56 - INQUIRY ABOUT THE EFFECTS OF THE HYPONATREMIA IN PARTICIPANTS OF HALF MARATHON OF RIO DE JANEIRO EDITION 2007.

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INTRODUCTION

The human body temperature is regulated, in normal circumstances, at around 37 ºC, tolerating only relatively small variations in the internal temperature. When an increase of the exterior temperature is verified, the human body acts through homeostatic mechanisms of thermoregulation, reducing the body temperature by procedures such as vase dilatation and production of sweat (McArdle et al, 2003).

The human body is usually warmer than the environment and, therefore, it loses heat. The energy generated by normal metabolism is enough to maintain the body temperature (Silverthorn et al, 2003).

The regulation of the body temperature is under the control of nervous centers in the hypothalamus. Thermo receptors Thermal receiver sensors are peripherally located in the skin and strategically to this regulating center.

This cholinergic sympathetic vasodilatation system dilates selectively the cutaneous blood vases, accenting the loss of heat in the surface of the skin. The sympathetics neurons control the eccrine sweat glands, also causing the bradykinin production, a paracrine vasodilatation substance that can contribute for the reply in the thermoregulation.

In exercises with long duration, there is an important fluid loss through sweat and breath. In these conditions, it is necessary to hydrate adequately, in a way not to bring risks to the athlete's health, as well as so that the performance is not diminished. Athletes that ingest important amounts of water, that sometimes exceed, even proper necessities, can produce a hemodialation and, as consequence, hyponatremia (Porcel et al., 2004).

Hyponatremia is a water-electrolyte imbalance that results in the abnormal fall of plasmatic sodium concentration to less than 135 mmol/L, due to a fluid replacement with exempt sodium liquids or little sodium, mainly in highly extended events (Adrogué & Matias, 2000).

The first description of the hyponatremia occurred in 1985, displaying some theories that had tried to explain its etiopatogeny. Before 1981, the term hyponatremia was totally unknown, and athletes were guided not to ingest liquids during the exercises, what could result in dehydration and hypernatremia. After the year of 1981, a high ingestion of liquids, became recommended, without restriction, to the athletes, during resistance exercises (Porcel et al., 2004).

The main symptoms of the hyponatremia include disorientation, confusion, agitation, slurred speech, cramps, lack of air, irregular breathing, nausea, convulsion, lethargy and, in some cases, coma (Weir, 2000; Yeates et al., 2004). Depending on the physical condition of the athlete, such disorientation can cause pulmonary edema, brain damages, and also, be able to cause one's death (Ayus et al., 2000).

During heavy exercise, the blood flow is deviated from the gastrointestinal tract for the skeletal muscle, diminishing the water absorption, since this is absorbed by the gut. The loss of sodium and water due to sweating, leads to a volume concentration of the blood, consequently occurs a stimulation of the secretion of hormones antidiuretic (ADH) (Armstrong et al., 1993; Speedy et al., 1999) and aldosterone (Wilmore and Costill, 2001), that they will go to act in the fluid retention. On the other hand, establishing a thought bias, with ceasing the exercise the blood flow gradually is reestablished for the gastrointestinal tract, leading to intense water absorption, being able to cause hyponatremia (Noakes et al., 1990).

OBJECTIVE

To investigate, if the athletes who had participated in the half marathon of Rio de Janeiro 2007 edition and that had needed medical cares, had presented some symptom that can be related to the hyponatremia.

SUBJECTS

20 subjects with age between 18 and 39 years that had participated in the half marathon of Rio de Janeiro 2007, of these 12 were men and 8 women. The choice of these subjects was made in the following manner: the first 20 participants of the event that needed medical care could be part of the free study in spontaneous will.

METHODOLOGY

The methodological process is initially based on a research with exploratory bias and quantitative characteristics. The choice of an appropriate method is based on the relative precision, on the trustworthiness and on the exactness of the available methods and on the existence of available resources that go in the direction of the interests considered for the study in function of reality.

In this purpose, we constructed a script of identification of the symptoms that attend the intention of the research, in what refers to investigate if the symptoms that the participants presented when looking for medical care during de half marathon, were related to the hyponatremia.

