

HELPING PHYSICIANS TO UNDERSTAND "HAVANA SYNDROME" AND A NOVEL METHOD OF MANAGING AHIS

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ABSTRACT

Never before have civilian physicians encountered patients with, or were challenged with diagnosing a chronic condition named "Havana Syndrome" and its acute events known as Anomalous Health Incidents (AHI). Furthermore, there are no therapeutic interventions exist to manage debilitating symptoms of AHI. The aim of this paper is two-fold. First, the author provides a framework for understanding these phenomena: brain entrainment and non-kinetic brain injury. Second, a promising method of managing AHIs of "Havana Syndrome" is described, and effectiveness demonstrated by the author. The method utilizes two percussive massagers set to different pulsating frequencies used simultaneously in order to de-synchronize brain activity subjected to exogenous electromagnetic pulses.

KEYWORDS

Neurology, Havana Syndrome, AHI, Brain Entrainment, Coupling, Non-Kinetic Injury

1. INTRODUCTION AND BACKGROUND

A novel medical condition colloquially called "Havana Syndrome" ("HS") presents a challenge to practitioners who have never encountered patients with this diagnosis before, or have never been challenged to diagnose this condition. The term "HS" first entered public conversation in 2017 following events in Havana, Cuba. Other terms used by the US Government: Unexplained Health Incidents (UHI), which was short-lived and was substituted by Anomalous Health Incidents (AHI)[1].

While there appears to be a controversy regarding the causation of "HS", the scientific community issued two Consensus Reports converging on the plausibility of directed pulsed electromagnetic (EM) energy, specifically in the microwave (MW) range, as causation[1, 2]. There are 25 Department of State employees stationed in Cuba whose diagnosis remains undisputed, and cannot be explained by environmental factors or pre-existing conditions. This group of patients is known as the Havana Cohort of the "HS". Finding in this group helped to establish diagnostic criteria for this novel condition[3].

Although the term "HS" was initially used in government reports, it was later changed to AHI (Anomalous Health Incidents). It is important to point out that these two terms are not interchangeable, even though they are used interchangeably in the government documents. AHI is an event, while "HS" is a condition encompassing these events and lasting longer than an event of events, and includes long-term sequelae such as cognitive impairment. Not adhering to using these terms in the disciplined way often leads to confusion and misunderstanding. AHI is better

described by R. McCreight as NeuroStrike, - an event resulting in neurocognitive disruption in personnel due to the directable EM pulses[4]. In this paper the term AHI will be used, since it is the term physicians might be more familiar with.

There is a pressure to stop using the term “HS” entirely, but the substitution that has been offered by these critical voices is either AHI, which doesn’t have the same meaning, or TBI (Traumatic Brain Injury). Using TBI as a term to describe a chronic condition following AHIs presents its own set of problems. TBI is synonymous with concussion, and when physicians are presented with terms such as Traumatic Encephalopathy due to this condition, doctors draw a blank, because a patient would have no history of concussion. However, in the military medicine this condition is known, and described as UBI (Unconventionally-Acquired Brain Injury) [5]. The brain injury is explained by short (sub-milliseconds) bursts of EM energy and generation of thermoacoustic or thermoelastic shockwaves in the brain tissue leading to cellular damage[6].

Another serious challenge surrounding “HS” is the fact that the US Government does not track or acknowledge this condition as being experienced by, and diagnosed among civilians who are not family members of federal workers. Only Government Employees and their dependents are tracked and entered into the AHI Registry. As of January 2024, 334 patients had qualified for AHI care, including 15 children, with multiple attacks occurring on US Soil[7]. The HAVANA Act of 2021 (Helping American Victims Afflicted by Neurological Attacks) signed by President Biden in October 2021 provides for the possibility of one-time, lump sum payments exclusively to federal employees and their dependents. At the same time, experts in the field such as Dr. James Giordano acknowledge diagnosed civilian cases, and warn physicians about this growing public health issue taking place without any action from CDC or NIH[8].

