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REFLECTION ARTICLE

Analysis of accidents in humans by snakes

Análisis de accidentes en humanos por serpientes

Análise sobre acidentes em humanos por ofídicos

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Abstract

The aim was to identify the medical conduct against snakebites in the literature. This is a descriptive study of a critical-reflexive nature, with a qualitative approach. Three categories were established for analysis, such as: Ophidian accidents, Medical conducts and Permanent education. It was noted the importance of recognizing snakes and knowledge of clinical management in the establishment of an appropriate medical conduct and that, for this, it is necessary for the professional to have a continuing education in their work environment. It is concluded that their accidents constitute a public health problem, with the highest number of accidents in rural areas, in patients of economically active age; regarding the anatomical part, the lower limbs were the most affected; Regarding seasonality, the months from October to December were more frequent and most patients sought immediate help, up to 3 hours after the accident. Among the accidents, the most frequent local manifestations were pain and edema. Most cases were classified as mild and the number of deaths extremely low. The results showed a lack in the taxonomic description and the scarcity of scientific materials that addressed the medical conduct to be taken in the face of accidents with snakes.

Descriptors: Snake Bites; Animals, Poisonous; Public Health; Epidemiology; Antivenins.

Resumén

El objetivo fue identificar la conducta médica frente a las mordeduras de serpientes en la literatura. Se trata de un estudio descriptivo de carácter crítico-reflexivo, con abordaje cualitativo. Se establecieron tres categorías para el análisis, tales como: Accidentes ofídicos, Conductas médicas y Educación permanente. Se señaló la importancia del reconocimiento de las serpientes y el conocimiento del manejo clínico en el establecimiento de una conducta médica adecuada y que, para ello, es necesario que el profesional tenga una educación continua en su ambiente de trabajo. Se concluye que sus accidentes constituyen un problema de salud pública, con mayor número de accidentes en las zonas rurales, en pacientes en edad económicamente activa; en cuanto a la parte anatómica, los miembros inferiores fueron los más afectados; En cuanto a la estacionalidad, los meses de octubre a diciembre fueron más frecuentes y la mayoría de los pacientes buscaron ayuda inmediata, hasta 3 horas después del accidente. Entre los accidentes, las manifestaciones locales más frecuentes fueron el dolor y el edema. La mayoría de los casos se clasificaron como leves y el número de muertes fue extremadamente bajo. Los resultados evidenciaron carencia en la descripción taxonómica y escasez de materiales científicos que aborden la conducta médica a tomar ante accidentes con serpientes.

Descriptores: Picaduras de Serpiente; Animales Venenosos; Salud Pública; Epidemiología; Antivenenos.

Resumo

Objetivou-se identificar a conduta médica frente aos acidentes ofídicos na literatura. Trata-se de um estudo descritivo de caráter crítico-reflexivo, de abordagem qualitativa. Estabeleceu-se três categorias para análise, tais quais: Acidentes ofídicos, Condutas médicas e Educação permanente. Notou-se a importância do reconhecimento das serpentes e conhecimento do manejo clínico no estabelecimento de uma conduta médica adequada e que, para isso, torna-se necessário que o profissional tenha uma educação continuada em seu ambiente laboral. Conclui-se que seus acidentes constituem um problema de saúde pública, sendo o maior número de acidentes na zona rural, em pacientes com idade economicamente ativa; com relação a parte anatômica, os membros inferiores foram os mais acometidos; com relação a sazonalidade, os meses de outubro a dezembro tiveram maior frequência e a maioria dos pacientes procuraram socorro imediato, até 3 horas após o acidente. Dentre os acidentes, as manifestações locais mais frequentes foram dor e edema. A maioria dos casos foram classificados como leves e o número de óbito extremamente baixos. Os resultados evidenciaram carência na descrição taxonômica e a escassez de materiais científicos que abordavam sobre as condutas médicas a serem tomadas frente aos acidentes com serpentes das serpentes.

Descritores: Mordeduras de Serpentes; Animais Venenosos; Saúde Pública; Epidemiologia; Antivenenos.

Introduction

One of the major public health problems that causes morbidity and mortality in tropical countries is the snakebite, which can be understood when a snakebite occurs in humans, in areas where both can be found. The accident is common in several regions of the country, often affecting young men, rural workers of economically active age[1].

These snakebites are clinical pictures resulting from trauma from snakebites, usually in the extremities, with the foot and leg being affected in 70% of the reported accidents and in 13% the hand and forearm. Some species of snakes, commonly called "snakes", have a venom inoculation device called venom in their venom-producing glands capable of altering the victim's physiological and biochemical processes, causing hemorrhagic, anticoagulant, necrotic, cholinergic, myotoxic disturbances. , inflammatory and cytotoxic[1].

The characteristics of the lesions involve the dissemination of the venom, associated with extensive tissue destruction with devitalization, which predispose to infection with the oral microbiota of snakes. This microbiota of the aggressor's oral cavity is related to fecal material, as it is related to the ingestion of prey with concomitant release of feces. Bacterial infections associated with stings can be of environmental origin, of the victim's endogenous microbiota or, more frequently, of the microbiota of the oral cavity of these snakes[1].

