Available online at www.scholarsresearchlibrary.com

Scholars Research Library

Der Pharmacia Lettre, 2016, 8 (5):340-344
(http://scholarsresearchlibrary.com/archive.html)

Der Pharmacia Lettre
Scholars Research Library
ISSN 0975-5071
USA CODEN: DPLEB4

Effect of general anesthesia plus spinal anesthesia on patients hemodynamic during coronary artery bypass Grafting surgery

Mehdi Dehghani Firoozabadi[1], Ahmad Ebadi[2], Mohammad Ali Sheikhi[3]* and Hossein Rahmani[4]

[1]*Assistant Professor of Cardiac Anesthesiology MD, Department of anesthesiology, Shahid Sadoughi University of Medical Sciences-Yazd, Iran*
[2]*Professor of Cardiac Anesthesiology MD, Department of Cardiac Anesthesiology, Atherosclerosis Research Center Golestan Hospital, and Pain Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*
[3]*Assistant Professor of Cardiovascular surgery MD, Department of Cardiac surgery, Atherosclerosis Research Center Golestan Hospital, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*
[4]*Toxicologist, Student Research Committee, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*

ABSTRACT

The Coronary Artery Bypass Grafting (CABG) is associated with different morbidity and mortality. One of the morbidity associated with CABG are the hemodynamic changes during surgery which has become a major concern for professionals. One of the reasons for this morbidity is lack of adequate pain control and the use of opioids as part of a balanced anesthetic technique will lead to hemodynamic stability. Many experts suggest the association of general anesthesia with spinal anesthesia for hemodynamic stability. The aim of this study was to evaluate the effect of spinal anesthesia on patients' hemodynamic in coronary artery bypass surgery. This study was a randomized clinical trial in Ahwaz Golestan Hospital. 60 patients of 40 - 75 years old and ASA Class II and III who had a history of drug abuse were divided into two groups of general anesthesia and general anesthesia plus spinal anesthesia. During operation, levels of each patient's medications and hemodynamics parameters were recorded and at the end were calculated for each patient and used as comparison baseline The results obtained of this study show there were significant difference between two groups for the mean heart rate (p = 0.001), mean blood pressure (p = 0.003) and mean arterial pressure (p = 0.001). In this present study, the group receiving intrathecal morphine in comparison with the control group in hemodynamic conditions were more stable and the intrathecal morphine association with general anesthesia more dramatically lead to improve the mean heart rate, mean blood pressure and mean arterial pressure during sternotomy that of course this effect can be less observed when removing the pump.

Key words: General anesthesia, Spinal anesthesia, Hemodynamic, CABG

INTRODUCTION

Annually, more than 800,000 operations of the Coronary Artery Bypass Grafting (CABG) takes place around the world and many are associated with different morbidity and mortality [1-3]. Development of patients management in cardiac surgeries require improved intraoperative monitoring [4] of which the foundation and basis of monitoring during anesthesia and surgery is the hemodynamic monitoring aimed at ensuring adequate tissue perfusion, oxygen delivery, prediction of instability and timely action to control it [5]. Hence, one of the morbidity associated with

CABG are the hemodynamic changes during surgery which has become a major concern for professionals [6-7]. The hemodynamic instability in cardiac surgeries for various reasons including hypolumia, heart failure and loss of vascular responses is frequently happened [8-9]. But one of the reasons for this morbidity is lack of adequate pain control. Providing an adequate pain relief to patients in addition to the satisfaction of the patients after surgery, can improve the outcome of patients and nursery and patients' stay costs can be significantly reduced since the pain remarkably cause multiple organ dysfunction and will have adverse effects on the response of systemic, homeostatic, respiratory, hormones, and in particular homodynamic [10]. Many experts suggest the association of general anesthesia with spinal anesthesia for hemodynamic stability [11-13]. The use of opioids as part of a balanced anesthetic technique will lead to hemodynamic stability [14]. The use of the low narcotic dose at intrathecal space before starting the surgery creates sufficient painless and reduces the side effects of venous drugs such as respiratory depression, itching, nausea and vomiting [15]. However, in cardiac surgery, local anesthesia technique is not routinely performed because the studies which support this approach are rarely found and the risks of local anesthetic is associated with using systemic anticoagulants drugs which are used before surgery for cardiac surgery candidates [16]. Using a low-dose intrathecal morphine can create extended analgesia [17] and is associated with a lower risk in creating hematoma compared with epidural method [18].