For civilians diagnosed with “HS”, Civilian Registry has been created and maintained by an MD [9]. The goal of this Registry is to alert health agencies to the growing number of civilian patients, and make these agencies to acknowledge, act and address this health crisis. Another goal of the Registry is to force law enforcement to investigate civilian cases, and for Congress to enact laws protecting general population from this technological and neurological disaster in the making.

2. BRAIN ENTRAINMENT FRAMEWORK OF AHIS

In order to better understand “HS”, one needs to first have a better understanding of its acute events,- AHI attacks. In order to accomplish this, it is helpful to frame signs and symptoms occurring during these attacks as brain entrainment episodes. Intelligence Community Scientific Consensus Report on AHIs titled “Analysis of Potential Causal Mechanisms” issued in 2022 contributed significantly to forming said framework [2].

Most common signs and symptoms of AHIs include sudden sense of vibrating pressure and/or loud, unpleasant sound, accompanied by nausea, dizziness, and acute cognitive deficiencies. AHI symptomology is often misunderstood because most of the complaints are considered to be non-specific. However, what is specific to these events is not just which symptoms experienced, but the timing of how they are experienced. Specifically, during AHIs, audio-vestibular sensory phenomena have acute onset with all symptoms occurring together, and with a sense of directionality. Constellation of the above signs and symptoms occurring simultaneously is unique and novel, and constitutes a separate, never seen before medical condition, thus requiring a novel explanation of its pathogenesis.

Moreover, one of the symptoms stands out as virtually unique to AHIs. It is called Buffeting. The term Buffeting comes from aeronautics, where it means turbulent, irregular shaking or oscillation of an aircraft caused by unsteady airflow. In the medical sciences, buffeting is referred to as a sensation of vibrational pressure. Vibrating pressure could be observed when a pulsating mechanical (kinetic) force is applied. In case of AHIs, no mechanical force is applied, and different causative mechanism must be considered.

Most physicians are not familiar with buffeting as a symptom because it has not been previously described in the clinical literature (outside of applying mechanical force), and has not been seen in common practice. A question should be raised whether the sensation of buffeting could be due to some form of epilepsy. It is author's experience and observation that there is a lack of epileptiform activity on the EEG recorded during an AHI attack, which conforms to the published literature on "HS".

Buffeting experienced during acute AHI attack is best explained by exposure to short (sub-milliseconds) pulses of EM energy, and consequent synchronization of brain waves to externally applied EM pulses. The aforementioned Intelligence Community Report refers to entrainment as coupling. During the exposure, EM pulses couple with an electrical resonance that entrain the brain [2].

The phenomenon of brain entrainment, or coupling due to pulses of EM energy in humans has been previously described by M. Persinger, *et al.* [10] and further detailed in Ber, 2024 [11]:

"Coupling occurs in two phases – Driving and Entrainment. Driving occurs when an external pulsed EM signal directly stimulates the brain, essentially pushing or forcing brain wave activity toward the frequency of the external stimulus. In this phase, the brain is not yet synchronized with the external signal, but it is being influenced or "driven" by the pulses. Entrainment refers to the synchronization of brain wave frequencies to external stimuli. The brain's neural oscillations can become synchronized or entrained to the frequency of these external inputs and match the rhythm of that stimulus."

The understanding of AHI attacks as brain entrainment episodes allowed the author to develop a novel method of brain dis-entrainment as described in Section 4.

3. NON-KINETIC INJURY AS A FRAMEWORK FOR UNDERSTANDING "HAVANA SYNDROME"

Classic model of a disease is such that an acute phase lasts up to 6 months from its inception. Past that, it becomes a chronic condition. In this sense, "HS" is a chronic neurological condition that persists beyond its acute events known as AHIs. Its hallmark is progressive cognitive decline stemming from the initial injuries that best explained as cellular damage due to thermoacoustic/thermoelastic shockwaves due to pulses of EM energy, rather than from a mechanical/kinetic interaction [6].

TBI, synonymous with concussion, which is a mechanical/kinetic trauma does not satisfactorily describe or help in the understanding of this condition. Therefore, substitution of "HS" with TBI, as being suggested, is imperfect. First, we have to expand the meaning of TBI to include other causative mechanisms, and second, - create a distinct entry for this condition.