Venomous animals are those that produce toxic substance and have a device for inoculation of this substance, where they actively pass through glands, which communicate with hollow teeth, stingers or goads. These inoculating devices (teeth, spines, stingers, spurs or harpoons) are the result of remarkable biological evolution and serve as a means of predation or defense[2,3].

In the Brazilian context, it is noticeable that the species of greatest interest in public health belong mainly to two families, namely Elapidae and Viperidae. The snakebites most frequently caused by these snakes are caused by the genera Bothrops, Lachesis, Crotalus and Micrurus. In addition, the Bothrops genus is the one with the highest rate of accidents recorded and referred to the Ministry of Health, most of which involve rural workers and, in recent years, there is a higher incidence of these accidents in large cities, due to biological imbalance, with consequent reduction of their natural habitat[4].

Snakes have an elongated body covered with scales, breathing is pulmonary and they do not have locomotor appendages or external ears. They are ectothermic (cold-blooded) animals, that is, their body temperature changes according to the temperature of their environment, being dependent on an external source of heat to maintain their body temperature. This explains the higher frequency of snakebites during the summer, with an average of 20,000 accidents and about 100 deaths recorded per year[4,5].

Non-venomous animals do not have a loreal pit; in venomous species this structure is found, except in the genus Micrurus. The loreal pit is an orifice found between the eyes and the nostrils, being an organ used for hunting, which has the functionality of a heat sensor that is used to detect the presence of warm-blooded organisms. Among the main morphological descriptions of venomous snakes, the following stand out: Bothrops is characterized by having a smooth tail; Lachesis has a tail with raised scales; Crotalus has a rattling tail; Micrurus is distinguished by having absent loreal pit, red, black and white rings in any type of combination[4].

The treatment for snakebites is done with the specific serum for each type of envenomation. Specific antivenoms are the only effective treatment and, when indicated, should be administered in a hospital environment and under medical supervision. The antivenom is used as an antidote when a person is bitten by a snake and they are produced from the venom taken from the snake itself and from the hyperimmunization of animals. Among the main types of antivenom produced in Brazil, we can mention: antibotropic, antibotropicocrotalic, antibotropicolaquetic and antielapidic[1].

It is important to identify the animal causing the accident by a trained technician to rule out the risks in cases of accidents by non-venomous snakes; and indicate more precisely the antivenom to be administered in cases of venomous. In addition, it is important to recognize local and systemic clinical issues caused by the bites. Thus, this study aims to identify the medical approach to snakebites in the literature.

Methodology

This is a descriptive study with a critical-reflexive character, with a qualitative approach, in order to answer the guiding question: “What are the medical conducts in the face of snakebites?”. To this end, a search and selection of scientific materials was carried out to support the discussion and note the facts in April 2022, in the databases: LILACS, MedLine MedCarib, PAHO-IRIS, WHOLIS, Google Scholar and other databases found in the Virtual Library in Health (BVS). The pre-established Health Science Descriptors (DeCS) were: “Snakebites”, “Poisonous Animals”, “Public Health”, “Epidemiology” and “Antivenoms”, with the help of the Boolean operator “AND”.

Results and Discussion

Snakebites

Venomous snakes are widely distributed around the world, with greater concentration in tropical and subtropical regions. Snake accidents in Brazil in the period from 2007 to 2017 had 1,633,765 reported cases, 321 species of snakes allocated in 75 genera and 9 families have already been described. Venomous snakes found in Brazil belong to the Elapidae and Viperidae family. In the Viperidae family they are represented by the genera Bothrops, Crotalus and Lachesis and; the Elapidae family is represented only by the genus Micrurus[4,6].

The identification of venomous snakes in Brazil can be done in two ways. In the Viperidae family it is identified through an anatomical structure (hole) found between the nostrils and the eyes called the loreal pit, this structure has

a thermoreceptor sensory function that is used for hunting, in the Elapidae family this identification is performed by the type of dentition of this animal that is known as proteroglyph, and can also be identified by the black, red and white colored rings[4].

Venomous snakes have venom glands linked to anatomical structures such as teeth, stingers, stings that are used for the inoculation of these toxins. Many animals do not have this specific structure for venom inoculation, so they are distinguished as venomous animals. These toxins have a very complex constitution, containing several activities such as: Proteolytic action present in bothropic and laquetic venoms; coagulant and anticoagulant action, present in crotalic, laquetic, and bothropic venoms; hemorrhagic action, present in bothropic and laquetic venoms; neurotoxic action, present in crotalic and elapidic venoms; myotoxic action, present in crotalic venom; and nephrotoxic action, present in crotalic and bothropic venoms[4].

The main complication is secondary infections, around 46% presented, but there are not many relevant studies, not counting the 75% barrier to ampicillin, because these types of animals operate as a reservoir with resistant bacteria, and most of them have resistance antimicrobial[6].