The script was composed of the following topics: a) presents disorientation, b) is confused, c) is agitated, d) presents slurred speech, e) complains of cramps, f) informs on respiratory difficulties; g) complains of nausea, h) presents convulsion, i) presents lethargy. It is important to register that the participation of the medical team at sight during the test had great importance in order to diagnose and to inform the symptoms presented and described by the athletes.

RESULTS

Ahead will be presented the results of the data related to the symptoms of the hyponatremia, which had been collected during the test of half marathon of Rio de Janeiro in 2007.

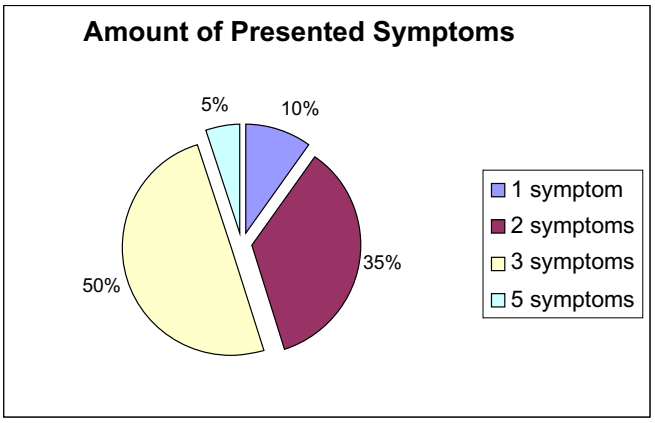


Figure 1

In figure 1 we present a graph, where the athletes are divided according the amount of symptoms that were presented, which could be related with the hyponatremia. The symptoms observed had been: disorientation, confusion, agitation, slurred speech, respiratory difficulties, cramps, nausea, convulsion and lethargy. We observe that 50% of the athletes who had needed medical cares had presented 3 related symptoms with the hyponatremia and that only 5 % with 5 symptoms.

The reasons for the occurrence of the hyponatremia are not, still, conclusive, being able to be developed as a consequence of the great loss of liquids, sodium and/or for an overhydration (Vrijens and Rehrer, 1999).

A high ingestion of liquids, above necessity, can to lead to state of hypervolemia, that it is an increase of the plasmatic volume that leads to a deficient functioning of the kidney, disabling the organism to eliminate amounts enough of water, resulting, thus, in hemodilution, or increase of the plasma, consequent of the dilution of the plasmatic content (Wilmore and Costill, 2001). In this way, the hemodilution, resultant of the hypervolemia, can unchain the hyponatremia (Porcel et al., 2004).

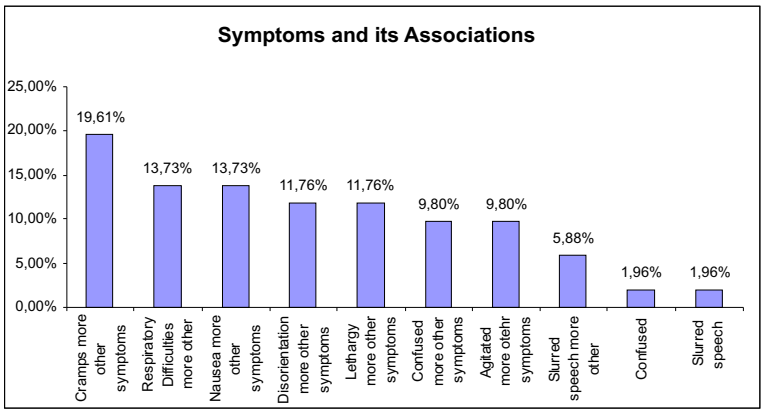


Figure 2

We verify that in figure 2 cramp is the most frequent symptom if analyzed inside of the set of symptoms, presenting itself 19.61% of the times associated with other symptoms. While slurred speech and confusion were presented without any association in some cases (1,96%).

