ASTEEC Conference Proceeding: Applied Science
2nd International Conference on Obstetricians Participating in Training for Innovative Measures to Advance Leadership 2025 (OPTIMAL 2025)
24 January 2025 (Online)

A Case Report: The Combination of Acupressure on Taichong Acupoint And Lemongrass Oil In Stabilizing Hemodynamics in Patients with Intracerebral Hemorrhage

Izzati Adha Pratitis[1], Eka Yulia Fitri[2*]

[1,2]Nursing Departement of Medical Faculty of Universitas Sriwijaya, South Sumatra, Indonesia

[*](Corresponding author: ekayulia_01@unsri.ac.id)

Abstract. Intracerebral hemorrhage (ICH) occurs in 10–15% of all strokes and is associated with high morbidity and mortality. Hemodynamic instability can be an indication of cardiovascular problems experienced by stroke patients. The implications highlight the effect of acupressure at the Taichong point using lemongrass oil on primary hemodynamic stability in ICH patients. This research uses quantitative methods with a case study approach. Hemodynamic assessment parameters include blood pressure, MAP, and pulse. The study's findings revealed that the five patients showed elevated blood pressure and pulse immediately after acupressure. Monitoring 30 minutes after acupressure showed that three patients (Mr. I, Mr. B, and Mrs. E) experienced lowered blood pressure, MAP, and pulse. Two patients (Mr. M and Mr. H) experienced elevated blood pressure, MAP, and pulse. We recommend acupressure for patients with higher GCS to prevent agitated reactions when applying pressure. Patients with lower GCS may require additional or intensive approaches to achieve similar improvements. Further studies need to confirm these findings and develop better protocols for applying acupressure to emergency and critical care patients.

Keywords: Intracerebral Hemorrhage, Taichong Acupoint, Hemodynamics

INTRODUCTION

Intracerebral hemorrhage (ICH) is a condition where bleeding occurs in the brain parenchyma. This hemorrhage stroke can be accompanied with or without blood expansion into the ventricles. Non-traumatic ICH occurs in 10%–15% of all strokes and correlates with high morbidity and mortality[1]. The stroke epidemiology study in 2015 revealed that the mortality rate due to intracerebral hemorrhage in Indonesia was higher than in other countries in Southeast Asia. Based on age and sex, the incidence of ICH was 193.3/100,000, and the number of years lost due to disability was 3,382.2/100,000[2]. In Indonesian society, the risk factors for intracerebral hemorrhage are the same as in surrounding countries, the difference among them is the high frequency of insufficient physical activity in both men (25.5%) and women (22.0%) and smoking behavior in men (76.2%). A history of hypertension is a high-risk factor, accounting for 36%–42% of all stroke events in both men and women[3].

Primary hemodynamic parameters include blood pressure and pulse, while advanced hemodynamics include stroke volume (SV), cardiac output (CO), and total peripheral resistance. As the blood circulates through the heart, lungs, and kidneys, disruption of these organs can affect the body's hemodynamics, mainly if they affect the cardiovascular and respiratory organs[4]. Hemodynamic instability indicates cardiovascular problems experienced by stroke patients. It refers to abnormalities value of heart rate, blood pressure, capillary refill time (CRT),

or cardiac output. Organ failure and death can result from delayed or poor administration of therapy[4].

Acupressure therapy is a potential alternative method that can help stabilize hemodynamics. This traditional Chinese medicine is applied by pressing specific points (known as meridians) on the body. It can stimulate healing from illness or enhance overall health. The Taichong acupressure point (LR3) is one of the acupressure points that plays a very important role in helping to stabilize blood pressure. The average systolic and diastolic blood pressure in the experimental group decreased at 0, 15, and 30 minutes after acupressure[5]. The combination of the Taichong acupoint acupressure with other massage therapies can increase comfort, reduce headaches, and improve sleep quality[6]. Lemongrass oil has pharmacological effects as an analgesic, antidepressant, tonic, and stimulant. The composition of the lemongrass oil is a water-soluble aldehydes and esters. It has a hypotensive effect and can lower heart rate[7,8].

