



Usefulness of a clinical algorithm for suspected leptospirosis

Utilidad de un algoritmo clínico para la sospecha de leptospirosis

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ABSTRACT

Leptospirosis is the most widespread zoonosis internationally. An algorithm is defined as a logical and sequential process used to solve problems or make clinical decisions. This research aims to describe the usefulness of a clinical algorithm for suspected human leptospirosis in the context of Primary Health Care in Cuba. A literature review was conducted using the following databases: Google Scholar, Lilacs, Redalyc, Medigraphic, Scielo, ProQuest, Pubmed, ScienceDirect, Scopus, and Web of Science. Thirty-two national and international articles, in Spanish or English, were reviewed. The main limitation of the study was the limited availability of up-to-date literature on the topic. The usefulness of a clinical algorithm for suspected leptospirosis in humans, aimed at physicians working at the primary care level, lies in its ability to standardize diagnosis and initial management.

Keywords: Leptospirosis; Risk Factors; Leptospira interrogans; Epidemiology; Zoonosis.

RESUMEN

La leptospirosis es la zoonosis de mayor difusión internacional, un algoritmo se define como un proceso lógico y secuencial que se utiliza para resolver problemas o tomar decisiones clínicas. La siguiente investigación tiene como objetivo describir la utilidad de un algoritmo clínico para la sospecha de leptospirosis humana en contexto de la Atención Primaria de Salud en Cuba. Se realizó una revisión bibliográfica de artículos en bases de datos de: Google Scholar, Lilacs, Redalyc, Medigraphic, Scielo, ProQuest, Pubmed y ScienceDirect, Scopus y Web of Science. Se revisaron 32 artículos nacionales e internacionales, en español o inglés. La principal limitación del estudio consistió en la poca disponibilidad de bibliografía actualizada sobre el tema. La utilidad de un algoritmo clínico para la sospecha de leptospirosis en humanos, dirigido a los médicos que laboran en el primer nivel de atención, radica en que estandariza el diagnóstico y el manejo inicial.

Palabras clave: Leptospirosis; Factores de Riesgo; Leptospira interrogans; Epidemiología; Zoonosis.

INTRODUCTION

Throughout history, numerous diseases that negatively affect human survival have been described. Among them, leptospirosis warrants special mention, as it is the zoonosis with the greatest international spread and causes the greatest damage from an economic and social perspective. (1,2,3)

Its distribution is worldwide, with a higher incidence in tropical areas than in warm-climate regions such as the coast; (4) transmission occurs more frequently in areas undergoing population expansion and in developing countries, and the disease presents epidemic, endemic, and sporadic outbreak transmission patterns. (5,6,7)

According to the Statistical Yearbook of Cuba for 2024, there are 75 deaths from leptospirosis, representing a crude rate of 0.8 per 100 000 inhabitants in both sexes. (8)

In the medical field, an algorithm is defined as a logical and sequential process used to solve problems or make clinical decisions. These algorithms can be presented as flowcharts, tables, or formulas, and are essential tools for standardizing medical care and improving decision-making. (9) The development of a clinical algorithm enables standardization of the initial approach, improvement of diagnostic opportunity, and strengthening of the problem-solving capacity of the family physician.

At the primary care level, where the first contact with the patient occurs, there are algorithms aimed at clinical and laboratory diagnosis; however, in the current Cuban context, a clinical tool is needed to guide the diagnosis and management of clinical suspicion efficiently. This deficiency limits the response capacity of medical personnel and affects the quality of care. Therefore, this research aims to describe the usefulness of a clinical algorithm for suspected human leptospirosis in the context of Primary Health Care in Cuba.

METHODS

A literature review was conducted in the following databases: Google Scholar, Lilacs, Redalyc, Medigraphic, Scielo, ProQuest, Publimed, ScienceDirect, Scopus, and Web of Science. A total of 32 national and international articles, in Spanish or English, were reviewed. The main limitation of the study was the limited availability of updated bibliography on the topic.

DEVELOPMENT

Leptospirosis represents a global health problem; in recent decades, no epidemic outbreaks have been reported in Cuba, which may be associated with underreporting of cases and the scarcity of diagnostic means in Primary Health Care (PHC) as a surveillance setting. Undoubtedly, the study of suspicion enables the identification of risk factors and vulnerable groups, early clinical diagnosis, and adequate management preventing the development of complications of the disease; this addresses different levels of health prevention.

