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Case Series of Suspicious Deaths in an Ambient Induced Heat Injury Syndrome in a Honduran State Institution

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Abstract

The present study of a series of cases is presented as a scientific analytical document from the pathophysiological anatomical point of view, which concluded in the death of people in the same enclosure and of which the causes were carried out for a more in-depth study due to their degree of importance. This study does not intend to point out, its claim is based on the legal medical analytical development that incurs in the importance of the development of forensic science, towards the scientific community at the point of promulgation of the breakdown of possible causes and how these can give us a previous circumstances of which may cause death.

Keywords: *Suspicious Deaths; Heat Injury Syndrome; Honduran State Institution*

Introduction

Among the two hypotheses that can be considered in the causes of death in the series of cases of a state institution in Honduras, a probable intoxication is pointed out in the first instance that could have contributed to this second instance, which is heat stroke due to exertion. In the first case, the literature indicates, based on food poisoning, that they are infections or irritations of the gastrointestinal tract caused by food or drinks that contain harmful bacteria, parasites, viruses, or chemicals. The gastrointestinal tract is a series of hollow organs that join into a long, coiled tube from the mouth to the anus. Common symptoms of food poisoning include vomiting, diarrhea, abdominal pain, fever, and chills [1].

Most food poisoning is acute, meaning it comes on suddenly and lasts a short time, and most people recover on their own, without treatment. Very rarely, food poisoning causes more serious complications. Each year an estimated 48 million people in the United States experience food poisoning. Food poisoning causes approximately 3,000 deaths a year in the United States [2].

There are data indicating that sport significantly increases the risk of sudden death during intense sports activity. The seasonal distribution and its greater frequency at certain times of the day support this fact [2].

In the second case, it stands out that in competitive athletes, understood as those who participate in an organized sport, deaths occur more frequently during autumn and spring, seasons in which the greatest number of competitions are held, and in which in the early afternoon, coinciding with the hours in which most sporting events take place, while in recreational athletes deaths occur in the early morning and late afternoon, coinciding with the moments on the day when these activities are most performed [3]. In addition, people who practice intense sports activity have a higher incidence of sudden death than non-athletes, 1.6 deaths per 100,000 compared to 0.75 per 100,000 [4].

Likewise, cardiovascular pathology, as in the population that does not practice sports, is the most frequent cause of sudden death. Between 74 and 94% of non-traumatic deaths that occur during sports practice are due to cardiovascular causes [5]. In the article by Suárez-Mier and Aguilera [6], considering the 61 cases of sudden death during sports activity, the predominant pathologies were coronary atheromatous disease with 25 cases (40.9%) and arrhythmogenic cardiomyopathy with 10 cases (16.3%).

Unlike other published series, hypertrophic cardiomyopathy, idiopathic left ventricular hypertrophy, myocardial fibrosis, coronary artery anomalies, and aortic valve disease have a low prevalence. However, the number of deaths from an undetermined cause is striking, 10 cases, all under 30 years of age, which represents 16.3% of the total and 31.2% in this age group, in which the competition is more frequent [7].

Its explanation could be in the main mechanisms involved in sudden death that are related to the hemodynamic and electrophysiological changes that occur during exercise, and that can also be different depending on the type of exercise performed. During physical exercise there is an increase in circulating catecholamines, which is increased by the stress generated by the competition and which exaggerates the responses of blood pressure, heart rate and myocardial contractility, with the consequent increase in the consumption of myocardial O_2. On the other hand, sympathetic stimulation can by itself favor the appearance of arrhythmias or aggravate a situation of underlying myocardial ischemia [8].

Heat stroke is a medical emergency caused by an elevation in core body temperature and disturbances in the central nervous system. It can be caused by physical activities in hot environments with high humidity or by intense heat waves. Mortality can be high (up to 70%) and neurological manifestations can be confusing and potentially fatal. Genetics and environmental acclimatization may also be important factors in susceptibility to heat stroke. The current definition may include a systemic inflammatory response and development of multiorgan failure with encephalopathy [9].

For this reason, three cases that arose at the same time under similar and homogeneous circumstances are analyzed below.

Case Analysis

Deceased 1

A 28-year-old man, born in the capital of Honduras, who was admitted to a regional hospital in Tegucigalpa, with unknown habits, to which the personal pathological history is denied, an autopsy was performed on him and the cause of death. death and its form is pending investigation, so his case is still under study.