The snakebites affect mostly young male adults, who are usually agricultural workers, with the lesion located in the lower limbs causing bothropic envenomation[7].

Figure 1. Bothrops jararaca (Jararaca). Matipó, MG, Brazil, 2022

Note: Left photo: Grantsau R. 2013; Right photo: Ingo Grantsau.

It established the need to prepare the units that provide health services, since according to certain regions there is a predominance of species and a degree of involvement of them in humans, thus being able to establish an adequate protocol to help these people, as well as highlighted for the control of fires and climate changes that make these animals move from rural areas to urban areas, increasing attacks in the same areas[8].

Medical conducts

The correct medical conduct when placed in front of snakebites is extremely important since they are the most serious causes of accidents among venomous animals[9].

From this, and from the reading and analysis of the scientific works found, it is noticed that the identification and knowledge of snakes is a preponderant factor for an adequate medical conduct. That is, the doctor, under ideal conditions, should have a basic knowledge about the snakes in the region, types and names used to refer to them[10].

Another differentiating point that serves as a guide to shape the physician's conduct is the clinical circumstances of the accident, since patients with edema and intense local pain are characteristic of bothropic and laquetic accidents, whereas patients with mild local pain or even absent are characteristic of crotalic and elapidic accidents. In addition to these, symptoms of paresthesia, neuromuscular paralysis are markers of elapidic and crotalic accidents[10].

Laquetic and bothropic accidents are very similar; however, there are manifestations that facilitate their differentiation. Among them: hypotension, diarrhea and vomiting, accompanied by sensory changes in the first 30 minutes are characteristics of snakes of the lachesis family[11].

In addition, the physician, when faced with a properly identified snakebite, must prepare himself adequately for the administration of antivenom serum. This is due to the possibility that the patient may have some type of anaphylactic reaction, thus requiring the proper preparation of emergency materials and, if possible, a search for the patient's history[10].

The medical agent must also be prepared to promote specific actions in order to minimize the damage caused by the venoms, which include elevation of the affected limb, hydration of the patient, control of vital signs, administration of analgesics, cleaning of the bite site, control of urinary output and use of antibiotics, if necessary. Along with this, the doctor must be prepared to reverse several conditions such as hypovolemia, hemorrhages and respiratory damage.[12].

The follow-up of the patient after the diagnosis and beginning of the treatment is extremely important since they

are indicators of the effectiveness of the treatment, and for that some complementary exams are used such as: Clotting time (CT), blood count, creatine phosphokinase (CPK), lactic dehydrogenase (LDH), and urine, electrolytes, urea, creatinine, and transaminases (AST and ALT)[13].

A point worth mentioning is that the medical professional, in many cases, has outdated conduct due to the lack of information during his academic and professional life[12].

Permanent Education

Continuing education is a working concept in the SUS about day-to-day knowledge and learning, which are always related to collectives. Continuing education encompasses educational actions guided by the problematization of work processes in health; its main objective is the transformation of professional practices and work organization, fulfilling the needs and particularities of the population.

Health professionals, mainly, need knowledge of the transforming actions of the health service. However, in the case of situations generated by snakes, continuing education is highly linked to the conduct that will be carried out by these professionals and even by the population included in the situation of occurrence. It is very important that such knowledge is dissipated from the sphere of health professionals to school and family environments[14].

According to the DATASUS Notifiable Diseases Information System (SINAN), in 2018, there were 259,553 cases of accidents with venomous animals in Brazil, with 292 deaths, predominantly snake, spider and scorpion bites. Being the snakebite, occupying the 3rd place in number of occurrences and the 1st in number of deaths (38.6%). In addition, it is worth remembering that these accidents require intensive treatment, long hospitalizations and can leave sequelae that require a long recovery time[14].

Such data only prove the importance of the propagation of permanent education at the federal level, both for large cities, smaller urban centers and mainly rural areas, where the rate of snakebites is higher. Therefore, knowledge about the problems and resolutions involved in the theme must be unraveled in rural ESFs and hospitals in small towns. It is essential that those responsible for managing basic health units and hospitals pay attention to the application of continuing education to the entire health team responsible for attending to snakebites, providing faster and more effective care, to avoid possible sequels or even death of the patient.

Final Considerations

The present study had its objective concluded by being able to categorize the medical conduct in the face of snakebites through the identification of snakes, specific symptoms of patients (victims of snakebites) for each genus of snakes, administration of specific serum, preparation of emergency materials , carrying out actions that minimize the effect of the poison and monitoring patients through complementary exams.

A limitation found for carrying out this study was the scarcity of scientific materials that addressed the medical conduct to be taken in the face of accidents with snakes.

The study is of great relevance to the medical clinic due to its ability to summarize the necessary medical procedures in the face of snakebite, which prepares the physician in the face of a rather neglected disease. It also has academic relevance for being able to reveal little scientific research on the subject of study, raising the importance of promoting more research on this niche. In addition, there is also relevance for society to increase clinical knowledge about snakebite, thus optimizing actions for patients with this condition.

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