Artigo

BLOODLETTING ON EAR APEX FOR ARTERIAL BLOOD PRESSURE CONTROL IN DENTAL PATIENTS. A CASE SERIES

SANGRIA NO ÁPICE DA ORELHA PARA CONTROLE DA PRESSÃO ARTERIAL EM PACIENTES ODONTOLÓGICOS. UMA SÉRIE DE CASOS

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ABSTRACT: Objective: Evaluate the effectiveness of blood pressure control in hypertensive patients using bloodletting on ear apex technique before tooth extraction. Methods: This observational prospective case series carried out on 65 volunteers who needed simple tooth extraction and had blood pressure above 140 / 90mmHg. The blood pressure measurement occurred 5 minutes after the baseline and after bleeding. Subsequently, the blood pressure measurement occurred in three moments: 15 minutes after bleeding, after anesthesia, and at the end of the procedure. Results: There were significantly more successes than failures. Every patient who presented successful results had the pressure remained at the recommended levels after anesthesia and at the end of the procedure. Also, there was sex influence with higher failure rates in men. Conclusion: The bloodletting on ear apex technique reduced the blood pressure satisfactorily in most cases, remaining at the recommended mean levels even when verified after anesthesia and at the end of the procedure.

KEYWORDS: Hypertension, Acupuncture, Auriculotherapy.

RESUMO: Objetivo: Avaliar a eficácia do controle da pressão arterial em pacientes hipertensos usando a técnica de sangria no ápice da orelha antes da extração dentária. Métodos: Esta série de casos prospectiva observacional foi realizada em 65 voluntários que precisavam de extração dentária simples e tinham pressão arterial acima de 140/90 mmHg. A medição da pressão arterial ocorreu 5 minutos após a linha de base e após o sangramento. Posteriormente, a medição da pressão arterial ocorreu em três momentos: 15 minutos após o sangramento, após a anestesia e no final do procedimento. Resultados: Houve significativamente mais sucessos do que fracassos. Todos os pacientes que apresentaram resultados bem-sucedidos tiveram a pressão mantida nos níveis recomendados após a anestesia e ao final do procedimento. Além disso, houve influência do sexo, com taxas de insucesso mais altas nos homens. Conclusão: A técnica de sangria no ápice da orelha reduziu a pressão arterial de forma satisfatória na maioria dos casos, permanecendo nos níveis médios recomendados mesmo quando verificada após a anestesia e ao final do procedimento.
1. Introduction

Hypertension is defined by the World Health Organization (WHO) as a medical condition wherein there is a persistent elevation of pressure in the blood vessels. The force of blood pushing against the walls of blood vessels while it is pumped by the heart creates blood pressure (BP). Blood pressure is the result of the force exerted by the circulating blood against the arterial walls during heart contractions. Consequently, the heart's pumping effort increases with higher pressure levels\(^1\). The ideal blood pressure to minimize the cardiovascular risk is when levels of systolic blood pressure (SBP) are < 120 mmHg and diastolic blood pressure (DBP) < 80 mm Hg\(^2\).

Unstable elevations in BP may be attributed to stimuli such as emotional overload, physical exercise, diet, medications, Valsalva maneuver, acute bleeding, and myocardial, cerebral, or other organ ischemia. Pressure variations are subjective and depend on the stimulus and individual response of each person. Sometimes, even, the submission to anamnesis or assessing BP may lead to an increase in the blood pressure of patients\(^3\)–\(^5\).

In Tradicional Chinese Medicine (TCM), hypertension may be associated with disharmony between Yin and Yang aspects of the Liver and kidneys, as well as the presence of Moisture, Heat or Mucosity\(^6\). However, unlike the Western definition, TCM does not have an equivalent concept of hypertension as a distinct disease. Instead, in TCM, hypertension is more related to symptoms such as headaches, dizziness, and cardiovascular or cerebrovascular disorders\(^7\).
In TCM, the auricular pavilion is related to the body, and each organ of the human body seems to have a corresponding point in the auricular pavilion. These specific points can be stimulated through auriculotherapy employing small needles, spheres, seeds, or lasers aiming to restore the body’s physiological balance\textsuperscript{8,9}.

There is an adjunctive treatment performed through auriculotherapy called Bloodletting used for systemic arterial hypertension. Bloodletting provides immediate relief of numerous discomforts and consists in a small puncture on the skin of the ear with a faceted lancet or hypodermic needle resulting in the outflow of blood after perforation in specific areas/capillaries of the ear pavilion. This method has six fundamental functions: antipyretic, anti-inflammatory, sedative, hypotensive, antiallergic, and addresses the "mind-body problem" while also promoting clarity of vision\textsuperscript{10,11}.

Despite bleeding in the upper part of the ear is related to control hypertension\textsuperscript{7,10}, there is a lack of experimental studies in dentistry utilizing this technique. Therefore, the aim of this study was to evaluate the feasibility of obtaining immediate control of blood pressure in patients during dental treatments using the practice of bloodletting.

