING BISPECTRAL INDEX IN HAJI ADAM MALIK MEDAN HOSPITAL

Awang Supriady

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ABSTRACT

Surgery is an invasive medical treatment performed to diagnose or treat a disease, injury, or deformity of the body. To determine the effect of intravenous aminophylline to speed up recovery time after postoperative general anesthesia in laparotomy surgery patients by using bispectral index at Haji Adam Malik Hospital, Medan. The research method used was a randomized and double-blind randomized controlled trial. This research was carried out at Haji Adam Malik General Hospital Medan from June to September 2018. The study population was all subjects who were electively scheduled to undergo abdominal laparotomy with general anesthesia technique with isoflurane inhalation at Haji Adam Malik General Hospital. The total sample obtained was 46 patients. The normal test of numerical data was used by fisher exact test. The research hypothesis was tested using the Mann-Whitney test. In the study conducted on 46 samples which were divided into 2 groups, it was found that there were significant differences between the two groups in the value of conscious recovery time in patients with general anesthesia. Based on this study, the results of ketorolac when recovered consciously with aminophylline average 10.48 minutes were calculated starting from T0 (when administering aminophylline) and in NaCl 0.9%, the average time of 15.48 minutes was calculated from T0 (when administering aminophylline), which of the two drugs that are given aminophylline can accelerate conscious recovery time in patients with general anesthesia. In the results of this study it was found that the use of aminophylline gave a faster recovery time compared to 0.9% NaCl ($p < 0.05$) by shortening the time to almost half, compared to the average recovery time. Administration of 0.9% NaCl in patients with general anesthesia did not affect recovery time after general anesthesia was assessed using the bispectral index. Administration of aminophylline in patients with general anesthesia can speed up recovery time after general anesthesia is assessed using the bispectral index. Administration of aminophylline in patients with general anesthesia can accelerate recovery time after general anesthesia compared with 0.9% NaCl which was assessed using the bispectral index.

KEYWORDS : Intravenous Aminophylline, Bispectral Index.

INTRODUCTION

Surgery is an invasive medical treatment performed to diagnose or treat a disease, injury, or deformity of the body. Based on data obtained from the World Health Organization (WHO), the number of patients with surgery reached a very significant increase from year to year.⁴

Laparotomy is one of the major surgical procedures, by performing an incision in the layers of the abdominal wall to get part of the organs in the abdomen that experience problems (hemorrhagic, perforation, cancer, and obstruction). Laparotomy is also performed on digestive and uterine cases such as appendicitis, perforation, inguinal hernia, gastric cancer, colon cancer, rectal cancer, intestinal obstruction, chronic intestinal inflammation, cholecystitis and peritonitis.⁴

Laparoscopic or laparotomy surgery is generally the type of anesthesia used is a type of general anesthesia. General anesthesia is a reversible state that changes the physiological status of the body, characterized by loss of consciousness (sedation), loss of perception of pain (analgesia), loss of memory (amnesia) and relaxation.²

General anesthesia can be done through drugs given intravenously and inhaled. Intravenous medicines include barbiturates (pentotal), ketamine, propofol, and etomidate. While inhalation drugs are used for maintenance of general anesthesia, including ether (now not used), metoxiflurane, halothane, enflurane, desflurane, sevoflurane and isoflurane. Recognize that patients receiving volatile anesthetics depend on eliminating drugs from the lungs and MACawake (end-tidal levels associated with opening eyes with verbal commands). Pulmonary elimination was determined by alveolar ventilation, blood-gas partitioning coefficient, and dose (MAC-hour).¹

Various ways are done to speed up the time of conscious recovery in patients both non-pharmacologically and with pharmacological interventions. One pharmacological intervention that can be done is by giving Aminophylline. Several clinical studies have shown that Aminophylline can accelerate the duration of conscious recovery of patients after total intravenous anesthesia with propofol and remifentanyl, sevoflurane, and desflurane.⁵

Aminophylline is often used in anesthetic practice to treat bronchospasm in premature neonates. Aminophylline has the effect of reducing the incidence of apnea after surgery. In addition to the field of anesthesia, the administration of Aminophylline, especially intravenously, can be used to overcome exacerbations of asthma in children who do not respond to first-line inhalation / nebulisation therapy. Research shows that Aminophylline given at the end of surgery shortens conscious recovery time from general anesthesia and improves recovery quality. Moreover, Aminophylline has the effect of reducing the depth and duration of sedation produced by barbiturates, diazepam, midazolam and propofol.⁵

