Brucellosis in humans and livestock

Brucelose em humanos e animais

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RESUMO
A brucelose é a principal doença antropo zoonótica, em todo o mundo representa um sério problema em humanos e animais em países com economia baixa e média, 500.000 casos são relatados anualmente em humanos em todo o mundo, no entanto, a incidência real é estimada em 5.000.000 a 12.500.000 casos anualmente. É transmitido ao homem por contato direto, com animais doentes ou pela ingestão de produtos não pasteurizados infectados. Gênero Brucella, com bordas retas ou ligeiramente convexas, extremidades arredondadas e imóveis com 0,5–0,7μm de largura por 0,6-1,5 μm de comprimento. Apresentam-se individualmente e raramente em pequenos cachos, não possuem cápsulas, esporos ou flagelos, e são aeróbicos A apresentação clínica, a gravidade e a evolução da infecção em humanos variam dependendo da espécie infectante de Brucella, da concentração do inóculo, do estado físico do paciente e da história de outros sofrimentos. Apresentação clínica em gado, ao contrário da brucelose humana, o aborto espontâneo em ruminantes infectados é a característica da infecção, a apresentação clínica em populações animais varia muito de acordo com a espécie afetada. No México, como na maioria dos países da América Latina, o controle de doenças em animais é complicado, pelas características de resistência bacteriana ao meio ambiente, a falta de rebanhos livres de brucelose para repovoar (principalmente caprinos que são reservatórios da Brucella melitensis a mais patogênica para o homem), o diagnóstico e a eliminação tardia dos animais positivos, que permanecem nos currais por tempo suficiente para perpetuar a infecção. Aspectos econômicos que afetam a renda dos proprietários por terem que eliminar os animais confirmados com a doença, o consumo de queijos artesanais e derivados do leite não pasteurizadores são fatores que dificultam a aplicação das normas e
regulamentações vigentes relacionadas à prevenção e controle de doenças em animais, impactando negativamente na saúde pública humana.

**Palavras-chave:** Brucelosis, humanos, livestok, saúde pública.

**ABSTRACT**

Brucellosis is the main zoonotic anthropo disease, worldwide represents a serious problem in humans and animals in countries with low and medium economies, 500,000 cases are reported annually in humans around the world however, true incidence is estimated at 5,000,000 to 12,500,000 cases annually. Is transmitted to human by direct contact, with sick animals or when ingesting infected unpasteurized products. *Brucella* genus, with straight or slightly convex edges, rounded, immobile ends 0.5–0.7μm wide by 0.6-1.5 μm long. They show individually and rarely in small bunches, do not have capsules, spores or flagella, and they are aerobics. The clinical presentation, the severity and the evolution of the infection in humans varies depending on the infecting *Brucella* species, the concentration of the inoculum, the physical condition of the patient and history of other sufferings. Clinical presentation in livestock, unlike human brucellosis, spontaneous abortion in infected ruminants is the characteristic of the infection, the clinical presentation in animal populations varies greatly according to the affected species. In Mexico as most in Latin American countries, disease control in animals is complicated, for the characteristics of bacteria resistance to environment, the lack of brucellosis-free herds to repopulate (mainly goats which are reservoirs of the *Brucella melitensis* the most pathogenic for humans), the diagnosis and late elimination of positive animals, which remain in the pens for long enough to perpetuate the infection. Economic aspects to affect the income of the owners by having to eliminate the animals confirmed with the disease, the consumption of handmade cheeses and milk derivatives not pasteurizer are factors that hinder the application of current regulations and norms related to prevention and control of disease in animals, negatively impacting in human public health.

**Keywords:** Brucelosis, humans, livestok, public health.

**1 INTRODUCTION**

Brucellosis is the main zoonotic anthropo disease, worldwide represents a serious problem in humans and animals in countries with low and medium economies, 500,000 cases are reported annually in humans around the world however, true incidence is estimated at 5,000,000 to 12,500,000 cases annually\(^1-3\). Is transmitted to human by direct contact, with sick animals or when ingesting infected unpasteurized products\(^4\). Twelve species of Brucellas are known and four are isolated without names, each of them has a preference for one or more hosts affecting mammals, human is accidental host. It recognized that these bacteria have their natural reservoirs: *Brucella. melitensis* (sheep, goat, camel), *Brucella. abortus* (veal, buffalo, camel, yak), *Brucella. suis* (pig, hare, reindeer, rodent, caribou), *Brucella canis* (dog), *Brucella neotomae* (rodents), and *Brucella ovis* (sheep) have more recently described four other species *Brucella ceti* and *Brucella pinnipedialis* (cetaceans and seals), *Brucella microti* (red foxes and field rodents) and *Brucella inopinata*, isolated in 2009 from a human infection. *Brucella vulpis* (red fox), *Brucella papionis*
(nonhuman primates). B. melitensis is recognized as the most pathogenic to humans and is the most isolated of blood cultures in patients with brucelosis, at present, the most acute growth in the number of cases is being registered in countries of Central and South-East Asia (OIE). Brucella species are commonly classified as smooth and rough, the group brucellas smooth, B. abortus, B. melitensis, B. suis and B. neotomae, while rough, B. canis and B. ovis smooth Brucella species are the most virulent.