DISCUSSION

In this study, it was observed that diverse symptoms of the hyponatremia had been common during the half marathon of Rio de Janeiro in 2007. However we cannot affirm that all the symptoms were indicative of hyponatremia, because some symptoms of the dehydration are similar with the hyponatemia symptoms, as cramps and muscular weakness (McArdle, 2001).

When analyzing figure 1, we observe that the appearance of 3 related symptoms the hyponatremia had represented 50% of the cases in the group of presented symptoms amount. But also we can observe that when 5 symptoms are evaluated, the percentage incidence diminishes to only 5%. Being the set some symptoms better indicating one of hyponatremia. However the appearance of 2 symptoms must always be considerate, with the objective of a better inquiry of the possibility of imminent hyponatremia and a possible correction.

According to Gross et. al., 1998, the correction speed of the symptomatic hyponatremia must be, at maximum, 0,5 mM per litre per hour, and the initial treatment must stop as soon as it reaches a light hyponatremia, between 125 and 130 mM/L. The treatment of hyponatremia is a challenge for the doctor, in part, because a treatment that corrects hyponatremia very quickly can lead to the cerebral injury.

According to Hiller (1989), extreme perspiration, added to the great loss of sodium and the absence of the consumption of liquids, can cause dehydration occur along with hyponatremia. In contrast, other authors, such as Noakes et al. (2005) and Speedy et al. (2000) propose that the most dangerous form of hyponatremia form happens, only, in athletes who have physiological condition to hold back liquids in excess and who have a great sodium deficit.

A study realized by Speedy et al. 1999, observed that 18% of the finalists of the 1998 Ironman New Zealand Triathlon were hyponatremics. In this study Speedy et al. evaluated serum sodium and the weight, before and after the competition, of 605 athletes.

When observing the symptoms, separately displayed in figure 2, we notice that cramp is the most common symptom. However there are several explanations that can justify the appearance of cramps during a test, amongst which result of great losses of sodium through sweat (Eichner, 2007), which would be the relation of bigger interest for the present study. However, cramp in physical activity can also be resultant of deficiency of other minerals such as magnesium and potassium, or even, of excess of lactic acid in the muscle.

According to Noakes et al., 2005, there exist many possible causes to explain exercise related hyponatremia. A hypothesis is the Syndrome of the Inadequate Anti-Diuretic Hormone Secretion (ADH) - the SIADH. In presence of the Syndrome, there is a reduction in the urine production and an increase of the fluid retention in the presence of an overload of liquids. A second hypothesis is of the kidnapping of water in the gut, resulting in a dilution of the blood concentrations after the competition, when the water is absorbed. Another hypothesis is related to the abusive use of nonsteroidal anti-inflammatory that can modify the renal function and reduce urine production. Finally, the hyponatremia can be caused by abnormal raised losses of sodium through sweat, or even extreme ingestion of liquids by itself can result in hyponatremia.

CONCLUSION

Hyponatremia is something new in the sport's world. In Brazil, for example, account of cases in the literature of hyponatremia, in athletes during national events, had not been found. Due to this fact, we must give more attention to hyponatremia, starting to investigate this problem more seriously in national events.

The type of analysis used in our study cannot be considered the most insured, hence being a non-invasive observational study. For better analysis of the hyponatremia an evaluation of serum sodium would be necessary recommended by Noakes, 2005, Kratz, 2005 and Glace, 2002. However according to Toy, 1992, clinical signs and symptoms of hyponatremia due to exercise usually do not occur if serum sodium does not fall to levels bellow to 120mEq/L, and at this level hyponatremia is a reality in the athlete.

However, the symptoms related by the athletes during the tests must be taken in account with the objective of prevention of coma, convulsion (Weir 2000 and Yeates 2004), pulmonary edema, cerebral damages and death (Ayus, 2000), which are some of the consequences in case hyponatremia is not treated.

The health area professionals, such as nutritionists, doctors and physical educators must avoid stimulating overhidratation during exercise, with the purpose to inhibit one of the factors that contribute to hyponatremia, starting, then, to stimulate an adequate fluid replacement rich in electrolytes.