It has been reported that Aminophylline shortens the effects of sedation on some anesthetic and analgesic drugs. The case report here shows that intravenous aminophylline effectively accelerates the effect of the sedative drug / propofol drug which lasts long after postoperatively. There were no direct side effects after sedation in Aminophylline administration. This study shows that Aminophylline can be clinically beneficial as a propofol antagonist.^{6,7}

The Bispectral Index Score (BIS) is a new electroencephalogram parameter specifically developed to measure the effects of sedation and hypnotics produced by anesthetic drugs. The main role of BIS is to measure the depth of anesthesia and is useful for adjusting sedative drug doses. The BIS index is a number between 0 and 100

on a scale that correlates between good clinical outcomes and EEG conditions during anesthesia administration. BIS values close to 100 represent a clinical condition "awake / fully conscious" and when the BIS 0 value means no EEG activity.¹⁰

Research conducted by Sina et al. Showing that the BIS score was found to be significantly higher ($p < 0.001$) in the group given Aminophylline compared to the group that received normal saline. Heart rate and blood pressure were found to be significantly higher after Aminophylline injection compared with the control group ($p < 0.001$). In addition recovery time in all measured variables (time to open eyes, extubation, hand grip and wakefulness) was significantly shorter in the group receiving Aminophylline when compared to the control group ($p < 0.001$).⁹

The results of other studies conducted by the Department of Anesthesiology and Intensive Therapy, Faculty of Medicine, University of Tehran, showed that the time to do postoperative extubation was significantly shorter in the group that received Aminophylline 5 mg / KgBW (10.4 ± 4.78 minutes), then followed Aminophylline group was 1 mg / KgBW (11.15 ± 8.2 minutes) and the longest in the group that received normal saline was the control group (12.26 ± 7.33 minutes) with p -value = 0.001. In addition, the amount of time needed to achieve a BIS score ≥ 90 was also significantly shorter in the group that received Aminophylline 5 mg / KgBW (10.6 ± 3.7 minutes) then followed by the Aminophylline group 1 mg / KgBB ($11.5 \pm 5, 6$ minutes) and the longest in the group that received normal saline was the control group (14.4 ± 4.2 minutes) with p -value = 0.001.⁸

METHODS

This research has been carried out in July - September 2018 at the Central Surgical Installation of H. Adam Malik General Hospital Medan. This study was conducted by double blind randomized sampling method. Patients aged 19-32 years in the aminophyllin group were 0 people (0%), while in the NaCl group 0.9% were 5 people (21.8%). Patients aged 33-46 years in the aminophyllin group were 11 people (47.8%) and in the NaCl group 0.9% as many as 9 people (39.1%), while patients aged 47-60 years in the aminophyllin group were 12 people (52.2%) and in the NaCl group 0.9% as many as 9 people (39.1%). Based on the age characteristics of patients, it was found that the data were relatively homogeneous ($p > 0.05$).

TABLE 1.1 Sample Characteristics Based on Age, Gender and ASAPS

Characteristic	The drug given		sum	Value p*
	Aminophyllin	NaCl 0,9%		
1. Age (Years)				
19-32	0 (0%)	5 (21,8%)	5 (10,9%)	0,782
33-46	11 (47,8%)	9 (39,1%)	20 (43,5%)	
47-60	12 (52,2%)	9 (39,1%)	21 (45,6%)	
Total	23 (100%)	23 (100%)	46 (100%)	
2. Gender				
Laki - Laki	8 (34,7%)	9 (39,1%)	17 (36,9%)	0,596
Perempuan	15 (65,3%)	14 (60,9%)	29 (63,1%)	
Total	23 (100%)	23 (100%)	46 (100%)	
3. PS ASA				
ASA 1	10 (43,4%)	14 (60,8%)	24 (52,1%)	0,488
ASA 2	13 (56,6%)	9 (39,2%)	22 (47,9%)	
Total	23 (100%)	23 (100%)	46 (100%)	

TABLE 1.2. Sample Characteristics Based on Gender

Gender	Mean	N	CI (95%)	Std. Deviation
Man	43.80	17	43.80 13.00	10.479
Woman	42.45	29	42.45 4.94	9.687
Total	44.22	46		9.665

