

The Effect of Aroma Therapy with Lavender Oil and Comparison with Premedication in Patients Undergoing Angiography

Bentolhoda Panjalizadeh*, Majid Jalalyazdi

Received: 12 September 2018 / Received in revised form: 20 March 2018, Accepted: 25 March 2019, Published online: 25 May 2019
© Biochemical Technology Society 2014-2019
© Sevas Educational Society 2008

Abstract

Introduction: cardiovascular disease are a major global concern regarding to their great burden. Coronary artery disease is a common cardiovascular disease which is mostly managed and diagnosed by angiography. As same as other cardiac interventions, angiography provide considerable stress and anxiety prior to its application. The aim of present study is the evaluation of premedication with benzodiazepine and aroma therapy in patients undergoing coronary angiograph. **Material and methods:** Patients who were candidate for coronary angiography enrolled in present clinical trial. These patients divided into 2 groups. The lavender group received lavender oil inhalation prior to angiography and other group received oxazepam the night before intervention. Changes in blood pressure and heart rate in both groups were then evaluated and analyzed by SPSS software version 20. **Results:** Among 80 patients with mean age of 49.9, a significant time effect for all variables indicating that the variables significantly changed over time regardless of the allocated group was seen. A significant difference in heart rate, SBP and DBP between baseline and at the end of the study ($p < 0.001$) was observed but there was no significant difference between groups in terms of heart rate, SBP and DBP at baseline and at the end of the study ($p > 0.05$). **Conclusion:** Although both treatment strategies can affect blood pressure and heart rate in patients undergoing coronary angiography, however, there is no superiority of using either of these two regimens in affecting blood pressure or heart rate.

Key words: Angiography, Blood Pressure, Heart Rate, Aroma Therapy, Lavender Oil.

Introduction

Cardiovascular disease are major cause of mortality and morbidity around the world. It has been reported that CVD has been declined mostly in regions with high sociodemographic index. In other countries, CVD is still a major cause of premature death and disability (Roth et al., 2017). Among cardiovascular disease, coronary artery disease has gradually decreased in past few years. However, still approximately one third of all deaths in adult population is caused by coronary heart disease (Sanchis-Gomar et al., 2016). Management and diagnosis of most of the coronary heart disease is based on coronary angiography. Coronary angiography is the gold standard test for coronary vessels anatomy (Doris and Newby, 2016; Ogobuiro et al., 2018; Rehman and Makaryus, 2017). Approximately, more than 200,000 coronary angiography is done each year in united states of America (Lim and White, 2013). As same as other similar invasive medical techniques, this procedure could be stressful and emotionally traumatic (Nekouei et al., 2011; Okkesim et al., 2011; Hajbaghery, Moradi and Mohseni, 2014) which can give rise to blood pressure, heart and respiratory rate, and the myocardial oxygen demand, which could be dangerous or life threatening during angiographic procedure (Nekouei et al., 2011; Hajbaghery, Moradi and Mohseni, 2014; Yousefi, 2017).

Benzodiazepines are commonly used to reduce anxiety and induce relaxation in patients undergoing medical procedures and prevent changes in patients' blood pressure and heart rate (Lind and Mushlin, 1987). Although some studies considered optimal sedative effects for such drugs (Randell and Kytta, 1998), however, their effects are not totally accepted or supported (Alamri et al., 2011; Astarcioğlu et al., 2016; Martin and Lennox, 2003; Vlastra et al., 2018; Bawden et al., 2011). Moreover, benzodiazepines could has adverse effects including respiratory depression and prolonged recovery time (Lepage et al., 2008), bradycardia requiring intervention (El-Hamid, Elrabiey and Youssef, 2014), allergic and anaphylactic reactions (Tavakol, Ashraf and Brener, 2012). Regardless of its side effects, the potential toxicity risk limit benzodiazepine usage in elderly especially those with liver, lung or kidney dysfunction (Griffin et al., 2013). Hence, the need of a safer and effective alternative drug has been emerged since years ago. Recent studies discovered sedative (Gevorkyan et al., 2016; Koulivand, Khaleghi Ghadiri and Gorji, 2013; López et al., 2017), anti-anxiolytic (Shiina et al., 2008; de Sousa et al., 2015) and nerve-calming (López et al., 2017) effects of an herbal medicine, Lavender, with the scientific name *Lavandula angustifolia*. This herbal medicine has been approved by European Medicines agency (EMA) (López et al., 2017) without major adverse side effects (Koulivand, Khaleghi Ghadiri and Gorji, 2013; Basch et al., 2004; Chien, Cheng and Liu, 2012). Lavender lowers heart rate

Bentolhoda Panjalizadeh*

M.D Cardiologist Mashhad University of Medical Sciences, Mashhad University of Medical Sciences, Mashhad, Iran.