There are efforts under way to introduce a novel nosological unit into the next edition of the ICD (International Classification of Diseases) that would be used in place of the "HS" diagnosis. It is

called NKBI (Non-Kinetic Brain Injury)[12]. Justification for this introduction would be as follows. Currently, Traumatic Brain Injury is synonymous with concussion, which is a kinetic form of neurological trauma, while “HS” is a result of pulses of EM energy. EM energy travels through the vacuum, therefore it represents a non-kinetic form of energy, and results in non-kinetic form of injury. This is a reasonable framework that we should adopt and educate physicians about. Today, the distinction between kinetic and non-kinetic forms of brain injury is virtually unknown to medical practitioners.

While AHIs result in NKBI, it is important to keep in mind that AHIs can continue past the acute phase of and occur while NKBI is already present. This is similar to the situation in which repeated concussions contribute to further development of mTBI (mild Traumatic Brain Injury) and Chronic Traumatic Encephalopathy (CTE). Following this logic, we should adopt terms such as Acute Non-Kinetic Encephalopathy and Chronic Non-Kinetic Encephalopathy.

4. NOVEL METHOD OF BRAIN DIS-ENTRAINMENT USING TWO PERCUSSIVE MASSAGERS

Currently there are no therapeutic measures to address harsh symptoms experienced during an AHI attack, or validated interventions to disrupt, or shield from an attack. The only recommendation ever mentioned with respect to the AHIs was in the Department of State Interim AHI Guidelines: “get off the X”[13]. The phrase “get off the X” is a military term advising to move away from a spot where one is vulnerable or exposed to danger. The effectiveness of this recommendation has never been evaluated. It was purely observational and was based on the description of the initial attacks that took place in 2017.

Understanding the genesis of the signs and symptom experienced during an AHI attack as a brain entrainment event allowed for the exploration into a promising method of brain dis-entrainment described in this section.

First, the author investigated which brain receptors are typically involved in the sensation of buffeting during the exposure to pulses of EM energy, and due to repetitive mechanical pulses. Other sensory phenomena were also included in the comparison. Information on the receptors involved is collated in Table 1. When comparing the range of receptors involved, significant overlap was noticed between pulses of EM Energy (non-kinetic stimuli) and the repetitive mechanical pulses from percussive massagers (kinetic stimuli). Specifically, the involvement of mechanoreceptors and proprioceptors in both scenarios was noted.

Percussive Massagers, or Massage Guns which use rapid bursts of pressure were introduced to the market in the early 2010s. Since then, they have become a household item, especially among athletes. Typically, they are used to relax spastic muscles, and to speed up the healing process of minor muscle and connective tissue injuries. For the method development, two different commercially available percussive massagers were purchased. Their specifications are presented in Table 2.

Conversion of RPM (Repetitions per minute) into Hz (cycles per second) revealed that these frequencies correspond to the brain electric activity in the beta (13–30 Hz) and gamma (>30 Hz) ranges. In order to generate more frequencies beyond the massager settings, the method of heterodyning, or frequency interference was utilized. In a very simplified manner, using two sources of pulsed frequencies simultaneously, at least two Intermodulation Products would be generated: Sum Frequency and Difference Frequency. Table 3 gives examples of Interference Product Frequencies using two percussive guns.

The author hypothesized that utilizing two percussive massagers should allow for de-synchronization of brain waves to the external EM pulses by a) creating a range of competing brain waves resulting from using percussive massagers, and b) by taking advantage of the overlapping range of brain receptors involved in the sensation generated by both kinetic and non-kinetic pulses. It is important to emphasize that EM pulses and mechanic pulses do not interact directly, but rather their resulting effects interact and compete at the level of brain activity.

5. SELF-EXPERIMENTATION

For the purpose of testing, the author undertook 2 week long self-experimentation to evaluate the effect of using two percussive massagers simultaneously on self-reported buffeting during AHI attacks. Procedures were designed following the same ethical guidelines applied to standard clinical trials, and all efforts were made to mitigate potential risks.