The suspicion of leptospirosis

The National Program for Prevention and Control of Human Leptospirosis (2nd Version), Cuba (1998), defines a suspected case of human leptospirosis as any person with a syndrome or clinical symptoms compatible with leptospirosis, without epidemiological evidence of exposure, and whose laboratory diagnostic result is pending. (10)

The authors consider that this definition is incomplete because it does not include exposure to the source of infection and exposure to risk factors as epidemiological elements. It is not possible to speak of suspected leptospirosis in humans solely on the basis of clinical manifestations, due to variations in presentation, nor of a probable case, due to the scarce diagnostic means available at the first level of care. The authors propose that, in the polyclinic as the fundamental setting of APS, two operational groups should be considered: suspected case and confirmed case of human leptospirosis.

However, Cedeño et al. suggest that leptospirosis should be suspected in patients presenting with symptoms such as fever, severe headache, prostration, myalgias, and conjunctival injection, or in patients with signs of aseptic meningitis, adult respiratory distress syndrome, renal failure, or jaundice. Information should be obtained from the patient about age, sex, occupation, and exposure history (place, date, and conditions of contact with animals or contaminated environments).¹¹

Finally, the authors contextualize the suspected case of human leptospirosis based on the clinical-epidemiological foundations proposed as: a patient with high fever ($>38^{\circ}\text{C}$) of nonspecific cause, accompanied by symptoms and signs such as frontooccipital headache, myalgias in lower limbs, prostration, conjunctival injection, jaundice, hemorrhages, arthralgias, diarrhea, vomiting, back pain, chills, or photophobia, with or without signs of multiorgan failure if there is disease progression. Furthermore, the case may present with or without an epidemiological history suggestive of exposure to *Leptospira* or risk factors such as exposure to floods, mud, or contact with stagnant waters (wells, lakes, and rivers) contaminated by rodent urine; farmers, ranchers, agricultural workers, veterinarians, librarians, underground and cleaning workers; or endemic areas, and with or without basic nonspecific but orienting clinical laboratory alterations.

Primary Health Care as a surveillance setting

The APS in Cuba is the guiding axis of public health and, as a result of that political will in favor of the health of the Cuban people, endogenous factors contribute to achieving health indicators that reflect a high degree of development comparable to that of the most advanced countries in the region and other developed regions as a whole. (11,12,13) The transformations that have occurred in the social, economic, and political spheres, along with the scientific-technical progress of humanity, influence the determination of the health status of the national and international population. This health status, expressed by physical, mental, and social indicators, is manifested in the quality, quantity, and distribution of diseases and their conditioning factors. (14,15)

In Cuba, this evolution also reaches the population and determines the need to make adjustments to health policies and to the already defined organizational and operational regulations. (16,17) Therefore, a transition occurs from curative medicine to preventive and social medicine, which is strengthened by the implementation of a comprehensive, humane, and community-based medical care system called family medicine. (13)

This international event arises from and has as its starting point one primary care working group, as a response to the limited results obtained with the strategies for overcoming the crisis, characterized in many countries by the fragmentation of care and by the use of health technologies and medications that are unnecessary, ineffective, or, worse, sometimes dangerous. (18,19)

The Cuban Ministry of Public Health, according to its fundamental principles for the emergence, development, and operation of the National Health System, among which is the APS System, includes social participation in all and each of the population's health activities; physical and financial accessibility to health services; intersectoral action, since a number of health problems are a consequence of factors related to the activity of different sectors of society; and an interdisciplinary and comprehensive approach to the population's medical-social problems (16).