Deceased 2

A 35-year-old man, born in the capital of Honduras, who was admitted to a regional hospital in Tegucigalpa, he was denied a personal pathological history, with unknown habits, he underwent an autopsy and the cause of death and its form is pending investigation, so his case is still under study.

Deceased 3

A 29-year-old man, born in the capital of Honduras, who was admitted to a regional private hospital in Tegucigalpa, his habits are unknown and his personal pathological history is denied. An autopsy was performed on him and the cause of death and its form is pending investigation, so his case is still under study.

Analysis and legal medical technical commentary

According to field epidemiological information, collected from the event that occurred on Sunday, September 11, at the facilities of a Honduran state institution, which was obtained at the health establishments of the clinic installed within said institution, Military Hospital, San Jorge Hospital de la Bolsa y del Hato, through the medical interview carried out with the health personnel, affected patients and cadets, as well as the review of the clinical file, that Sunday around 400 people submitted to a job contest in said institution, of which 35 in said event resulted in health complications, of which a total of 3 died and 32 hospitalized, all of them young people between the ages of 22 and 38, of origin and residence mostly from Francisco Morazán, with a predominance of both sexes, all with professional university studies, highlighting in particular the 3 deceased males, from Comayagüela and Tegucigalpa FM, aged 28, 29 and 35, auxiliary profession (engineer), doctor and lawyer respectively, which through epidemiological information collected describe the event, which in general terms refer that on Sunday morning they decided to travel to the department of La Paz (where said institution is located) having a very light breakfast at home, during the on the way, in the hotels and surroundings of La Paz, because they did not want to be in discomfort "heaviness", due to the physical test to which they would submit, presenting themselves outside the facilities of said institution, remaining in line for approximately 2 hours, once inside they always remained like this in administrative procedures, later waiting for words of welcome that did not happen, giving them instructions to move to the kitchen (between 1:00 p.m. and 3:00 p.m.), where they were provided with their cooking utensils. kitchen (non-disposable, aluminum plate and glass) having lunch with their hands fish, rice, vegetables and fruit punch, giving them a time limit (less than one minute) to be able to ingest them (which they did try everything, consuming them approximately less than half), referring to not feeling anything strange in the food, then they wash their utensils with a time limit as well (15 seconds), then going to training, telling them to pick up their largest suitcase (jogging/running), forming again. Approximately between 30 minutes and an hour after lunch, they are told to run on a dirt track, to do 3 to 5 laps (approximately 1 to 1.5 km each lap), reaching 2 and 4 laps in average, at a temperature of approximately 30 degrees Celsius, in a hot environment, most of which began with symptoms of generalized muscle contraction, syncope (other living patients report a conscious state without being able to react, blurred vision, hyperthermia, chest tightness, nausea and vomiting) with convulsions (convulsive status), being one of the 3 deceased treated within the facilities with cardiopulmonary resuscitation measures, being transferred to the Roberto Suazo Córdoba Hospital, dying there in La Paz (transferred to the Directorate of Forensic Medicine for its respective legal medical autopsy), the other referred to the Military Hospital in convulsive status, entering the emergency room on Sunday at 6:00 p.m. referred for convulsive symptoms, with a diagnosis of convulsive status to investigate, in critical condition transferred to the ICU (Intensive Care Unit) declaring him deceased at 9:00 p.m., who was hospitalized for approximately 3 hours (transferred to the Directorate of Forensic Medicine for its respective legal medical autopsy) and the third is referred from the La Paz Hospital (Roberto Suazo Córdoba) due to convulsive episodes to the Military Hospital, where they were told that they have to be transferred to the San Jorge Hospital with a diagnosis of convulsive syndrome, who remained in the ward for 2 days, transferring to the ICU on the third day, due to presenting liver failure, kidney failure, with neurological deterioration, serving 9 days in the hospital, dying on September 19 (transferred to the Directorate of Forensic Medicine for its respective legal medical autopsy).