The author has been experiencing AHI attacks since 2019, and was diagnosed with “HS” in 2020 at the University of Miami by Dr. Micheal E. Hoffer. Dr. Hoffer and colleagues examined and diagnosed the 25 uncontested cases among diplomats stationed in Cuba. These two dozen cases of “HS” are known as the Havana Cohort. The initial diagnostic criteria were developed based on the symptoms, and neurological, audio-vestibular, and cognitive findings in this group of patients[3]. The author met said criteria and was given the same diagnosis as the diplomats, even though the author is a civilian, with all of AHI attacks occurring on US soil, primarily at the author’s residence. Author’s AHIs have continued to the day of writing this article. They last from 15 min to 1.5 hour, every day, multiple times a day. The author is believed to be the first US civilian on disability due to “HS”. The author is also a retired MD, and is uniquely qualified to conduct the experiment.

Over the last 5 years the author has become attuned to the signs of these attacks including the distinct sensation of buffeting that feels like no other neurological symptoms. Buffeting is extremely uncomfortable and at the high intensity can be very painful, debilitating, incapacitating, and inducing loud vocalization when intolerable. The author describes: “To power through the most severe attacks, I would scream in order to “push” against extremely painful sensation of buffeting. It feels as if your head is being squeezed in a vibrating vice. You can’t talk or perform cognitive tasks, – if you try, your brain feels scrambled and foggy. You can’t walk, – if you try, you lose balance”.

In order to formalize and track the experience, the author developed a self-reported scale of AHI attack based on the intensity and tolerability, with levels ranging from 0 to 10. Level 0 represents lack of buffeting, and Level 10 represents the highest intensity, accompanied by pain and loud vocalization. Explanation of the scale is presented in Table 4.

Intervention was conducted by placing of percussive massagers on the body as shown in Figure 1. Anatomically, anterior position corresponds to the bilateral placement over *Rectus femoris*; and the posterior position corresponds to the bilateral placement over the upper portion of *Trapezius* and *Splenius capitis*. Successful disruption was defined as decrease in the intensity of the attacks from intolerable levels (7-10) to the tolerable levels (5 or lower).

6. RESULTS

Over the 2-week period of experimentation, AHI attacks were experienced daily, ranging from 2 to 7 attacks per day, totaling 71 documented attacks. The speed with which the attacks ramped up in intensity varied from 5-45 seconds (short driving period) to 4-6 minutes (long driving period). Typical duration of the attacks ranges from 15 min. to 1.5 hour. During the experimentation period all of the attacks were disrupted, so the shortest duration of the attack could not be determined. However, the longest attack during the same period was still 1.5 hour.

Attempts to disrupt AHI attacks using a single percussive massager were unsuccessful, although allowed for marginal relief. When two massage guns were used simultaneously, using different frequencies, 100% of the attacks were disrupted, meeting criteria for successful disruption (the intensity subsided to the tolerable levels, 5 or lower). Relief due to the use of percussive guns was felt almost immediately, within a few seconds and up to 30 seconds for the most severe attacks (dis-entrainment time). After achieving successful dis-entrainment, 11 attacks or 15% required no additional application because tolerable levels were achieved. In 60 attacks, or 84%, after successful dis-entrainment was achieved, driving process continued, and additional applications were required. Dis-entrainment time also depended on how early in the attack the massagers were utilized, and on the level of the intensity at the beginning of the intervention. Generally, the sooner in the driving process, and the less the intensity of the attack, the more successful and faster dis-entrainment was achieved.

Among the two placements, posterior neck placement was more effective than the anterior leg placement. The neck placement was necessary to disrupt attacks of intensity levels 9 and 10. All combinations of massage gun settings were effective. Specific effectiveness of various combinations was hard to estimate without having proper control.

Undesirable effects and caution. While AHI attacks are inherently causing dizziness and instability, massage gun placement over the neck muscles causes additional dizziness, as well as slight head shaking. In order to prevent loss of balance, neck placement was used only while sitting down. Dizziness and excessive head shaking were also mitigated by lowering the pressure with which massagers were applied. It is reasonable to advise that people with the history of epilepsy should not be using the percussive method as described.