TABEL 2.1 Average Value of BIS at Every Time of Examination

Drug	BIS T0	BIS T1	BIS T2	BIS T3	BIS T4	
Aminophilin	Mean	69.61	81.91	90.30	93.56	97.90
	N	23	23	23	9	2

NaCl 0,9%	Std. Deviation	6,569	6,735	7,144	5,364	2,828
	Mean	63,26	73,04	82,04	88,84	96,93
	N	23	23	23	19	15
Total	Std. Deviation	5,948	6,278	7,010	4,086	1,668
	Mean	66,43	77,48	86,17	90,36	96,71
	N	46	46	46	28	17
	Std. Deviation	6,978	7,845	8,149	4,968	1,829

DISCUSSION

This study aims to determine the average recovery time after general anesthesia with inhalation of isoflurane after administration of Aminophylline 3 mg / kgBB and intravenous administration of normal saline (0.9% NaCl) in laparotomy surgery using a bispectral index at Haji Adam Malik General Hospital Medan.

Administration of aminophylline to analyze the effect of intravenous administration to speed up recovery time in general anesthesia in patients with laparotomy surgery using BIS. In studies aminophylline was administered to patients of different sexes, and different age groups in patients with regadenoson stress. Rangel et al explained that the administration of aminophylline works differently for each individual both male and female and has varying effects on various age groups. So further, it was concluded by Rangel et al, that the administration of aminophylline to different sex groups and different age groups had effects that varied greatly depending on the individual. Therefore, the effect that varied in the administration of aminophylline, was considered that the effects of aminophylline by sex and age group could be ignored in this study.

This study was attended by 46 people who met the inclusion and exclusion criteria. From the characteristics of the study sample in the table consisting of different sex categories and ASA groups assessed by statistical tests, there were no significant differences in all samples so that there was no significant difference based on sex, age and ASA PS. This aims to avoid bias in the results of this study, in the absence of differences in the characteristics of all samples, it is expected that the results of this study are truly accurate and reliable. In the results of this study it was found that the use of aminophylline gave a faster recovery time compared to 0.9% NaCl ($p < 0.05$) by shortening the time to almost half, compared to the average recovery time. This is in line with research conducted that intravenous aminophylline can reduce the sedation effect of benzodiazepines and speed up the recovery time of patients despite being under the influence of benzodiazepines. While emphasized that injection of aminophylline during an emergency can trigger an increase in BIS and shorten the conscious time to recover from the influence of anesthetic drugs. Wherein aminophylline can inhibit Adenosine which is a central nervous system neuromodulator. There are 4 adenosine receptor subtypes in the central nervous system: A1, A2A, A2B, and A3. Some evidence suggests that both the A1R and A2AR subtypes stimulate sleep, although the adenosine receptor subtype responsible for sleep regulation is debated. Adenosine hypnotic effect has been done first in experimental animals and the effect of soporific from systemic and central adenosine administration has also been studied in humans. In this study during the study there were no significant side effects after intravenous Aminophylline administration.³

In the study conducted on 46 samples which were divided into 2 groups, it was found that there were significant differences between the two groups in the value of conscious recovery time in patients with general anesthesia. Based on this study, the results of ketorolac when recovered consciously with aminophylline average 10.48 minutes were calculated starting from T0 (when administering aminophylline) and in NaCl 0.9%, the average time of 15.48 minutes was calculated from T0 (when administering aminophylline), which of the two drugs that are given aminophylline can accelerate conscious recovery time in patients with general anesthesia. This is consistent with the research conducted which showed that the time to do postoperative extubation was significantly shorter in the group receiving Aminophylline 5 mg / KgBB (10.4 ± 4.78 minutes), followed by the Aminophylline 1 mg / KgBB (11.15 ± 8.2 minutes)

and the longest in the group that received normal saline was the control group (12.26 ± 7.33 minutes) with p -value = 0.001. In addition, the amount of time needed to achieve a BIS score ≥ 90 was also significantly shorter in the group that received Aminophylline 5 mg / KgBW (10.6 ± 3.7 minutes) then followed by the Aminophylline group 1 mg / KgBB (11.5 ± 5.6 minutes) and the longest in the group that received normal saline was the control group (14.4 ± 4.2 minutes) with p -value=0.001.

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CONCLUSION

In the results of this study it was found that the use of aminophylline gave a faster recovery time compared to 0.9% NaCl ($p < 0.05$) by shortening the time to almost half, compared to the average recovery time.

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