As this media fact is an event of great uncertainty, which is of great medical-legal, epidemiological and/or public health importance, since regardless of the approach in question, it is essential to know the origin or origins that caused this fateful event, not ignoring also that this event, due to the circumstances in which it happened, how it occurred and the fact that it was a suspicious death (that death where there are doubts about its origin) of the 3 deceased, is indicative of a forensic evaluation (legal medical autopsy and forensic clinical evaluation) in order to objectively establish the diagnostic entity and its repercussions, however, due to the time (months/years) that this process takes and the confidentiality that exists due to the criminal and administrative responsibilities that could exist, we will focus on

trying to elucidate this fact based solely on the circumstances in which the event occurred, the interview and evaluation of those affected, review of the clinical records of living patients and without data from the autopsy of the deceased, so that We will address them in two major events that triggered this morbidity and mortality, which, although one of them may be independently or both be present, is undoubtedly the one or more responsible for this fatal outcome: so that we will address them in two major events that triggered this morbidity and mortality, which although one of them may be independently or both be present, is therefore undoubtedly the one(s) responsible for this fatal outcome: so that we will address them in two major events that triggered this morbidity and mortality, which although one of them may be independently or both be present, is therefore undoubtedly the one(s) responsible for this fatal outcome:

(A) This activity carried out by these people in the open air essentially represents a sport (it has the 3 characteristics that define it: competition, training and specific rules), specifically one of its two tendencies, which is performance sport (selection of the best athletes in a talent detection process, through the filter that this competition entailed), where there were clearly two risk situations:

1. Submission to a maximum physiological requirement: The physical activity to which these applicants were exposed tries to obtain a mark that depends on speed and the ratio between the muscular strength of the whole body and body weight, which consisted of a run of approximately 4 - 7 kilometers, carrying a suitcase (overload of 40 - 60 pounds more with respect to his body weight), therefore, probably, initially in the first 7 - 10 seconds (together with the massive sympathetic discharge) maximum power was reached, demanding the necessary amount of ATP from the muscle cells, which was obtained from the one present in the cells and from phosphocreatine, both known as the phosphagen system, After this time and between 1 - 2 minutes (added to the effects of sympathetic stimulation of the adrenal medulla), the energy required for them to continue their physical activity (although with less reduced power) depends on anaerobic metabolism (glycolysis, which carbohydrates are the only ones that provide energy without oxygen), also known as the glycogen-lactic acid system (initiating lactic acidosis), it is from here that it also began to combine with the aerobic system, knowing that the human body It contains approximately two liters of stored oxygen (lungs, hemoglobin, myoglobin, etc.) to support another minute or so and be able to obtain the necessary energy, which now also depends not only on carbohydrates (stored glycogen) but also on the availability of fats and proteins present, through which not only gluconeogenesis (formation of carbohydrates from fats and proteins) is important, but also the diet and the previous consumption of food (which was minimal), being in this aerobic stage the respiratory system a good safety element in the applicants (gases without or with slight alterations), since it did not limit the oxygen supply (capacity maximum ventilatory rate is approximately half of the actual pulmonary ventilation that is used in maximum effort physical activity), however, what really affected the oxygen supply to meet these energy demands was the cardiovascular system, because the increase in blood flow to the muscles was drastically increased (increased oxygen consumption produces vasodilation), not only due to sympathetic discharge through the autonomic nervous system, which causes vasoconstriction in most of the arterioles (except these arterioles of the active muscles, coronary and cerebral system), but also by the increase in blood pressure (slightly) and cardiac output (this varies from one person to another, trained or untrained), since the use of oxygen by the organism, can never exceed the amount of oxygen that this cardiovascular system is capable of transporting and providing to the tissues (being this moment a frequent event of sudden deaths of cardiac origin); It should also be noted that during all this intense physical activity, added to the activation of the sympathetic nervous system (adrenaline and norepinephrine), all the energy demand (known as the metabolic rate, which is the rate of heat release during chemical reactions) generated, since a part of that energy (perhaps a quarter or fifth) was transformed into muscular work (even this continued to be converted into heat), the rest is converted into body heat, translating into hyperthermia and increased temperature, a situation probably capable of having caused heat cramps in some patients, being in any case regulated by the conduction and transfer of heat, as well as by compensatory mechanisms such as through vasodilation, sweating and decreased heat production (chemical thermogenesis, shivering, etc).