With respect to the mentioned matters, the aim of this study was to evaluate the effect of spinal anesthesia on patients' hemodynamic in coronary artery bypass surgery.

MATERIALS AND METHODS

Patients and Methods:

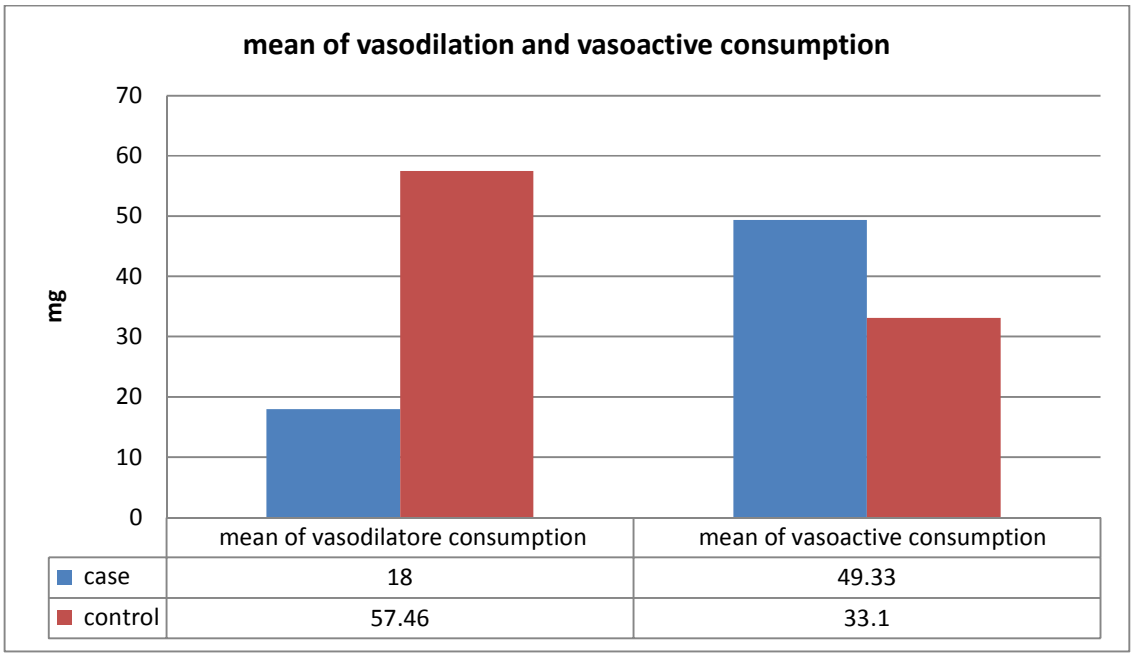
This study was a randomized clinical trial. After obtaining the permission from the Ethics Committee of Ahvaz Jundishapur University of Medical sciences, from the patients admitted for CABG surgery, 60 patients of 40 - 75 years old and ASA (American society of anesthesiologists) Class II and III who had a history of drug abuse at least once a week for more than 6 months were used as inclusion criteria were divided into two groups of general anesthesia and general anesthesia plus spinal anesthesia. Exclusion criteria included The patients of urgency surgery, all patients who did not consent to the methods, or had procedures in addition to CABG or had a history of lumbar disc, spinal infection, coagulopathy, and patients who had a cardiac non-sinus rhythm. Also, the patients whose pump time lasted over than 2 hours; patients with emergency surgery and patients with certain renal dysfunction (creatinine clearance less than 50 ml/min) were excluded the study. We used 0.1mg/kg morphine and 0.5mg/kg promethazine intramuscular 30 min before operation for premedication. Following the prescription of 5cc/kg crystalloid for all the patients, After Prescription cc / kg 5 crystalloid for all patients, for patients in the first group before the general anesthesia, the patients in order to perform the spinal anesthesia were in the sitting position for 5 minutes and the anesthesiologist using a 25 spinal needle injects 20 mg of bupivacaine 5/0% plus 4 microgram/kg morphine into the spinal space. And the patients immediately after the injection were in supine positions. Patient of second group also after being placed on the bed and receiving 5 cc/kg crystalloid were for 5 min in a sitting position. After placing patients in supine position, the noninvasive monitoring included ECG and Pulse oximetry were used for the patients and for the accurate measurement of blood pressure in patients the arterial catheter was placed. For general anesthesia for all patients the same drugs of midazolam 0.02 – 0.04 mg/kg, sufentanil 0.5 µg/kg, sodium thiopental 3-5 mg/kg and atracurium 0.5 mg/kg were used. Then, the intubation with a fit cuffed tube is done on the patient and is connected to the anesthesia machine and during surgery capnography and monitoring of central venous pressure after insertion of the catheter in the jugular or subclavian vein was used. During the anesthesia, arterial blood pressure and heart rate in patients were monitored and recorded after placing the patient on bypass pump the arterial blood pressure were also controlled and recorded. To maintain the anesthesia, continuous infusion of sufentanil (0.5 µg/kg/hr) and sevoflurane with MAC 0.8 to 1.1% before and after placement of the patient on bypass pump was used and the placement of the patient on bypass pump, for anesthesia the infusion of propofol (3 mg/kg/h) was used. Also we used atracurium 0.3 mg/kg for maintenance of muscle relaxant. All patients intravenously received 1g of methylprednisolone before placement in on-pump bypass. Remifentanil infusion start by pump during surgery and it was continued until the end of stitching practice. we used TNG and adrenalin for treatment of hypertension and hypotension respectively. Following the end of surgery, the patients without chip tube extubathion were transferred to the intensive care unit. After 1 hour, in case of no active bleeding (bleeding rate less than 100 ml for the first hour after the surgery), body temperature higher than 36°C, hemodynamic stability, absence of arrhythmias and respiratory rate above 6 times/minute, the patients were reversed with prescription of 0.05 mg / kg of neostigmine and 0.02 mg / kg atropine. All patients' awareness and consciousness were confirmed by their ability to pressing your hands and keeping the head above body for at least 5