Based on this background, we provide nursing intervention by Taichong acupressure point combined with lemongrass oil to patients with intracerebral hemorrhage. The hypothesis is that conducting intervention can stabilize primary hemodynamics.

METHODS

This research uses quantitative methods with a case study approach. Five patients were diagnosed with ICH and experienced primary hemodynamic instability in the intensive care unit at Hospital X, Palembang, South Sumatra, comprised the study's sample. We administered acupressure at the Taichong acupoint using lemongrass oil for 10–15 minutes over two days. Applying acupressure involves pressing the Taichong acupoint (LR3) with the thumb, rotating counterclockwise and clockwise, and applying pressure with a weight of approximately 3 kg[5,9,10]. This intervention was conducted in February 2024.

The primary hemodynamic parameters measured included blood pressure (systolic and diastolic), MAP, and pulse. We monitored hemodynamic changes before, soon after, and 30 minutes after administering acupressure. We install a 5-lead monitor screen on the patient's body to monitor hemodynamic parameters. We arranged the hemodynamic monitoring results before, soon after, and 30 minutes after acupressure in the form of line charts and tables to identify differences and abnormalities, and to create a summary of the findings.

RESULTS AND DISCUSSION

We identified a main nursing problem of decreased intracranial adaptive capacity from five patients diagnosed with intracerebral hemorrhage, namely Mr. I, Mr. B, Mrs. E, Mr. M, and Mr. H. Among all the patients, Mr. B, Mr. M, and Mr. H had undergone decompressive craniectomy surgery. Meanwhile, Mr. I and Mrs. E did not undergo any surgical procedures.

1.1 Management Patient 1: Mr. I

On the first day, the nursing team conducted intervention management for increased intracranial pressure. The evaluation showed that GCS increased to 8T (E3M5VT), indicating partially resolved intracranial adaptive capacity despite the patient looking restless. We measured the parameters of the primary hemodynamics, systolic blood pressure was 148 mmHg, diastolic was 86 mmHg, MAP was 106 mmHg, and pulse was 76 bpm. Soon after implementing the combination of acupressure by Taichong acupoint pressing and lemongrass oil, the systolic blood pressure increased to 158 mmHg, diastolic 90 mmHg, MAP 113 mmHg, and pulse 89 bpm. After 30 minutes of implementing the intervention, there was a decrease in systolic blood pressure to 140 mmHg, diastolic 79 mmHg, MAP 99 mmHg, and pulse 80 bpm (figure 1).

On the second day of the evaluation, the nursing problem was partially resolved. The patient was extubated, GCS showed E3M6V4, and looked restless. Before implementing acupressure on the second day, hemodynamic monitoring revealed a systolic blood pressure of 147 mmHg, a diastolic blood pressure of 85 mmHg, a MAP of 106 mmHg, and a pulse of 78 bpm. Following

implementation, these values increased to a systolic blood pressure of 155 mmHg, a diastolic blood pressure of 92 mmHg, and MAP of the pulse remained at 78 bpm; after 30 minutes, there was a decrease in systolic blood pressure to 139 mmHg, diastolic blood pressure 79 mmHg, MAP to 99 mmHg, and the pulse increased to 75 bpm.

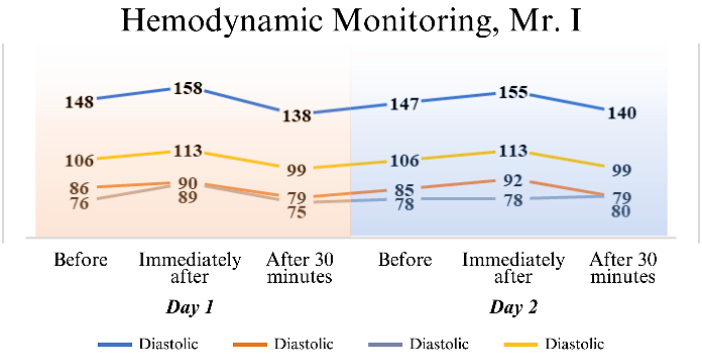

Figure 1. Hemodynamic Monitor, Mr. I

1.2 Management Patient 2: Mr. B

On the initial day, the nursing team conducted intervention management of increased intracranial pressure. The evaluation showed that GCS was 7T (E2M5VT), indicating that the nursing problem was not solved yet. On the first day before implementing acupressure, the systolic blood pressure was 152 mmHg, diastolic was 76 mmHg, MAP was 101 mmHg, and pulse was 61 bpm. After implementation, it increased to a systolic blood pressure of 169 mmHg, a diastolic of 91 mmHg, a MAP of 117 mmHg, and a pulse of 70 x/min. After 30 minutes, there was a decrease in systolic blood pressure to 162 mmHg, diastolic 76 mmHg, MAP 105 mmHg, and pulse increased to 59 bpm (figure 2).