2. The nature of the sport: in this case it is a clear generator of danger, because the physical space of the ANAPO facilities, where the aspiring police officers underwent performance sports, was an environment with a temperature of approximately 30 degrees Celsius, as well as the heat and humidity present in the place, situations that promoted a detrimental effect, especially for those who were not native to that area due to the lack of acclimatization (since at least one to three weeks to develop an increasing tolerance to heat and humidity), however a minority of them were already acclimatized).

   It is without a doubt that the combination of these two risk situations are those that directly (only the autopsy would confirm) or indirect ly compromised the death of these 3 people and the hospitalization of these 35 people, due to the great amount of energy released within tissues as heat (during nutrient metabolism and muscle contraction), which is almost exactly proportional to oxygen consumption, plus hot and humid conditions (dry and humid) of the air), which evidently made more difficult the loss of heat of these individuals, since the increased metabolism of metabolically very active organs (CNS, heart, liver, kidneys, active muscles) through the regulation of the nuclei of the preoptic region of the anterior hypothalamus, increased the speed of heat conduction towards the skin (increasing even more cutaneous blood flow, generating even more hyperthermia) and from this organ to the environment (outside) by radiation, convection and evaporation, being difficult in the latter, due to the humidity present, since the environment does not admit more water vapor, so sweat does not evaporate properly (the skin behaving in this sense as a heat radiator system) added to the fact that the compensatory mechanisms described are also present to the maximum (cutaneous vasodilation, visceral vasoconstriction, increased cardiac output, etc.), so the rate of heat dissipation was not sufficient to counteract the heat gain generated during exercise, what the body temperature probably rose to high values (41 - 42 degrees Celsius), this being a destructive weapon for all the cells of the human body, for which one of the mechanisms that developed (due to elevated skin vasodilation) It is the decrease in blood flow of all organs (hypoxia), mainly the gastrointestinal system, allowing the release of endotoxins into the systemic circulation, activating the systemic inflammatory response (sepsis), which together with the circulatory overload of thermal stress (alteration in expression of heat shock proteins) overwhelmed the thermoregulatory system, which triggered this condition known as exertional heat stroke, with multi-organ failure (seizures, liver failure, acute kidney injury, etc.) that the three deceased presented and the majority of hospitalized patients.

(B) The other event that undoubtedly must be confirmed or ruled out if it was directly or indirectly related (which could only be confirmed through clinical evaluation, medical-legal autopsy and toxicological chemistry) is poisoning, so without a doubt with the information collected we will focus on the most frequent possible toxicological entities or those most compatible with what happened:

1. As well as smooth muscle (a) therefore drastically affected the sweat glands, which greatly decreased the secretion of sweat, generating even more heat, added to the fact that the little sweat that was secreted could not evaporate (already commented on due to the heat and humidity of the place), situations that undoubtedly represented a rich cocktail for its fatal outcome, causing heat stroke. (b) These alkaloids known as atropine, hyoscyamine scopolamine (easily transformable into each other), are mentioned together because they have very similar pathophysiological properties, and it is considered likely that they could be present in the juice of fruits and vegetables consumed, that once they have been ingested and have reached circulation and distribution in their target organs, condition that greatly aggravated the elimination of body heat (produced by intense strenuous physical activity), which caused the metabolic rate of these applicants (deceased and affected) to further increase, leading them to develop heat stroke. (c) Other alkaloids that could be considered a foodborne illness, which the applicants consumed, although less frequently, but cannot be left out of mention, are aconitine and hemlock, which present similar symptoms (to those deceased and affected applicants), capable of producing death on their own (depending on the dose), but without a doubt that even at low doses.

2. Fungi: Among the possible infectious causes that, although not lethal, could have contributed to the cause of death (heat stroke), is a panterinian syndrome (it has a rapid onset) caused by the ingestion of the amanita mushroom. muscaria and panther amanita, as a foodborne disease, which once they have reached circulation and distribution, were responsible for the excitatory effects at the central nervous system level with parasympathetic paralyzing effects (similar to atropine) in the autonomic nervous system, which produced gastrointestinal and nervous symptoms, similar to those that occurred in this event, adding a delirious confusional state (which may be present).