Hamid Zarei Samangan

Department of Cardiovascular Diseases, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

and has short-term effect on heart rate variability (Chien, Cheng and Liu, 2012). It has been shown that its blood pressure and heart rate lowering effects will occur without reporting adverse effects and toxicity potential similar to benzodiazepines (Koulivand, Khaleghi Ghadiri and Gorji, 2013). Regarding to the mentioned shortcomings of benzodiazepine use in medical procedures, the aim of present study is to evaluate the effects of lavender on heart rate and blood pressure during angiography in comparison with benzodiazepines.

Material and Methods:

The present non-inferiority clinical trial took place in Imam Reza Hospital, Mashhad, Iran from Jun 2018 to Jan 2019. Every patients who were admitted and candidate to undergo first time coronary artery angiography because of acute coronary syndrome could enter the study. These patients should have aged between 25 to 75 years old and were not using any medication prior to initiation of cardiac symptoms. Moreover, patients with positive history of liver or pulmonary disorders, food or drug allergy and psychiatric disorder did not considered eligible to enroll present study. The eligible patients filled an informed consent form. Any patients who did not agree to continue the study or needed general anesthesia, cardiac resuscitation or experienced hemodynamic instability have excluded from the study. Eligible patients were randomized into 2 equal groups including benzodiazepine group receiving oxazepam 10mg the night before intervention) and Lavender group receiving Lavender inhalation (Lavender oil drop, Eap-cotehran, Iran). The randomization was performed by using online software. Those patients in lavender group deeply inhaled 5 drops of lavender extract which was dripped on a cotton and held 5 cm away from their nose for 5 minutes. The patients experienced the inhalation 12 hours and 30 minutes before angiography. The blood pressure and heart rate documented by a blind researcher before the last inhalation and 30 minutes after the inhalation. The patients in benzodiazepine group deeply inhaled 5 drops of sterile water the same way as case group. Moreover, these patients have received oxazepam the night before angiography. The study data was then analyzed by SPSS statistic software version 20 (Armonk, New York, united states of America). Mean and standard deviation (SD) was used to describe quantitative variables and qualitative variables were described by frequencies and percentage. Repeated measures ANOVA used for evaluation of time effect for all variables. P values lesser than 0.05 was considered as statistically significant results.

Results:

Total of 80 patients with mean (SD) age of 49.9(6.63) years enrolled in present study and divided into 2 equal groups. The patients' demographic data is summarized in table 1. Repeated measures ANOVA revealed a significant time effect for all variables indicating that the variables significantly changed over time regardless of the allocated group. A significant group effect was found for heart rate and DBP which indicates that there was a significant difference between groups regardless of the time of assessment. There was a significant time*group effect for heart rate and DBP indicating that these variables were significantly different between groups at different time points. The Bonferroni test revealed a significant difference in heart rate, SBP and DBP between baseline and at the end of the study ($p < 0.001$) but there was no significant difference between groups in terms of heart rate, SBP and DBP at baseline and at the end of the study ($p > 0.05$) (table 2).

Discussion:

The present study revealed that premedication with oxazepam and lavender can affect pulse rate and blood pressure but these 2 interventions does not show any significant superiority to each other. It's well demonstrated that cardiac diagnosis instrument including angiography can cause anxiety in patients and reducing the anxiety with different techniques is mandatory to achieve better therapeutic results (Nekouei et al., 2011). Various pharmaceutical and non-pharmaceutical interventions has been developed in order to reduce the anxiety and stress before performing an angiography. It has been reported that most of the patients who should undergo coronary angiography lack adequate information about their procedure. This lack of medical information increases anxiety and stress among such patients. Even the anxiety of coronary intervention can be more than an open heart surgery while people are more aware about this procedure (Moradi and ADIB HM, 2015). Anxiety will make patients more metabolically active and induce increase in respiratory rate, catecholamine release and increase oxygen demand (White, 1999; Astley et al., 2008). Moradi et al. have demonstrated that their preparation package before angiography can reduce the anxiety (Moradi and ADIB HM, 2015). Another study by Basar et al. has demonstrated that applying audio-visual education can effectively affect anxiety level, heart rate as well as blood pressure prior to angiography (Basar et al., 2015). Such studies highlight the important role of nurses and hospital staffs in providing a humanized assistance in order to reduce patients stress and anxiety prior to cardiac interventions (Buzatto and Zanei, 2010). However, despite of non-pharmaceutical management, different drugs has been used for treating pre-procedural anxiety and stress. Among these drugs, benzodiazepines are of particular interest. Various benzodiazepine drugs are used regarding to their empirical experience. Vlastra et al. demonstrated that using lorazepam or diazepam can have modest positive effects on anxiety level prior to interventional procedures (Vlastra et al., 2018). On the other hand, another study by Alamri et al. has demonstrated that premedication with oral diazepam and chlorphenamine before coronary intervention will not affect anxiety and pain rate (Alamri et al., 2011). Moreover, premedication was associated with increased coronary spasm. In our study, we did not have any angiography complication including artery spasm and all patients had uneventful intervention. A possible explanation regarding this issue could be type of medication and time of premedication. They have used diazepam one hour prior to angiography while we have used oxazepam a night before angiography and demonstrated the beneficial effects of this benzodiazepine. Regarding the use of other medications as premedication, some studies have tried different

herbal medications. Abdi et al. has used another aroma therapy in their patients and revealed that orange essential oil can significantly reduce anxiety prior to angiography (Abdi et al., 2018). Tahmasebi et al. compared Benson relaxation and aroma therapy (Tahmasebi et al., 2015). They have demonstrated that both aroma therapy with lavender and Benson relaxation are both effective in reducing the anxiety as well as systolic blood pressure, respiratory and pulse rate (Tahmasebi et al., 2015). Another study by Ziyaeifard has also shown that pulse rate, systolic and diastolic blood pressure could have significant changes after lavender inhalation (Ziyaeifard et al., 2017). However, the effect of benzodiazepines and lavender oil aroma therapy has not been widely studied. In our study we have revealed that although both treatments can affect blood pressure and heart rate, but there is not any superiority about using benzodiazepine over lavender. One possible limitation of present study could be the short duration of lavender use. Rezaei-Adaryani et al. reported that 30 minutes inhalation of lavender weekly for 2 months will significantly reduce blood pressure (Rezaei-Adaryani et al., 2009). Here we suggest researcher to conduct their further research on using lavender oil as premedication for longer time periods. Moreover, authors should keep in mind that different extracts of lavender oil with different concentration may also have different outcomes. This issue should also be addressed in further studies.

Conclusion:

The present study demonstrated that both benzodiazepine and lavender oil aroma therapy prior to angiography can affect blood pressure and pulse rate. However, there is no superiority of using lavender oil to benzodiazepine use in such patients.