2. Methods

2.1 Study Design

This observational prospective case series was performed in line with the principles of the Declaration of Helsinki. It had approval granted by the Ethics Committee of Federal University of Sergipe (protocol CAAE number 83160318.6.0000.5546), and all included patients provided signed informed consent before participating in this research. This study was performed at the Department of Dentistry of Federal University of Sergipe in Aracaju, Sergipe, Brazil.
2.2 Population Characterization, Inclusion and Exclusion Criteria

The inclusion criteria were patients aged under 18 years, ASA II or ASA III\textsuperscript{12} who sought dental extraction from the Surgery service in the Dentistry Department of Sergipe Federal University. The subjects had to present the blood pressure (BP) higher than 140/90 mmHg using or not with antihypertensive drugs. All dental extractions were made without requiring an osteotomy.

Exclusion criteria were diabetics, hemophiliacs, pregnancy, patients with dental fear or phobia of needles, and individuals using anxiolytics or antiplatelet drugs. All participants were informed about the risks and benefits of the study before signing an informed consent form.

2.3 Procedure Execution

Before starting the dental procedures, all patients had the BP checked using the pressure monitor (Omron®) certified by INPE (Brazilian Institute of Weights and Measures), following the rules of resolution 44/2016 of ANVISA (Brazilian National Health Surveillance Agency). Only individuals with values higher than 140 / 90 mmHg participated in the study.

After 5 minutes, the Blood Pressure has been verified again and registered. Then, a physiotherapist (specialized in acupuncture), after antisepsis using cotton with 70% alcohol, performed a massage at the apex of the ear until the presence of hyperemia. Lastly, the region was restrained and the apex point punctured using a silicone-coated lancet (MicroletTM Bayer, Switzerland) to promote a withdrawal of 5 to 20 drops of blood (Figure 01). Blood pressure was verified for the third time 15 minutes after the puncture. Cases when the BP did not decrease to values below 140/90 mmHg was considered failure, and dental procedure was not performed.
Figure 01. Clinical photos of the procedure. A - Massaging the ear until the presence of hyperemia of the site of puncture. B – Finding the ear apex. C – Positioning the lancet to puncture. D – The bloodletting with a drop of blood from the ear apex.

Source: prepared by the authors.

The BP was verified for the third time 15 minutes after the puncture. Cases in which the BP did not decrease to values below 140/90 mmHg were considered a failure. In case of failure the patient the dental procedure was not performed.

Otherwise, if there was a decrease in BP to acceptable levels (< 140/90 mmHg), the dental procedure was performed. Then, the BP was measured and recorded after anesthesia plus at the end of the tooth extraction.

2.4 Data Analyses

The collected data were analyzed according to the distribution, and homoscedasticity. Data were submitted to statistical analysis (unpaired t-
tests, Chi-square, and ANOVA) using GraphPad Prism 7.0 software with a significance level set at p < 0.05.

3. Results

A total of 65 patients who presented blood pressure (BP) higher than 140/90 mmHg were included in this study.

There were significantly (Chi-square, p < 0.0001) more successes than failures. In addition, there was an influence of gender, with a significantly higher failure rate in men (Chi-square, p = 0.0090). There were no differences (unpaired t-test, p = 0.2332) between the ages (mean ± SD) of women (51.2 ± 12.98 years) and men (54.8 ± 11.17 years). There were also no differences (unpaired t-test, p = 0.3535) between the ages of those who had succeeded or not with the technique (Table 1).

Table 1. Distribution of results regarding success and failure according to sex.

<table>
<thead>
<tr>
<th>Result</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure</td>
<td>2</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Success</td>
<td>28</td>
<td>22</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>35</td>
<td>65</td>
</tr>
</tbody>
</table>

Source: prepared by the authors.

Figure 2 shows the systolic blood pressure (SBP) (A and B) and diastolic blood pressure (DBP) (B and C) of the volunteers who displayed success (A and C) or failure (B and D) with the technique.
The volunteers who displayed failure did not have statistically significant differences (ANOVA of repeated measures) for both the SBP ($p = 0.79$) and the DBP ($p = 0.15$) between the analyzed times. However, for volunteers who displayed success, it was observed that there was a decrease (ANOVA of repeated measures, $p < 0.0001$) for both SBP and DBP after 15 minutes, remaining at the average levels verified at that time both after anesthesia and at the end of the tooth extraction.

Thereby, when the bloodletting on the ear apex was considered effective, there was a significant blood pressure decrease, thus, making the tooth extraction possible. The average time of the procedures performed in those with success was $31.8 \pm 6.05$ minutes.
4. Discussion

Many studies claim that acupuncture and medicine association is effective for hypertension treatment\textsuperscript{13–15}. However, bloodletting is most effective when used in emergencies instead as the primary treatment for hypertensive disease\textsuperscript{7,11}.

Cases of hypertensive urgencies can be controlled by oral medication. The generally indicated classes of medications are short- or immediate-acting Ca++ channel blockers, angiotensin-converting enzyme inhibitors (ACEI), α and β blockers, β-blockers, or loop diuretics. Thus, treatment can be performed on an outpatient basis by a physician, but the patient should be observed for 5-6 hours after the start of administration of the drug\textsuperscript{16}.