3. Since these parasympathetic effects should still be present in living patients, however, if this intoxication had been present and associated with this strenuous physical activity, it could have contributed to dehydration, due to excessive secretion of sweat (hyperhidrosis), which although This cannot be adequately evaporated due to weather conditions, it is also possible that it contributes to a greater energy gain, ending in death from heat stroke. (b) Organochlorines: despite the fact that it is an infrequent cause of poisoning in our country today, since its use is currently prohibited, due to its environmental effects and chronic toxicity, it cannot be left out of mention given that a Once having access, it is easily absorbable through the digestive tract (also through the respiratory tract and skin).

4. There are many differential diagnoses of what happened in this event, however, according to field epidemiological information collected, it does not make them seem so feasible, but they could be demonstrated by legal medical autopsy and chemical-toxicological analysis, which are: (a) There are many drugs (antipsychotics and antiemetics) that can trigger a neuroleptic malignant syndrome, with symptoms similar to those that occurred in the ANAPO facilities, however they would have to be present in all affected applicants, and with a minimum of 2 weeks of use, situation Undocumented epidemiological. (b) There are also many drugs that inhibit muscarinic and nicotinic receptors, which, if present in the biological samples of the 35 affected, could be explained as the triggers responsible for heat stroke.

It is evident that the medico-legal autopsy plays a fundamental role in being able to verify these diagnostic entities, since the forensic doctor (autopsy physician) must keep them in mind and many other entities, since the course is directed by the findings of the corpse with which has been found, given the specificity and non-specificity of these macroscopic and microscopic findings, that could be present, integration and interpretation of these complementary tests (Histopathological, Toxicological, etc.) is required, as well as special caution and complete knowledge and accurate description of the mechanisms of action, half-life, and biological fluids in which these suspected toxic substances are detected.

Regarding some findings documented by an epidemiological study that consisted of site inspection, history reported by cadets and affected patients, absence and presence of clinical findings, review of clinical records, as well as the fact that they had a fatal outcome or not, it is worth mentioning some important factors or diagnostic entities that are and/or could be related to this unfortunate event:

1) Before making a special mention of tear gas, as well as the consumption of energy drinks, these being the most mentioned in the media, they are ruled out by an epidemiological study collected, pending the results of the legal medical autopsy.

2) Which any of its strains (enterotoxigenic *E. coli*, enteropathogenic *E. coli*, enteroaggregative *E. coli*, enteroinvasive *E. coli*, Shiga toxin-producing *E. coli*) that were isolated could or may further compromise the health of hospitalized patients, who already have multi-organ involvement caused by environmentally induced heat injury syndromes. (b) *Salmonella*: the presence of this enterobacterium is always associated with disease in humans, in which the most frequent way they could contract it is through the ingestion of contaminated water and/or food products (they are not properly preserved), as well as through products prepared on contaminated surfaces, what really explains this finding is that it is a foodborne illness (ETAS), without forgetting that they can be present as a chronic carrier state (they survive in the gallbladder), which undoubtedly contributed or may contribute more to

worsening sepsis caused by exertional heat stroke. (c) *Shigella*: These enterobacteria have human beings are the only reservoir, the facilities of said institution being an ideal place for fecal-oral transmission, mainly through people with contaminated hands (they ate with their hands without cutlery, without time to wash) and to a lesser extent through contaminated food and water, which if not resolved can further complicate the states of dehydration and convulsive episodes that these patients presented. B) These enterobacteria are ubiquitous microorganisms that are found universally in soil, water and vegetation.

3) Alcohol: It is worth mentioning that according to the epidemiological information collected, very few claimed to consume alcoholic beverages occasionally (once a week), however, according to information obtained from ANAPO cadets, excessive intake is said to be routine. of alcohol 30 - 48 hours (2 previous nights) before being presented to the facilities (because they can no longer do so inside them), despite the fact that all the ethanol ingested has already been metabolized and eliminated, there is still acetaldehyde in the body and some of its effects, one of them being dehydration, which, if present in these applicants, made them vulnerable to suffering heat injury syndromes induced by the environment.

4) Diet: Plays a fundamental factor in muscle performance, especially in resistance, the contribution of nutrients to the muscle (stored glycogen), before having undergone this performance test, so a rich diet was extremely important. in carbohydrates for their performance, specifically in this sporting activity.