References

- Abdi h, hejazi s, tahmasebi h, abdi joybari f. Effect of Aromatherapy with Orange Essential Oils on Anxiety in Patients Experiencing Coronary Angiography: A Randomized Control Trial %J Journal of Nursing and Midwifery Urmia University of Medical Sciences. 2018;15(11):806-14.
- Alamri H, Almoghairi A, Almasood A, Alotaibi M, Alonazi S. Do We Need Premedication Before Coronary Angiography? A Controlled Clinical Trial. *Cardiol Res.* 2011;2(5):224-8.
- Astarcioğlu M, Sen T, Kilit C, Durmus H, Gozubuyuk G, Agus H, et al. Procedural sedation during transradial coronary angiography to prevent spasm Sedierung während transradialer Koronarangiographie zur Spasmusprävention. *Herz.* 2016;41(5):435-8.
- Astley CM, Chew DP, Aylward PE, Molloy DA, De Pasquale CG. A randomised study of three different informational aids prior to coronary angiography, measuring patient recall, satisfaction and anxiety. *Heart, lung & circulation.* 2008;17(1):25-32.
- Basar C, Beşli F, Keçebaş M, Kayapınar O, Turker YJA. The effect of audio-visual education prior to coronary angiography on the state anxiety. 2015;13:14.
- Basch E, Foppa I, Liebowitz R, Nelson J, Smith M, Sollars D, et al. Lavender (*Lavandula angustifolia* Miller). *Journal of herbal pharmacotherapy.* 2004;4(2):63-78.
- Bawden J, Villa-Roel C, Singh M, Fabris G, Bond K, Boyko D, et al. Procedural sedation and analgesia in a Canadian ED: a time-in-motion study. *The American journal of emergency medicine.* 2011;29(9):1083-8.
- Buzatto LL, Zanei SSVJE. Patients' anxiety before cardiac catheterization. 2010;8(4):483-7.
- Chien L-W, Cheng SL, Liu CF. The effect of lavender aromatherapy on autonomic nervous system in midlife women with insomnia. *Evidence-Based Complementary and Alternative Medicine.* 2012;2012.
- de Sousa D, Hocayen P, Andrade L, Andreatini R. A systematic review of the anxiolytic-like effects of essential oils in animal models. *Molecules.* 2015;20(10):18620-60.
- Doris M, Newby DE. Coronary CT angiography as a diagnostic and prognostic tool: perspectives from the SCOT-HEART trial. *Current cardiology reports.* 2016;18(2):18.
- El-Hamid AA, Elrabiey MA, Youssef O. Conscious sedation during diagnostic cerebral angiography: A comparative study between dexmedetomidine and midazolam. *Ain-Shams Journal of Anaesthesiology.* 2014;7(3):423-.
- Gevorkyan E, Minasyan S, Adamyan T, Ksadzhikeyan N. Sedative effect of lavender during physical loads. *Gigiena i sanitaria.* 2016;95(7):665-9.
- Griffin III CE, Kaye AM, Bueno FR, Kaye AD. Benzodiazepine pharmacology and central nervous system-mediated effects. *The Ochsner Journal.* 2013;13(2):214-23.
- Hajbaghery MA, Moradi T, Mohseni R. Effects of a multimodal preparation package on vital signs of patients waiting for coronary angiography. *Nursing and midwifery studies.* 2014;3(1).
- Koulivand PH, Khaleghi Ghadiri M, Gorji A. Lavender and the nervous system. *Evidence-Based Complementary and Alternative Medicine.* 2013;2013.
- Lepage L, Frangie MC, Detaint D, Brochet E, Guegueniat J, Partouche G, et al. Nitrous oxide inhalation for transoesophageal echocardiography: an alternative to benzodiazepine sedation? *European Journal of Echocardiography.* 2008;9(5):621-4.
- Lim MJ, White CJ. Coronary angiography is the gold standard for patients with significant left ventricular dysfunction. *Progress in cardiovascular diseases.* 2013;55(5):504-8.
- Lind LJ, Mushlin PS. Sedation, analgesia, and anesthesia for radiologic procedures. *Cardiovascular and Interventional Radiology.* 1987;10(5):247-53.