The evaluation on the second day revealed that GCS E2M5V2 had partially resolved the problem of decreased intracranial adaptive capacity, the client had undergone extubation, and the client appeared restless. Hemodynamic monitoring on the second day before implementing acupressure showed that the systolic blood pressure was 156 mmHg, diastolic 75 mmHg, MAP 102 mmHg, and pulse was 60 bpm. After implementation, it increased to systolic blood pressure of 160 mmHg, diastolic 76 mmHg, MAP 104 mmHg, and pulse of 65 bpm. After 30 minutes, there was another increase in systolic blood pressure to 171 mmHg, diastolic 80 mmHg, MAP 110 mmHg, and pulse increased to 58 bpm.

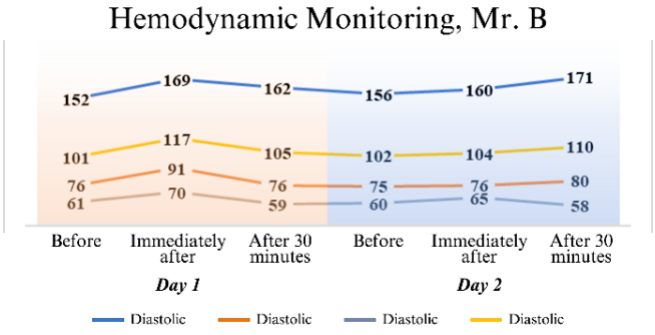

Figure 2. Hemodynamic Monitor, Mr. B

1.3 Management Patient 3: Mrs. E

On the initial day, the nursing team conducted intervention management of increased intracranial pressure. The results showed that the decreased intracranial adaptive capacity was partially resolved. She reported that during acupressure therapy, she felt pain and was slightly sore from the pressure point to the calf. However, this discomfort subsided after 1-2 minutes, resulting in a GCS of E4M6V4, and the client appeared calm. In Figure 3, Mrs. E's hemodynamic monitoring shows that on the first day before acupressure, the systolic blood pressure was 166 mmHg, the diastolic blood pressure was 106 mmHg, the MAP was 126 mmHg, and the pulse rate was 74 bpm. After acupressure, the systolic blood pressure went up to 171 mmHg, the diastolic blood pressure went up to 106 mmHg, the MAP went to 127 mmHg, and the pulse rate went down to 77 bpm. After 30 minutes, the systolic blood pressure went down to 150 mmHg, the diastolic blood pressure dropped to 92 mmHg, the MAP dropped to 111 mmHg, and the pulse rate returned to 76 bpm.

On the second day of the evaluation, we found that the problem of decreased intracranial adaptive capacity had partially resolved. Mrs. E reported feeling sore and slightly sore from the point of pressure down to the calf during acupressure therapy, but this soreness subsided after 1-2 minutes. Following this, Mrs. E felt relaxed, GCS was E4M6V4, and she appeared calm. Hemodynamic monitoring on the second day before implementing acupressure showed that the systolic blood pressure was 147 mmHg, diastolic 94 mmHg, MAP 112 mmHg, and pulse was 75 bpm. After implementation, it increased to systolic blood pressure of 167 mmHg, diastolic 109 mmHg, MAP 128 mmHg, and pulse of 80 bpm. After 30 minutes, there was a decrease in systolic blood pressure to 139 mmHg, diastolic 92 mmHg, MAP 108 mmHg, and pulse increased to 74 bpm.