seconds, chip tube extubation is done, and the patient was given oxygen through the mask. Otherwise, patients ventilation was done for more 1 hour and again in case the desired conditions are achieved, endotracheal tube was removed. During operation, levels of each patient's medications and hemodynamics parameters were recorded and at the end were calculated for each patient and used as comparison baseline. To do this, a questionnaire was used in which the recording person was not aware of the type of techniques. Statistical analyses were performed using SPSS 19.0 software. Demographic and surgical data were compared between groups using the unpaired Student's t-test.A p value<0.05 was assigned as statistically significant

Table 1: Hemodynamic changes: Mean of heart rate, Mean of blood pressure, Mean arterial pressure

Parameters	Time Of monitoring	Case Group	Control Group	P
Mean Of Heart Rate	Preoperative	87.93	86.46	0.615
	Intubation	74.73	81.86	0.014
	Sternotomy	69	87.6	0.001
	Start The Pumping	66.8	80.2	0.01
	At Removing The Pump	68.6	82.9	0.002
	postoperative	82.1	94.5	0.01
Mean Of Blood Pressure	Preoperative	168	160.6	0.117
	Intubation	114.3	127.3	0.012
	Sternotomy	102.6	150.9	0.012
	Start The Pumping	110	130.3	0.01
	At Removing The Pump	102	109.9	0.01
	postoperative	121.4	144.6	0.02
Mean Arterial Pressure	Preoperative	85	87	0.471
	Intubation	73.8	82.8	0.003
	Sternotomy	60	69	0.01
	Start The Pumping	63	70.46	0.001
	At Removing The Pump	66.66	73.06	0.01
	postoperative	77.86	86.46	0.02