7. DISCUSSION

In the conceptual part of the article, a framework for understanding symptomology of AHIs as a brain entrainment event is presented. Brain entrainment during an AHI is a form of synchronization of brain waves to externally applied EM pulses. As a result of this biological effect, signs and symptoms of AHI are experienced simultaneously. Among these, buffeting, or vibrational pressure is the most distinct symptom, virtually unique to the exposure to EM pulses. Brain entrainment framework should help practitioners to grasp the nature of AHI attacks.

Further, a chronic neurological condition colloquially known as “HS” develops as a result of the damage incurred during AHIs. Plain substitution of this term with TBI is unsatisfactory, because TBI is synonymous with concussion, or mechanical/kinetic injury. The genesis of “HS” includes cellular damage due to the exposure to pulses of EM energy, which is non-kinetic in nature. Therefore, a new nosological unit, NKBI (Non-Kinetic Brain Injury) has been suggested for inclusion into the next edition of the ICD.

Drawing a comparison from the mechanical form of brain injury, where concussion is understood as Acute Traumatic Encephalopathy, and the chronic condition is understood as Chronic Traumatic Encephalopathy, it is reasonable to think of AHI and “HS” as Acute Non-Kinetic Brain Injury and Chronic Non-Kinetic Encephalopathy.

Currently, there are no therapeutic interventions have been offered in the published literature for managing debilitating symptoms of AHI attacks. Brain entrainment framework of AHIs allowed for the development of a promising method of brain dis-entrainment. The method includes utilizing two percussive massagers set to different pulsating frequencies simultaneously. This results in mechanical waves, including their intermodulation products, which compete with the synchronizing effect of external pulses of EM energy at the brain level. The range of brain receptors involved in the development of the sensation of buffeting from mechanical and non-kinetic sources match closely. Specifically, mechanoreceptors and proprioceptors are involved in both scenarios.

In the experimental section of the article, the percussive method was used during AHI attacks for two weeks. Out of the 71 attacks experienced during the 2-week period, 100% of the attacks were disrupted. Most severe attacks required neck placement of the percussive massagers, which is in closer proximity to the brain than the leg placement. Also, most effective and quick disruptions were achieved when massagers were used early in the attacks, during the driving phase. Neck placement should only be used while sitting down. The method is not recommended if prone to epilepsy.

The double percussive method is the first reported medical intervention for managing debilitating symptoms experienced during AHI. Its effectiveness further confirms the utility of brain entrainment as an explanatory framework for AHI. Said framework should allow for method improvement and for developing other measures for disrupting the coupling of biological tissues to external EM pulses. The effectiveness of the percussive method on the development of Chronic Non-Kinetic Encephalopathy is unknown, and warrants further research.

Limitations of the information presented include self-experimentation, subjective nature of the phenomenon studied, short duration, and lack of proper control. In order to have proper control, the same source of EM pulses used under the same conditions and with similar brain architecture must be utilized. Such source is a military weapon, and unavailable for conducting clinical research. Also, it would be nearly impossible to obtain an IRB approval considering the detrimental effects of such weapon on human brain. The weapon and its characteristics, as well as the methods of detection remain classified. However, considering that the AHI and “HS” is a growing health problem in the general population, this will have to change.

8. CONCLUSION

“HS” and its acute events, AHIs are largely misunderstood by physicians who find the controversy surrounding this condition confusing. In order to grasp the nature of these phenomena, a brain entrainment framework should be used for explaining AHIs; and Non-Kinetic Brain Injury (NKBI) and Chronic Non-Kinetic Encephalopathy should be used to understand “HS”.

A promising intervention method for managing debilitating symptoms of AHIs was developed based on the brain entrainment framework. The method utilizes two percussive massagers set to different frequencies simultaneously. This result in the generation of brain waves that compete with the brain waves synchronized to external EM pulses, and disrupt brain entrainment. The

method was effective in disrupting all AHI attacks during the 2-week self-experimentation period, and results are presented, although limitations exist.

The method holds promise to the many sufferers of AHIs of the “HS”, both federal employees and civilians, as no other therapeutic intervention is found in the published literature.