In dentistry offices, dentists are not able to treat hypertension. Benzodiazepines are usually used as a pre-anesthetic medication to avoid BP elevation due to emotional conditions\textsuperscript{17,18}. Nevertheless, benzodiazepines are related to some adverse effects such as drowsiness; paradoxical effects (excitement, agitation, and irritability); anterograde amnesia; mental confusion, and headache\textsuperscript{19,20}. Therefore, there are no reports in the literature associating bloodletting with adverse effects, which justifies the relevance of conducting studies on this technique.

There are few studies published in available periodic journals about bloodletting on ear apex to control high blood pressure. Despite we have found a systematic review about it, the studies mentioned are not available for consultation\textsuperscript{7}. Another study performing the bloodletting technique presented BP reduction in 80% of the participants for DBP and 25% of the participants for SBP, but it increased by 15% for both\textsuperscript{21}.

In contrast, we observed significant reductions in blood pressure levels that were considered safe for providing dental care in 50 out of 65 patients, both in SBP and DBP. This may be attributed to the fact that we allowed sufficient time for patient accommodation before the bloodletting procedure,
and we extended the evaluation period to 15 minutes after the bloodletting instead of only 10 minutes. The time waited before evaluation might have made a difference since only 15 minutes after the bloodletting patients in our study presented a satisfactory reduction in the BP as reported before. Therefore, the time waited after bloodletting could be a variable more explored in future studies. We noted in figure 2 that after 15 minutes, the values of diastolic BP of patients that had no success for bloodletting showed a tendency to dispersion, and it could be possible that values of DBP could diminish even on those patients if we had waited for more.

Furthermore, our results can be related to the number of spilled drops and the patient’s profiles. Bloodletting is indicated preferably in cases of crises, so a withdrawal of 5 to 20 drops of blood is made, according to the severity of the problem. Limiting the drops of blood to only one and using the technique in controlled patients could have led to a technical failure in the previous study.

One of the TCM theories states that auricular acupuncture effectiveness is due to groups of pluripotent cells that encompass knowledge of the whole body. Then, the stimulus of the reflex point of the auricular pavilion will activate these pluripotent cells.

Furthermore, there is a relation between the vagus nerve and cardiovascular conditions. Even in Western medicine, blood pressure is reduced by activation of the vagus nerve. Also, the vagal tonus may be affected by auricular acupuncture since the auricular branch of the vagus nerve (ABVN) innerve the auricular concha and the area around me acoustic meatus.

The auricular apex is the most indicated point for bleeding because of your anatomic localization since it is the highest point of the pavilion, where the posterior auricular artery and vein find the superficial temporal artery and vein. It enables the action throughout all the microsystems of the ear, making all ear regions benefited. Therefore, the reduction in blood pressure.
pressure achieved in this study is probably related to a vagal response and a balance caused by ear stimulation and bloodletting acupoint choice.

It is worthy to emphasize the maintenance of the bloodletting effect in BP. In our study, the values of BP kept stable even through local anesthesia and the dental extraction moments. We were unable to find another study that establishes the maintenance of the reduction in BP levels\textsuperscript{7,21}. Our results can be faced as a relevant achievement since the maintenance of recommended BP levels enables the professional to execute the dental extraction safety with a lower risk of cardiovascular event\textsuperscript{2}.

A curious result shown in our study is the influence of sex. There was a significantly higher failure rate in men. In Western medicine, the control of hypertension is different for men and women and may vary depending on age. No evidence in the literature could correlate the patient's sex to the bloodletting response. But maybe a hybrid concept, western and traditional Chinese medicine, might help us understand that sex influence.

Western medicine establishes that the influence of sympathetic activity on blood pressure is significant in individuals aging over 40 years old and it is higher in women than in men. In addition, the directly proportional relationship between bursts per minute influenced by sympathetic nervous activity in the musculature and the increase in mean blood pressure is considerably higher in women than in men both over 40 years age\textsuperscript{24}.

Therefore, women over 40 years of age will be more susceptible to BP controls through acupuncture parasympathetic activation, which corroborates with our better results in women with a mean age above 40 years and could be related to the vagal response attributed to ear acupuncture through bloodletting.

Besides, there is still no defined drug protocol for BP management in dentistry. Then, dentists could use the bloodletting technique to increase the comfort and safety of the patient in dental care. As long as acupuncture is a legalized activity for the dentist, as in Brazil, where acupuncture is already
regulated in the Federal Council of Dentistry as a dental specialty\textsuperscript{25}. Give the limitations but the promising application of bloodletting in dentistry, we suggest further studies such as clinical trials.

5. Conclusion

Bloodletting at the ear apex technique reduced the blood pressure of hypertensive patients to acceptable levels. Blood pressure control was better established in women. And in most cases, the mean blood pressure values remained at safe levels even when verified after anesthesia and at the end of the procedure.