Fig 1. Mean of vasodilation and vasoactive consumption



RESULTS AND DISCUSSION

The results obtained of this study show a mean age of case group was 59.6±8.27 and the mean age of the control group was 56.5±11.72 that was not a statistically significant difference (p = 0.247). All of the patients in this study were men. The average weight of the case group was 65.58±6.54 and the mean weight of control group was

62.63±6.15. The weights of the two case and control groups showed no significant difference (p = 0.103). The preoperative mean of heart rate, the mean of blood pressure, and the mean arterial pressure were not significantly different in the two case and control groups but we can see major significant difference in the other time in this parameters (Table 1). In terms of using vasodilators, the mean usage in case group was 18 mg and in the control group was 57.46, and a significant difference was observed between the two groups (p = 0.01). Regarding the using vasoactive, the mean usage of case group was 49.33 mg and 1.33 in the control group and a significant difference was observed between the two groups (p = 0.02) (Figure 1). Concerning using beta-blockers, the average consumption in the control group was 586.66 micrograms and in case group no beta-blocker was used and a significant difference was observed between the two groups (p = 0.001).

As the results of the study show the intrathecal morphine affects the hemodynamic from different aspects. One of the parameters considered in this study has been the mean heart rate. Changes in heart rate is a noninvasive diagnostic technique that is often used in autonomic control of heart and the changes will cause arrhythmias and hemodynamic instability, and this important issue is also important for patients undergoing CABG [19-22]. In this present study, the most significant difference of the mean heart rate between these two groups was related to the time of sternotomy and the least significant difference in mean heart rate was related to the intubation time. In continuum of the results, it was observed that intrathecal morphine in addition to heart rates is also effective on the blood pressure. Changes in blood pressure during the CABG operation are one of other important and critical parameters that have become an important concern for researchers, and they are looking for more stability of these variables [23]. In the obtained results of our study, the most significant difference of the mean blood pressure was related to sternotomy time and the least significant difference of the mean blood pressure was related to the pump removal. Others understudy parameter on which the intrathecal morphine has affected is the mean arterial pressure. The importance of the mean arterial pressure is one of the important things that many researchers are looking for more stability of this variable during operation and this important issue is also considered in CABG surgery [24]. According to the findings of this study, the most significant difference in the mean arterial pressure was during intubation and sternotomy and the least significant difference of the mean arterial pressure has occurred when removing the pump. Also, regarding the data shown in Figure 1 concerning the amount of vasodilators and vasoactive drugs, desirable effects of the intrathecal morphine can be realized. In this present study, the group receiving intrathecal morphine in comparison with the control group in hemodynamic conditions were more stable and the intrathecal morphine association with general anesthesia more dramatically lead to improve the mean heart rate, mean blood pressure and mean arterial pressure during sternotomy that of course this effect can be less observed when removing the pump; so, with regard to the intrathecal morphine favorable effects on hemodynamic during sternotomy, other researchers are recommended to conduct further research with a focus on the effects of intrathecal morphine on hemodynamic during sternotomy.