2 ETIOLOGICAL AGENT

Gram-negative bacteria are facultative and intracellular Brucella genus, with straight or slightly convex edges, rounded, immobile ends 0.5–0.7 μm wide by 0.6-1.5 μm long. They show individually and rarely in small bunches, do not have capsules, spores or flagella, and they are aerobics. Brucella is characterized by its great capacity to persist for long periods in the soil, water or manure and in the environment under appropriate conditions, such as: low temperature, moderate humidity, pH close to neutrality and in waste of frozen animals; as well as on dried substrates containing organic matter, and protected from sunlight, they can retain their infective capacity for years. However, they can be destroyed in the pasteurization process, because they are quite sensitive to heat when exposed for 5 minutes to ultraviolet light dies quickly and with common disinfectants at the indicated concentrations.

CLINICAL PRESENTATION IN HUMANS

The clinical presentation, the severity and the evolution of the infection in humans varies depending on the infecting Brucella species, the concentration of the inoculum, the physical condition of the patient and history of other sufferings, the bacterium has sophisticated evolutionary mechanisms to evade the immune system of the mammals it infects, it can cause a disease asymptomatic, latent state with late reactivation of the immune system. The humoral immune response against intracellular infections is limited and does not produce a protective immune memory and presents great tendency to chronicity. The characteristic symptoms are intermittent or irregular fever, of variable duration, headache, fatigue, diaphoresis, myalgia, weight loss, anorexia, generalized malaise, with or without localization signs such as: arthritis, spondylitis, endocarditis, meningitis, orchitis, epididymitis. On physical examination, the most frequent finding, in 30-50% of cases, is hepatomegaly and splenomegaly in 12-20% of cases, lymphadenopathy can be found. Focal manifestations are evidenced by suppurative infections of different organs or systems, including osteoarticular, cardiovascular and central nervous system. Even when the diagnosis is made early and the therapy is prescribed correctly, about 10 to 30% of patients will...
develop chronic brucelosis\textsuperscript{24}, the diagnosis of this disease should be based on the patients medical history, especially there was contact with sick animals, or he visited an endemic area and ingested unpasteurized lacteal products, the diagnosis should include blood cultivation and serological tests.\textsuperscript{25,26}

**CLINICAL PRESENTATION IN LIVESTOCK**

Unlike human brucellosis, spontaneous abortion in infected ruminants is the characteristic of the infection\textsuperscript{27}, the clinical presentation in animal populations varies greatly according to the affected species, usually in bovine brucellosis (\textit{B. abortus}), brucellosis goat (\textit{B. melitensis}) and swine brucellosis (\textit{B. suis}) animals may present with undulating fever, mastitis and the birth of weak offspring\textsuperscript{28-30}. Transmission in animals is presented vertically (to their descendants) and horizontally (members of the herd), OPS,\textsuperscript{31,32} infected animals excrete a large amount of bacteria along with tissues and abortion products in milk, and genital secretions; thus contaminating the soil, the pens, the straw of the beds, the water of streams, canals and wells.\textsuperscript{10}

**HUMAN TREATMENT**

Medical treatment for humans is based on the use of antimicrobials and simultaneously administering medications to reduce symptoms, the patients medical history related to allergies, chronic degenerative diseases and synergy that may occur due to the use of others drugs\textsuperscript{33} the most used combinations are those proposed by the World Health Organization (WHO)\textsuperscript{34} that contemplate two options; both include doxycycline for 6 weeks, combined with streptomycin for 2 to 3 weeks, or rifampin for 6 weeks. Although the use of streptomycin would be more effective for relapse prevention, parenteral administration requires the existence of some special conditions\textsuperscript{19}, other combinations of alternative drugs are being used\textsuperscript{35-37} The clinical tracing of patients during and after treatment should be carried in order to verify the remission of symptoms, the correct adherence to treatment, the presence of adverse effects, reappearance of signs or symptoms of disease (relapses) and to realize the corresponding serological and microbiological controls\textsuperscript{38}.

**3 CONCLUSIONS**

In Mexico as most in Latin American countries, disease control in animals is complicated, for the characteristics of bacteria resistance to environment, the lack of brucellosis-free herds to repopulate (mainly goats which are reservoirs of the \textit{Brucella melitensis} the most pathogenic for humans), the diagnosis and late elimination of positive animals, which remain in the pens for long enough to perpetuate the infection. Economic aspects to affect the income of the owners by having
to eliminate the animals confirmed with the disease, the consumption of handmade cheeses and milk derivatives not pasteurizer are factors that hinder the application of current regulations and norms related to prevention and control of disease in animals, negatively impacting in human public health.

No Conflicts of interest.
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