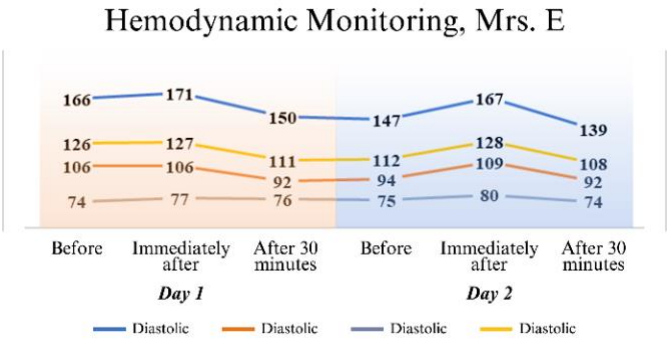

Figure 3. Hemodynamic Monitor, Mrs. E

1.4 Management Patient 4: Mr. M

On the first day, nurses implemented intervention management to address increased intracranial pressure. The evaluation results were obtained. The evaluation results showed that GCS E2M5V2 partially resolved the problem of decreased intracranial adaptive capacity, but the client's restlessness increased during acupressure. Figure 4 shows that on the first day before implementing acupressure, the systolic blood pressure was 134 mmHg, the diastolic 90 mmHg, the MAP 104 mmHg, and the pulse 126 bpm. After implementation, it increased to systolic blood pressure 152 mmHg, diastolic 109 mmHg, MAP 123 mmHg, and the pulse decreased to 118 bpm. After 30 minutes, there was a decrease in systolic blood pressure to 146 mmHg, diastolic 99 mmHg, MAP 115 mmHg, and pulse 110 bpm.

On the second day of the evaluation, the decrease in intracranial adaptive capacity was partially resolved. The GCS E2M5V2, patient appeared restless during acupressure. Hemodynamic monitoring on the second day before implementing acupressure showed that the systolic blood pressure was 139 mmHg, diastolic 83 mmHg, MAP 102 mmHg, and pulse 109 bpm. After implementation, it increased to systolic blood pressure of 147 mmHg, diastolic 92 mmHg, MAP 110 mmHg, and pulse 122 bpm. After 30 minutes, there was a decrease in systolic blood pressure

to 145 mmHg, diastolic 87 mmHg, MAP 106 mmHg, and pulse increased to 115 bpm.

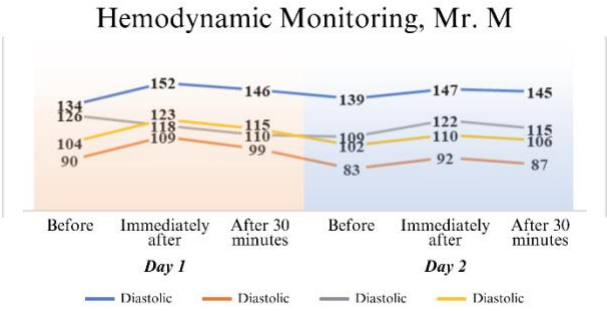

Figure 4. Hemodynamic Monitor, Mr. M

1.5 Management Patient 5: Mr. H

On the first day, nurses implemented intervention management to address increased intracranial pressure. The evaluation showed that the GCS was 7 (E1M4V2), indicating a decrease in intracranial adaptive capacity was not resolved, and acupressure increased anxiety. On the first day before implementing acupressure, the systolic blood pressure was 187 mmHg, diastolic 109 mmHg, MAP 135 mmHg, and pulse 90 bpm. After implementation, it increased to a systolic blood pressure of 190 mmHg, a diastolic of 107 mmHg, a MAP of 132 mmHg, and a pulse of 92 bpm. After 30 minutes, there was another increase in systolic blood pressure to 196 mmHg, diastolic 105 mmHg, MAP 135 mmHg, and pulse 110 bpm (figure 3.5).

During the second day, the patient's condition was still the same as the first day. The acupressure led to an increase in restlessness. Hemodynamic monitoring on the second day before implementing acupressure showed that the systolic blood pressure was 178 mmHg, diastolic 128 mmHg, MAP 145 mmHg, and pulse 112 bpm. After implementation, it increased to systolic blood pressure of 196 mmHg, diastolic 129 mmHg, MAP 151 mmHg, and pulse 111 bpm. After 30 minutes, there was another increase in systolic blood pressure to 205 mmHg, diastolic 124 mmHg, MAP 151 mmHg, and pulse increased to 114 bpm.