- López V, Nielsen B, Solas M, Ramírez MJ, Jäger AK. Exploring pharmacological mechanisms of lavender (*Lavandula angustifolia*) essential oil on central nervous system targets. *Frontiers in pharmacology*. 2017;8:280.
- Martin ML, Lennox PH. Sedation and analgesia in the interventional radiology department. *Journal of vascular and interventional radiology*. 2003;14(9):1119-28.
- Moradi T, ADIB HM. The effect of a multi-modal preparation package on anxiety in patients undergoing coronary angiography. 2015.
- Nekouei ZK, Yousefy A, Manshaee G, Nikneshan S. Comparing anxiety in cardiac patients candidate for angiography with normal population. *ARYA atherosclerosis*. 2011;7(3):93.
- Nekouei ZK, Yousefy A, Manshaee G, Nikneshan S. Comparing anxiety in cardiac patients candidate for angiography with normal population. *ARYA Atheroscler*. 2011;7(3):93-6.
- Ogobuiro I, Tuma F. Anatomy, Thorax, Heart Coronary Arteries. *StatPearls [Internet]: StatPearls Publishing*; 2018.
- Okkesim Ş, Kara S, Kaya MG, Asyali MH. Analysis of coronary angiography related psychophysiological responses. *Biomedical engineering online*. 2011;10(1):71.
- Randell TT, Kytä JV. Conscious sedation in patients undergoing surgical and investigational procedures. *CNS drugs*. 1998;10(5):329-42.
- Rehman R, Makaryus AN. *Cardiac Imaging*. 2017.
- Rezaei - Adaryani M, Ahmadi F, Mohamadi E, Asghari - Jafarabadi MJJoan. The effect of three positioning methods on patient outcomes after cardiac catheterization. 2009;65(2):417-24.
- Roth GA, Johnson C, Abajobir A, Abd-Allah F, Abera SF, Abyu G, et al. Global, Regional, and National Burden of Cardiovascular Diseases for 10 Causes, 1990 to 2015. *J Am Coll Cardiol*. 2017;70(1):1-25.
- Sanchis-Gomar F, Perez-Quilis C, Leischik R, Lucia A. Epidemiology of coronary heart disease and acute coronary syndrome. *Annals of translational medicine*. 2016;4(13):256.
- Shiina Y, Funabashi N, Lee K, Toyoda T, Sekine T, Honjo S, et al. Relaxation effects of lavender aromatherapy improve coronary flow velocity reserve in healthy men evaluated by transthoracic Doppler echocardiography. *International journal of cardiology*. 2008;129(2):193-7.
- Tahmasebi h, darvishkhezri h, Abdi H, Abbasi A, Asghari N. The Effect of Benson Relaxation and Aromatherapy on Anxiety and Physiological Indicators in Patients Undergoing Coronary Angiography %J *Journal of Nursing and Midwifery Urmia University of Medical Sciences*. 2015;12(12):1094-103.
- Tavakol M, Ashraf S, Brener SJ. Risks and complications of coronary angiography: a comprehensive review. *Global journal of health science*. 2012;4(1):65.
- Vlastra W, Delewi R, Rohling WJ, Wagenaar TC, Hirsch A, Meesterman MG, et al. Premedication to reduce anxiety in patients undergoing coronary angiography and percutaneous coronary intervention. *Open heart*. 2018;5(2):e000833.
- White JM. Effects of relaxing music on cardiac autonomic balance and anxiety after acute myocardial infarction. *American journal of critical care : an official publication, American Association of Critical-Care Nurses*. 1999;8(4):220-30.
- Yousefi Z. 129: The Effect of Lavender Essential Oil on Vital Signs (Blood Pressure, Pulse) in Patients Undergoing Coronary Angiography. *BMJ Open*. 2017;7(Suppl 1).
- Ziyaeifard M, Zahedmehr A, Ferasatkish R, Faritous Z, Alavi M, Alebouyeh MR, et al. Effects of lavender oil inhalation on anxiety and pain in patients undergoing coronary angiography. 2017;18(1):44-50.

Table 1. The study participant's demographic data according to their intervention group

Variable		Benzodiazepine group	Lavender group	P value
Gender	Male (%)	20(50)	21(52.2)	0.823
	Female (%)	20(50)	19(47.5)	
Diabetes mellitus (%)		13 (32.5)	13(32.5)	1.0
Hypertension (%)		28(70)	31(77.5)	0.446
Angiography results	Normal (%)	7 (17.5)	6 (15)	0.762
	Abnormal (%)	33 (82.5)	34 (85)	

Table 2. The time and group effect of using both interventions among study groups.

	Group	Before	After	Time effect	Group effect	Time*group effect	Lavender vs Benzodiazepine	Before vs after
Heart rate	Benzodiazepine	87.15±4.08	85.17±4.21	<0.001	<0.001	<0.001	0.936	<0.001
	Lavender	87.07±4.27	84.07±4.27				0.250	<0.001
Systolic blood pressure	Benzodiazepine	119.70±5.93	110.80±17.82	<0.001	0.657	0.657	0.811	<0.001
	Lavender	119.37±6.16	109.37±6.16				0.634	<0.001
Diastolic blood pressure	Benzodiazepine	79.70±5.93	77.10±6.58	<0.001	<0.001	<0.001	0.811	<0.001
	Lavender	79.37±6.16	74.37±6.16				0.060	<0.001