In addition to the aforementioned principles, there are: the use of methods and means of science and technology developed at the state and institutional level as a complement to diagnostic and prevention methods, as well as the scientific nature of its methods, procedures, and activities, and the use of health diagnosis levels and their corresponding planning as a management and evaluation tool for the work. This relationship is fundamental in achieving healthcare quality. (16,18)

The strategy of Comprehensive General Medicine and PHC in general substantially reduces morbidity and mortality from preventable diseases, as well as improving the health level and life expectancy of the population, despite innumerable challenges and problems. (19,20,21)

In the twentieth century, Langmuir defined epidemiological surveillance as: "the continuous observation of the distribution and trend of incidence through the systematic collection, consolidation, and evaluation of morbidity, mortality, and other relevant facts." In the same century, this concept was expanded to that of public health surveillance, so that its approach encompassed the administration of services, including processes and impact. (22,23) The development of strategies aimed at promoting and guaranteeing the quality of life of the population through critical and constant monitoring of the determining causes in the health-disease process, which allows intervention for better control and follow-up of these processes. (21,22,23)

Primary health care plays an essential role in the early detection of communicable diseases. In Cuba, the health surveillance system is organized through a network of services at the local and national levels, in interaction with other sectors and activities; the family physician is responsible for active surveillance and follow-up of patients with symptoms compatible with leptospirosis at the local level. However, the lack of structured clinical algorithms may hinder decision-making in high-demand scenarios.

Decision algorithm in medicine

According to classical decision theory (Luce and Raiffa, 1958), a decision problem can be classified into: individual decision-making and group decision-making (TDG). TDG is a problem in which experts try to achieve a common solution, taking into account the opinions or preferences of all those involved; however, some of the decisions made are not accepted as good by some of the experts. (24) To avoid these disagreements, a consensus process is required, in which experts discuss and modify their preferences to reach a level of agreement before making the decision.

Consensus is defined as an agreement where experts align their positions to make a decision. The concept of consensus has been defined and studied in different ways in the literature: consensus is defined as a group opinion, and it refers to the approaches, models, tools, and procedures where experts align their positions to make a group decision (Zhang et al. 2019). (24,25)

In the medical field, an algorithm is defined as a logical and sequential process used to solve problems or make clinical decisions. These algorithms can be presented in the form of flowcharts, tables, or formulas, and are essential tools for standardizing medical care and improving decision-making. (25)

The authors adopt the aforementioned theory as the theoretical basis for the development of a clinical decision algorithm or medical consensus as a tool to standardize medical care and improve decision-making in the face of a health problem.

The authors contextualize a clinical decision algorithm for suspected human leptospirosis as a logical and sequential process used for clinical decision-making and for determining the course of action in patients with suspected leptospirosis, based on epidemiology, clinical features, and basic nonspecific clinical laboratory findings indicative of the disease. They consider that it enables an efficient, timely, and equitable clinical-epidemiological diagnosis and, in turn, serves as a health prevention tool.

Prevention of human leptospirosis

In 1988, the WHO defined health prevention as those “measures intended not only to prevent the onset of disease, such as reducing risk factors, but also to halt its progression and attenuate its consequences after they are established.” Thus, prevention is understood as measures aimed at preventing and halting the progression of a disease, as well as alleviating or attenuating its effects after it has begun. (25,26,27)

Prevention should be based on knowledge of the natural history of the disease or of how a pathological process evolves when there is no medical intervention. Accordingly, when controlling a health problem, three levels of prevention can be established, depending on the stage at which the disease is found: primary prevention, secondary prevention, and tertiary prevention. (28,29,30)

The Modules of Principles of Epidemiology for Disease Control (MOPECE), Third edition, define prevention as actions that prevent the occurrence of diseases, aimed at eradicating, eliminating, or minimizing the impact or disabilities, and delaying the progression and disability. It is important to note that the Leavell and Clark prevention model considers the levels of primary, secondary, and tertiary prevention, and primordial and quaternary have recently been incorporated. In secondary prevention, the actions are early diagnosis, early treatment, and limitation of damage. When the disease has no cure, it is oriented towards increasing survival and improving quality of life. (31,32)

The authors define prevention of human leptospirosis as activities aimed at avoiding exposure, timely detection and treatment, rehabilitation and reduction of sequelae, in addition to health education and communication. Using a clinical algorithm directed at suspected leptospirosis, health prevention is achieved through early diagnosis of cases and timely treatment, thereby avoiding complications and death in the absence of screening and confirmation tests.

CONCLUSIONS

The utility of a clinical algorithm for suspected leptospirosis in humans, based on evidence and scientific recommendations and aimed at physicians working in the first level of care, lies in standardizing the diagnosis and management of suspected cases. Additionally, it serves as a health prevention alternative.

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CONFLICT OF INTEREST

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