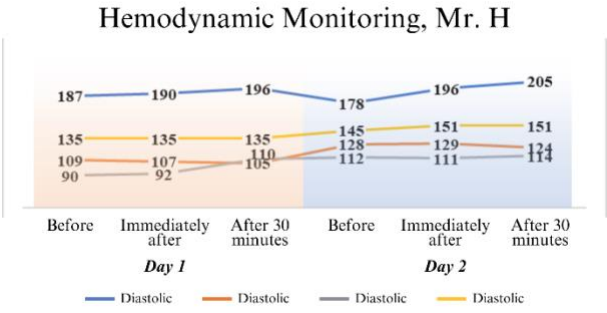

Figure 5. Hemodynamic Monitor, Mr. H

1.6 Discussion

Before the acupressure at the Taichong acupoint was used on the five patients, their systolic blood pressure was between 134 and 187 mmHg, their diastolic blood pressure was between 76

and 109 mmHg, and their pulse rate was between 61 and 92 bpm. Hemodynamic monitoring of the five patients who had undergone acupressure intervention at the Taichong acupoint for 10–15 minutes showed a tendency to increase blood pressure, MAP, and pulse. After 30 minutes of intervention, Mr. I and Mrs. E experienced lowered blood pressure and MAP, but his pulse was still within normal limits. After 30 minutes of monitoring, Mr. B showed no significant changes. But, on the second day of the intervention, there was elevated blood pressure and MAP, and the pulse was below normal level. After 30 minutes of intervention on the first and second days, Mr. M did not show better hemodynamic improvement than before the intervention. After monitoring for 30 minutes on the first and second days, Mr. H has elevated blood pressure and MAP, and his pulse is above normal level.

During the initial assessment day for Mr. I and Mr. B in the general intensive care unit, the plan was to extubate the patient the following day and gradually reduce the sedation dose, particularly Neodex or Dexmedetomidine. Guidelines from the Society of Critical Care Medicine emphasize the need to manage sedation carefully to prevent oversedation and its side effects, such as agitation and hemodynamic instability. The guidelines recommend daily sedation interruptions and assessment to ensure the patient is not over-sedated, thereby facilitating a smoother extubation process and reducing complications[11]. However, multiple instances of reduced sedation before extubation may result in increased agitation in the patient. Reducing sedation too quickly often leads to agitation, as the patient may experience discomfort, confusion, or pain. Reducing sedation may lead to hemodynamic instability, which includes fluctuations in blood pressure and heart rate. The stress response associated with awakening and the physical and psychological stress of being in an ICU environment often causes this instability[12,13].

Mrs. E, with GCS E4M6V4, was the only patient available for an interview. She experienced pain and slight soreness during and after acupressure to the pressure point, which subsided after 1-2 minutes and left her feeling more relaxed. Some patients report feeling pain or discomfort during acupressure despite the therapy's intended reduction of kidney stone pain[14]. Massaging or pressing the soft tissue and joints around acupressure points can cause pain or discomfort during this therapy, especially on sensitive points[15].

In an analysis of journals examining the effectiveness of acupressure at the Taichong point with lemongrass oil, various studies indicate a decrease in blood pressure in patients undergoing this intervention. For instance, acupressure at the Taichong point effectively lowered blood pressure in hypertensive patients treated at the cardiology clinic of Taiwan General Hospital. Giving acupressure at the Taichong acupoint decreased the average systolic and diastolic blood pressure in the experimental group at 0, 15, and 30 minutes after acupressure (165.0/96.3, 150.4/92.7, 145.7/90.8, and 142.9/88.6 mmHg). It suggests that giving acupressure at the Taichong acupuncture point for 15 minutes can reduce systolic and diastolic blood pressure in hypertensive patients for at least 30 minutes or in the short term.[5].