5) Physical condition: According to epidemiological information, the cadets report that the applicants did not have the required physical condition required to be part of said institution, however all the patients interviewed claim to perform physical activities on a routine basis, having prepared for said activity high-performance sports, even one of the deceased was already an assistant of said institution, in addition to clearly observing that none of the deceased applicants interviewed was overweight or obese.

6) There are many genetic factors, but two are important to mention: (a) Men are genetically fitter than women in this specific sporting activity, due to differences in size, body composition and the presence of testosterone, however, It was observed that this condition did not influence this catastrophic event, since both sexes were affected almost equally, the three deceased being men. (b) Muscle fibers: there are fast muscle fibers (develop extremely intense contractile power within seconds to a little over a minute) and slow muscle fibers (provide endurance, maintain prolonged contractile power from several minutes to hours), which are usually present in some people more than others.

7) Drugs of abuse: Various drugs of abuse such as cocaine, marijuana, amphetamines, etc. are discarded by laboratory through review of clinical records. If they are present, they clearly have their interactions and pathological repercussions.

It is important to mention that this unfortunate event requires a knowledge and understanding of human pathology, forensic sciences and toxicology, specifically medical (clinical and forensic) and environmental toxicology, undoubtedly supported by epidemiology, therefore that a better multidisciplinary approach is required between these disciplines, to get closer to a more precise diagnostic entity, so in my opinion I base my forensic medical hypothesis on three determining factors involved in the morbidity and mortality of this event, which are: physical exercise excessive, climatic/environmental conditions and toxic substances, factors that caused this unfortunate event that occurred within the facilities of said institution in which 3 people died, Unleashing this fact produced an environmental risk that triggered the well-known heat-induced injury syndromes, specifically heat stroke, which through an adequate investigation and effective legal medical autopsy, was most likely involved in the presence of one of these toxic substances mentioned, as a detonating agent that aggravated this fateful event, which without a doubt represents a huge problem for public health, in addition to dismaying the Honduran population in general. As a detonating agent that aggravated this fateful event, which without a doubt represents a huge problem for public health, in addition to dismaying the Honduran population in general.as a detonating agent that aggravated this fateful event, which without a doubt represents a huge problem for public health, in addition to dismaying the Honduran population in general.

Conclusion

From the epidemiological point of view, the most important thing in this case is a more accurate diagnosis of what happened, for a better multidisciplinary approach, since waiting for the results performed in that place, as well as the autopsy, is limited. legal doctor, to follow up and close the case.

From the point of view of public health, the close relationship that this has with toxicology and forensic sciences was observed, since it is necessary to know the other links that exist between them, in order to prevent and control not only this type of event, if not all those that link their areas.

From the medical-legal and toxicological point of view; It is a suspicious death, given that there are doubts about its nature, but with repercussions on human life and health, in which physical, environmental and toxicological factors under study intervened, due to the criminal and administrative responsibilities that were can trigger.

Bibliography

1. Scallan E., *et al*. "Foodborne illness acquired in the United States-unspecified agents". *Emerging Infectious Diseases* 17.1 (2011): 16-22.
2. Centers for Disease Control and Prevention. "Surveillance for foodborne disease outbreaks-United States, 2007". *Morbidity and Mortality Weekly Report* 59.31 (2010): 973-979.
3. Maron BJ., *et al*. "Sudden death in young competitive athletes. Clinical, demographic and pathological profiles". *The Journal of the American Medical Association* 276 (1996): 199-204.
4. Thiene G., *et al*. "Is prevention of sudden death in young athletes feasible?" *Cardiología* 44 (1999): 497-505.
5. Basso C., *et al*. "Cardiovascular causes of sudden death in young individuals including athletes". *Cardiology in Review* 7 (1999): 127-135.
6. Suárez-Mier MP and Aguilera B. "Causes of sudden death associated with sport in Spain". *Revista Española de Cardiología* 55 (2002): 347-358.
7. MacAuley D. "Does preseason screening for cardiac disease really work?: the Britsh perspective". *Medicine and Science in Sports and Exercise* 30 (1998): S345-S50.
8. Jensen-Urstad M. "Sudden death and physical activity in athletes and nonathletes". *Scandinavian Journal of Medicine and Science in Sports* 5 (1995): 279-284.
9. N Piñeiro Sande., *et al*. "Heatstroke". *Emergencies* 16 (2004): 116-125.

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