Bibliography

ADROGU HJ, MATIAS NE. Hyponatremia. New Engl J Md, 2000; 342: 1571-89.
ARMSTRONG LE, CURTIS WC, HUBBARD RW et al. Hyponatremia Symptomatic during prolonged exercise in heat. Med Sci Sports Exerc 1993; 25: 543-9.
AYUS JC, VARON J, ARIEFF THERE. Hyponatremia, cerebral edema, and noncardiogenic pulmonary edema in marathon runners. Annals of Internal Medicine 2000; 132 (9): 711-4.
EICHNER ER. The rolls of sodium in ?heat cramping?. Sports Med. 2007; 37 (4-5): 368-70.
GLACE BW, MURPHY CA, MCHUGH MP. Food intake and electrolyte status of ultramarathoners competing in distinguishes heat. Journal of the American College of Nutrtion 2002; 21 (6): 553-9.
GROSS P, REINMANN D, NEIDEL J, DOKE C, PROSPERT F, DECAUX G, VERBALIS J, SCHIRIER RW. Hyponatremia The treatment of severe. Kidney International, 1998; fev; 53 (64): S6-11.
KRATZ, SIEGEL AJ, VERBALIS JG, et al. Sodium status of collapse marathon runners. Arch Pathol Lab Med 2005; 129: 227-30.
MCARDLE W. et al. Nutrio for the sport and the exerccio. River of January, Guanabara Koogan, 2001
MCARDLE W, KATCH FI, KATCH VL. Physiology of the Exerccio, Energy, Nutrio and Human Desempenho. 5 ed. Rio De Janeiro: Ed. Guanabara Koogan, 2003:637 - 50.
NOAKES TD, NORMAN RIO DE JANEIRO, BUCK RH, et al. Hyponatremia The incidence of during prolonged ultraendurance exercise. Med Sci Sports Exerc 1990; 22: 165-70.
NOAKES TD, SHARWOOD K, SPEEDY D, et al. Biological Three independent mechanisms causes exercise-associated hyponatremia: evidence from 2,135 weighed competitive athletic performances. PNAS 2005; 102 (51): 18550-5.
PORCEL FBO, RUIZ JR, GARZN MJC, et al. Hiponatremia en esfuerzos of ultraresistance: efectos on there salud y el income. Archivos Latino American of Nutricion 2004; 54 (2): 155-64.
SILVERRTHORN DU. Physiology human being: An integrated boarding. 1 edio; Manole. 2003.
SPEEDY DB, NOAKES TD, ROGERS TO GO, et al. Hyponatremia in ultradistance triathletes. Med Sci Sports Exerc 1999; 31: 809-15.
TOY BJ. The hyponatremia Incidence of in prolonged exercise activity. Journal of athletic Training 1992; 27 (2): 116-8.
WEIR E. Hyponatremia Extreme exercise and. CMAJ 2000; ago: 163; 439.
WILMORE JH, COSTILL DL. Physiology of the sport and the exerccio. 1 ed. Only Pablo: Ed Manole, 2001.
YEATES KE, SINGER M, MORTON AIR. Salt and to water: simple approach you the hyponatremia. CMAJ 2004; 70 (3): 365-9.

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INQUIRY ABOUT THE EFFECTS OF THE HYPONATREMIA IN PARTICIPANTS OF HALF MARATHON OF RIO DE JANEIRO EDITION 2007.

ABSTRACT

The hiponatremia is a water-electrolyte imbalance. OBJECTIVE - To investigate, if the athletes who had participated in the half marathon of Rio de Janeiro 2007 edition and that needed medical cares, had presented some symptom that can be related to the hyponatremia. SUBJECTS - 20 subjects with age between 18 and 39 years that had participated of the half marathon of Rio de Janeiro 2007, of these 12 were men and 8 women. The choice of these subjects was made in the following manner: the first 20 participants of the event that needed medical care could be part of the free study in spontaneous will. METHODOLOGY - Research with exploratory bias and quantitative characteristics. The choice of an appropriate method was based on the relative precision, the trustworthiness and the exactness of the available methods and on the existence of available resources that that go in the direction of the interests considered for the study in function of the reality. RESULTS - the symptoms observed had been: disorientation, confusion, agitation, slurred speech, respiratory difficulties, cramps, nausea, convulsion and lethargy. We observe that 50% of the athletes who had needed medical cares had presented 3 related symptoms with the hyponatremia and that only 5 % with 5