Acknowledgement
Authors acknowledge the support by Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

REFERENCES

[1]. L Nalysnyk , Fahrbach K, Reynolds M, Zhao S, Ross S. *Heart*. **2003**; 89 (7):767-72.
[2]. A Ebadi, Mohammad Ali Sheikhi Ahmad, et al. *International Journal of Bioassays* 4.02 (2015): 3648-3655.
[3]. MA Sheikhi, Mohammad Ali, Ahmad Ebadi, and Hossein Rahmani. *International Journal of Bioassays* 4.01 (**2014**): 3680-3685.
[4]. L JJ Roediger, Senard M, Larbuisson R, Canivet JL, Lamy M. *Anaesthesia*. **2006**;61:838–44.
[5]. ME Cove, Pinsky MR. *Best Practice & Research Clinical Anaesthesiology*. **2012**;26(4):453-62.
[6]. T Hosten, Solak M, Kilicken L, Ozdamar D, Toker K. The Effects of Etomidate and Propofol Induction on Hemodynamic and Endocrine Response Undergoing CABG Surgery. *Trakya Universitesi Tip Fakultesi Dergisi*. **2007**;24(2):114-26.
[7]. C Do Q-B, Goyer, Chavanon O, Couture P, Denault A, Cartier R. *European journal of cardio-thoracic surgery*. **2002**;21(3):385-90.
[8]. IJ Welsby, Bennett-Guerrero E, Atwell D, White WD, Newman MF, Smith PK, et al. *Anesthesia & Analgesia*. **2002**;94(5):1072-8.
[9]. A Mekontso-Dessap, Tual L, Kirsch M, D'Honneur G, Loisance D, Brochard L, et al. *British journal of anaesthesia*. **2006**;97(6):777-82.
[10]. R Przkora, Martin TD, Hess PJ, Kulkarni RS. *Korean journal of anesthesiology*. **2012**;63(6):563-6.

[11]. A Messina, Frassanito L, Colombo D, Vergari A, Draisci G, Della Corte F, et al. Hemodynamic changes associated with spinal and general anesthesia for hip fracture surgery in severe ASA III elderly population: a pilot trial. *Minerva anestesiologica*. **2013**.
[12]. P Biboulet, Jourdan A, Van Haevre V, Morau D, Bernard N, Bringuier S, et al. *Regional Anesthesia and Pain Medicine*. **2012**;37(4):433-40.
[13]. SV dos Santos LM, Santos SR, Malbouisson LM, Carmona MJ. *Clinics (Sao Paulo).* **2009**;64:279-85.
[14]. GS Murphy, Szokol JW, Marymont JH, Greenberg SB, Avram MJ, Vender JS, et al. *Anesthesia & Analgesia*. 2009;109(2):311-9.
[15]. JC Ballantyne, Carr DB, Suarez T, Lau J, Chalmers TC, Angelillo IF, et al. *Anesthesia & analgesia*. 1998;86(3):598-612.
[16]. SS Liu, Block BM, Wu CL. *Anesthesiology*. **2004**;101(1):153-61.
[17]. JC Ballantyne, Carr DB, Suarez T, Lau J, Chalmers TC. *Anesthesiology*. **2004**;100:1573-81.
[18]. Ho AM CD, Joynt GM. *Chest*. **2000**;117:551-5.
[19]. I Cygankiewicz, Wranicz JK, Bolinska H, Zaslonka J, Jaszewski R, Zareba W. *The American journal of cardiology*. **2004**;94(2):186-9.
[20]. Wu Z-K, Vikman S, Laurikka J, Pehkonen E, Iivainen T, Huikuri HV, et al. *European journal of cardio-thoracic surgery*. **2005**;28(1):109-13.
[21]. TT Laitio, Huikuri HV, Mäkikallio TH, Jalonen J, Kentala ES, Helenius H, et al. *Anesthesia & Analgesia*. **2004**;98(5):1239-44.
[22]. R Bauernschmitt, Malberg H, Wessel N, Kopp B, Schirmbeck E, Lange R. *European journal of cardio-thoracic surgery*. **2004**;25(3):320-6.
[23]. JA Herd, Hoogwerf BJ, Barton F, Terrin ML, Czajkowski SM, Lindquist R, et al. *American heart journal*. **2003**;146(2):273-9.
[24]. Y Kadoi, Fujita N. *Journal of clinical anesthesia*. **2003**;15(5):339-44.