In a different context, a study reported a reduction in blood pressure after acupressure at the same point for 7 days in patients with stage 2 and 3 hypertension in the emergency room of RSUD Dr. R. Goeteng Taroenadibrata Purbalingga[10]. Another study demonstrated the positive effects of acupressure on pregnant women with hypertension at the Puskesmas of Banyumas Regency, noting a decrease in blood pressure and anxiety levels following the intervention[16]. Similarly, the impact of the Spiritual Emotional Freedom Technique (SEFT) and Taichong acupressure, found a decrease in blood pressure among elderly individuals with hypertension[17].

Stimulation of the Taichong acupressure point can spread liver *Qi Yuan* points. It is a meridian point where the vital energy (*Yuan Qi*) of the zang-fu organs passes and settles. Diseases related to the five Yin organs implicate these points and also regulate *Yuan Qi*. Piercing the yuan point can stimulate the vital energy of regular meridians, regulating the functional activities of internal organs. Therefore, acupressure at the Taichong acupoint can stimulate liver function to facilitate the flow of qi (liver) throughout the body, thereby reducing systolic and diastolic blood pressure[5].

Acupressure therapy using lemongrass oil has a calming effect. The properties of lemongrass oil, particularly its aldehydes and esters, are water-soluble, hypotensive, and can lower heart frequency. When acupressure therapy employs lemongrass oil at the Taichong acupoint, the

compound absorbs, travels through the skin's epidermis layer, penetrates lymph and blood channels, permeates sweat glands and nerves, enters the bloodstream, and reacts with every cell in the body, resulting in a soothing effect. This compound has a hypotensive effect, meaning it can lower blood pressure[8,18].

However, the results of this study were not in line with Mr. H's, which showed an increase in blood pressure immediately and 30 minutes after acupressure. Mr. H, with GCS E1M4V2, showed restless behavior by hitting his hands on the bed several times, followed by increased blood pressure and pulse. The results of measuring pain using the Wong-Baker scale when performing acupressure showed a scale of 5 (moderate pain) out of 3 (mild pain). This involves various challenges when treating patients with minimal consciousness, agitation, and pain sensitivity to physical stimuli such as pressure on certain areas of the body. Medical procedures and physical manipulation often trigger an agitated response in patients with minimal awareness. Increased sensitivity to external stimuli can cause discomfort and restlessness.[12].

Functional neuroimaging studies show greater pain perception in patients in a minimally conscious state compared to patients in a vegetative state, indicating that preserved cognitive mechanisms may be involved in the process of pain modulation in patients in a minimally conscious state[19]. Patients who have been in an acute comatose state because of brain damage may feel more pain because of central sensitization mechanisms. They may also have unpleasant sensory and emotional experiences related to actual or possible tissue damage[20].

Patients with minimal awareness experience a variety of pathologies that affect their ability to interact with their environment, resulting from both traumatic and non-traumatic causes. Consciousness is generally defined as the brain's capacity to understand oneself and the environment, which requires adequate arousal and awareness of content (sensory, cognitive, and affective experience). Whether they realize it or not, patients with neurological disorders can experience increased spasticity and autonomic activation (hypertension, tachycardia, tachypnea, sweating, pupil changes, etc.) in response to pain, which can also worsen dysautonomia symptoms[21,22]. Suffering is an individual's emotional reaction to the perception of pain and may involve a variety of responses, including frustration, denial, anger, and anger at oneself, among others. Pain can manifest as a chronic and long-lasting condition in patients who experience prolonged disturbances of consciousness, which they perceive as an internal trait due to central sensitization mechanisms that lead to pain hypersensitivity[20,21].

CONCLUSION

In conclusion, the application of acupressure at the Taichong acupoint (LR3) demonstrates potential in improving hemodynamic stability, particularly in patients with higher Glasgow Coma Scale (GCS) scores. By promoting relaxation and enhancing circulation, this technique may help mitigate agitation reactions commonly observed in critically ill patients. However, individuals with lower GCS scores may not experience the same level of benefit and may require additional or more intensive interventions to achieve comparable hemodynamic improvements. Given these findings, further research is necessary to validate the efficacy of acupressure in diverse patient populations and refine protocols for its application in emergency and critical care settings. Future studies should explore optimal stimulation parameters, patient selection criteria, and possible integrations with conventional medical treatments to maximize therapeutic outcomes.

ACKNOWLEDGEMENTS

We would like to thank all parties involved in the implementation of this intervention.

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