AHIs present significant health and legal concerns. Their symptoms are debilitating, extremely painful, and consequential. Considering that AHIs are caused by the intentional use of military grade weapons, they constitute war crime, crime against humanity, and torture. Furthermore, AHIs result in Chronic Non-Kinetic Encephalopathy that manifests by progressive cognitive and vestibular degradation, and disability.

Although verified civilian cases exist, Health Agencies and Law Enforcement have not acted on this under-reported under-diagnosed under-treated under-investigated health crisis that also affects children. It presents a serious domestic law enforcement challenge and a challenge to the legislators, which must be addressed and acted upon immediately.

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Table 1. Brain receptors involved in generating various sensory effects.

Buffeting due to Pulsed EM Energy	Vibrating Sensation Due to the Use of Percussive Massagers	Somatic Pain	Headache	Pressure Pain
Mechanoreceptors	Mechanoreceptors	Mechanoreceptors		Mechanoreceptors
Thermoreceptors	Thermoreceptors	Thermoreceptors		Thermoreceptors
Nociceptors	Nociceptors	Nociceptors	Nociceptors	Nociceptors
Auditory Receptors	Auditory Receptors			
Vestibular Receptors	Vestibular Receptors			
Proprioceptors	Proprioceptors			

Table 2. Specifications of two percussive massagers manufactured by Renpho, Inc.

No.	Massage Gun Model	RPM (Rotations/minute)	Corresponding Hz (Cycles/sec)
1	RP-GM171-N1	Range: 1,800 – 3,200 r/min Settings: 1) 1,800 rpm 2) 2,150 rpm 3) 2,500 rpm 4) 2,850 rpm 5) 3,000 rpm	Range: 30-53.3 Hz Settings: 1) 30 Hz 2) 35.8 Hz 3) 41.7 Hz 4) 47.5 Hz 5) 53.3 Hz
2	R-C007	Range: 1600-2800 r/min Settings: 1) 1,600 rpm 2) 1,900 rpm 3) 2,200 rpm 4) 2,500 rpm 5) 2.800 rpm	Range: 26.7 Hz – 46.7 Hz Settings: 1) 26.7 Hz 2) 31.7 Hz 3) 36.7 Hz 4) 41.7 Hz 5) 46.7 Hz

Table 3. Examples of intermodulation products generated by using two percussive massagers.

No.	1 st Massager Setting	Correspond. Frequency, Hz	2 nd Massager Setting	Correspond. Frequency, Hz	Sum Frequency, Hz	Difference Frequency, Hz
1	(4)	47.5	(5)	46.7	94.2	0.8
2	(4)	47.5	(4)	41.7	89.2	5.8
3	(4)	47.5	(3)	36.7	84.2	10.8

Table 4. Self-Reported Scale of the Intensity of Buffeting During AHI Attacks.

Intensity Level	Description
0	No sensation of buffeting
1	Very slight sensation of buffeting, tolerable
2	More obvious sensation of buffeting than level 1, tolerable
3	More obvious sensation of buffeting than level 2, tolerable
4	More obvious sensation of buffeting than level 3, tolerable
5	Very obvious sensation of buffeting, the most intense level tolerable
6	More intense sensation of buffeting than level 5, becomes intolerable and may induce vocalization such as moaning
7	Intense sensation of buffeting, intolerable, typically accompanied by loud moaning
9	Very intense incapacitating sensation of buffeting, accompanied by vocalization in the form of loud moaning or screaming
10	Extremely intense incapacitating sensation of buffeting, accompanied by loud screaming

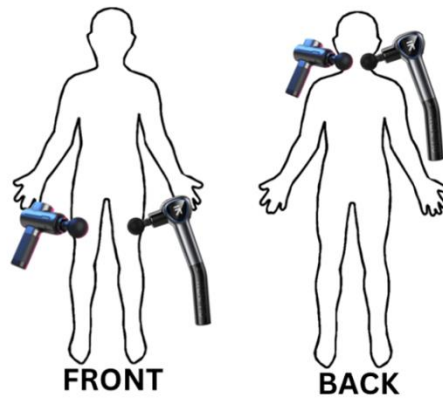


Figure 1. Placement of percussive massagers on the body

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