symptoms. DISCUSSION - It was observed that diverse symptoms of hyponatremia had been common during the half marathon of Rio de Janeiro in 2007. However we cannot affirm that all the symptoms were indicative of hyponatremia, because some symptoms of the dehydration are similar with the hyponatremia symptoms, such as cramps and muscular weakness. CONCLUSION - We must give more attention to hyponatremia, starting to investigate it more seriously in national events. The type of analysis used in our study cannot be considered the most insured, hence being an invasive observational study. For better analysis of hyponatremia an evaluation of serum sodium would be necessary.

KEY-WORDS: Hyponatremia, dehydration, water-electrolyte imbalance.

UNE RECHERCHE CONCERNANT LES EFFETS DE L`HYPONATRÉMIE CHEZ LES PARTICIPANTS DU DEMI-MARATHONN DE RIO DE JANEIRO 2007.

RÉSUMÉ

L`hyponatrémie est un déséquilibre hydroélectrique. OBJECTIF - Une investigation pour apprendre si les athlètes qui ont participé du demi-marathon de Rio de Janeiro 2007 qui ont eu besoin des soins médicaux, ont présenté quelque symptôme qui puisse se rapporter à l`hyponatrémie. PIBLIC CIBLE: 20 individus âgés de 18 à 39 ans qui ont participé du demi-marathon de Rio de Janeiro 2007 dont 12 étaient du sexe masculin et 8 du sexe féminin. Le choix de ces individus a été fait de la suivante manière: ils pouvaient participer de cette étude sans aucune contrainte. METHODOLOGIE - Une recherche par le biais d`observations quantitatives. Le choix d`une méthode idéale est basée sur la précision relative, sur la confiance et l`exactitude des méthodes disponibles, et sur l`existence des ressources disponibles qui marchent dans la même direction des intérêts proposés pour l`étude en fonction de la validité trouvée. RESULTATS - Les symptômes observés ont été: la désorientation, la confusion, l`agitation, le langage confus , les crampes, les dificultés respiratoires, les nausées, la convulsion et la léthargie. Nous avons constaté que 50% des athlètes qui ont eu besoin des soins médicaux ont présenté trois symptômes rapportés à l`hyponatrémie et que seulement 5% n`en avaient que 5 symptômes. DISCUSSION - Nous avons constaté que plusieurs symptômes de l`hyponatrémie étaient communs pendant l`épreuve du demi-marathon de Rio de Janeiro 2007. Cependant, nous ne pouvons pas affirmer si tous les symptômes éatient des indicatifs d`hyponatrémie vu que quelques symptômes de la déshydratation sont pareils à ceux de l`hyponatrémie comme, par xemple, les crampes et la faiblesse musculaire. CONCLUSION - Il faut faire plus attention à l`hyponatrémie avec une observation plus minutieuse des événements nationaux. Le genre de l`analyse employée chez notre étude ne peut pas être considérée comme le plus exact car il ne s`agit que d` une étude d`observation non invasive. Afin de mieux analyser l`hyponatrémie, il faudrait une évaluation du sodium sérique.

MOTS-CLÉS: hyponatrémie, déshydratation, d` deséquilibre hydroélectrique

INVESTIGACIÓN SOBRE LOS EFECTOS DEL HIPONATREMIA EM PARTICIPANTES DEL MEDIO MARATÓN DE RÍO DE JANEIRO EDICIÓN 2007.

RESUMEN

El hiponatremia es un el desequilibrio hídrico y electrolítico. OBJETIVO - Investigar si los atletas que habían participado del medio maratón de Río de Janeiro edición 2007, que habían necesitado asistencias médicas, habían presentado un cierto síntoma que se puede relacionar con el hiponatremia. PUBLICO ALBO - 20 sujetos con edad entre 18 y 39 años que habían participado del medio maratón de Río de Janeiro 2007, de estos: 12 eran hombres y 8 mujeres. La escoja de estos sujetos fue hecha de la forma siguiente: los 20 primeros participantes del acontecimiento de el cual la asistencia médica fue necesaria, podrían ser parte del estudio por libre y espontánea voluntad. METODODOGIA - Una investigación con diagonal exploratorio y características cuantitativas. La opción de un método apropiado se basea en la precisión relativa, en la confiabilidad y en la exactitud de los métodos disponibles y en la existencia de los recursos disponibles que entran en la dirección de los intereses considerados para el estudio en función de la realidad. RESULTADOS - Los síntomas observados habían sido: la desorientación, confusión, agitación, habla confusa, calambres, dificultades respiratorias, náusea, la convulsión y el letargo. Observamos que 50% de los atletas que habían necesitado asistencias médicas que habían presentado 3 síntomas relacionados con el hiponatremia y que solamente 5% con 5 síntomas. DISCUSIÓN - Fue observado que los síntomas diversos del hiponatremia habían sido comunes durante el medio maratón de Río de Janeiro en 2007. No obstante no podemos afirmar que todos los síntomas eran indicativos de hiponatremia, porque algunos síntomas de la deshidratación son similares con los sintomas del hiponatremia, como los calambres y debilidad muscular. CONCLUSIÓN - Se debe dar más atención al hiponatremia, comenzando a investigar este problema con más seriedad en los acontecimientos nacionales. El tipo de análisis usado en nuestro estudio no puede ser considerado lo más seguro, por solamente ser un estudio observacional no invasor. Para un mejor análisis del hiponatremia una evaluación del sodio del sérico sería necesaria.

PALABRAS CLAVE: Hiponatremia, deshidratación, desequilibrio hídrico y electrolítico.

INVESTIGAÇÃO SOBRE EFEITOS DA HIPONATREMIA EM PARTICIPANTES DA MEIA MARATONA DO RIO DE JANEIRO EDIÇÃO 2007.

RESUMO

A hiponatremia é um desequilíbrio hidroeletrolítico. OBJETIVO - Investigar, se os atletas que participaram da meia maratona do Rio de Janeiro edição 2007 que necessitaram de cuidados médicos, apresentaram algum sintoma que possa ser relacionado à hiponatremia. PUBLICO ALVO - 20 sujeitos com idade entre 18 e 39 anos que participaram da meia maratona do Rio de Janeiro 2007, destes 12 eram homens e 8 mulheres. A escolha destes sujeitos foi feita da seguinte forma: os 20 primeiros participantes do evento que precisasse de atendimento médico poderiam fazer parte do estudo de livre e espontânea vontade. METODODOGIA

Pesquisa com viés exploratório e com características quantitativas. A escolha de um método apropriado se baseia na precisão relativa, na confiabilidade e na exatidão dos métodos disponíveis e na existência de recursos disponíveis que caminhem na direção dos interesses propostos para o estudo em função da realidade encontrada. RESULTADOS: Os sintomas observados foram: desorientação, confusão, agitação, fala confusa, cãibras, dificuldades respiratórias, náusea, convulsão e letargia. Observamos que 50% dos atletas que necessitaram de cuidados médicos apresentaram 3 sintomas relacionados a hiponatremia e que apenas 5 % com 5 sintomas. DISCUSSÃO - Observou-se que diversos sintomas da hiponatremia foram comuns durante a prova de meia maratona do Rio de Janeiro em 2007. Porém não podemos afirmar que todos os sintomas eram indicativos de hiponatremia, já que alguns sintomas da desidratação se assemelham com o da hiponatremia, como cãibras e fraqueza muscular. CONCLUSÃO - Devemos dar uma maior atenção a hiponatremia, começando a investigar com maior seriedade nos eventos nacionais. O tipo de análise utilizado em nosso estudo não pode ser considerada a mais segura, por ser apenas um estudo observacional não invasivo. Para melhor análise da hiponatremia seria necessária uma avaliação do sódio sérico como o recomendado

PALAVRAS CHAVES: Hiponatremia, desidratação, desequilíbrio hidroeletrolítico.