BRUCELLOSIS IN IRAQ

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ABSTRACT

Brucellosis or "Malta fever" as knowing in Iraq (1) ,this name came from the first case was discovered in the island of Malta between British soldiers(2).this disease became emerging disease Since the causative agent *Brucella melitensis* discovered in 1887 by David Bruce (3).Brucellosis is widespread zoonoses disease in the world most caused by Gram-negative bacteria genus Brucella (4),various species can infect livestock like *B. abortus* mostly in cattle; while sheep and goats infected with *B.melitensis*, *B.suis* isolated principally from pigs; and *B.ovis*, found mainly in sheep(5),these bacteria can transmitted to human through direct contact with blood, placenta, fetuses or uterine secretions, or through consumption of contaminated raw animal products(6) Brucellosis is consistently ranked among the most economically important zoonoses globally ,It is a 'multiple burdens' disease with economic impacts attributable to human, livestock and wildlife disease (7),In Iraq Brucellosis considered one of the most endemic disease scince1937 (8).In this review we will concentrated on epidemiology of this disease in Iraq and etiology, transmission, Sign and symptoms, Brucellosis and bioterrorism, and Prevention.

No: of Tables: 2 **No:of Figures: 1** **No:of References: 47**

Epidemiology

The reports show that 60% of emerging human pathogens are zoonotic, one of the most common zoonotic disease Brucellosis ,it's recorded in 56 country , were more than 500,000 new cases annually reported ,In the year 2005, the annual incidence rate per 100,000 population was: 160.30 in Syria, 60.60 in Mongolia, 26.20 in Turkey and 21.40 in Saudi Arabia(9,10,11)

Table 1 Human infected case of middle and south Iraq for the period 1988-2003 source :salih,2010 (24)

Year	Cases	Year	Cases
1988	1892	**1996**	7531
1989	2464	**1997**	8911
1990	2819	**1998**	5305
1991	13106	**1999**	7297
1992	14546	**2000**	8030
1993	14989	**2001**	8166
1994	15476	**2002**	7189
1995	19040	**2003**	No Data *

In Iraq this disease hit the human and animal together in all governorates, since the first time discovered until know days ,in human many cases recorded in different governorates ,in 2001 up to 2003 recorded 108 incidences in Baquba city(12) , while in 2004 Khuder, was recorded 166 infection case in Salahddin province were he notice the ratio of female infection reached to 96.6% (13),after one year in (2005) many cases appeared in different provinces , it were 150,88,50 case in Babylon, Kirkuk and Najaf respectively (14,15,16), in another study carried out on (188) patients with fever attending Tikrit Hospitals, in Tikrit city, were out of 188 cases with fever 28 (13%) case had brucellosis. Most of the patients 24(85.7%) were females from rural area (75%),who were housewives and farmers(17). In the same province after two years (Zedan and Moheeb) recorded 88 brucellosis case with different Clinical features(18) Baghdad ,capital of Iraq, within the western border located Abu-Ghraib city, it's an area in which brucellosis is endemic, many of the inhabitants are farmers raising livestock, in 2008 diagnosis 90 patients with brucellosis(19). In the south of Iraq there is city called Missan this city famous with marshes and buffaloes that live in it, in this city was recorded 266 incidence from 2009-2011 this is due to the nature of the rural city and tendency of many people to animal husbandry indoors(20). while in the north (Erbil/Kurdistan) brucellosis incidence 223 infection in 2012 were recorded by (Rasul and Mansoor) (21). In Mosul city hospitals

was recorded on of the most important case were 16 patients diagnosis with neurobrucellosis, is a recherché neurological complication of brucellosis (22). According to Ministry of Health in Iraq the human brucellosis in 15 governorates except Kurdistan reduced (1897) case between 2005 -2012,were in 2005 was 5565 case while in 2012 was 3668 case (23). Brucellosis in animal , All domestic species almost can be affected with brucellosis except cats which are resistant to Brucella infection (25).There are many factors that can affect the infection of brucellosis with various species of livestock such as climatic conditions, geography, species, sex, age and diagnosis tests applied(26),many cases of brucellosis in animal reported in Iraq for different type of livestock , in seven provinces of middle and south Iraq(Baghdad, Salah-Eldin, Wasit, Babil, Thiqar, Missan &Basra) Al- Hussain and Thaer were investigated brucellosis in buffaloes incidence ,524 blood samples were they found the high infected rate between the aborted cases revealed 10.4% ,7% of non-aborted and 3.3% of pregnant, the overall percentage of infected cases was 7.2% (27).similarly in cattle many cases appeared in AL-Diwaniya city with incidence rate30%(28) ,while in Duhuke city the incidence rate was 6.38% (29). Brucellosis incidence rate in Iraqi camel relatively few, in Najaf city recorded 6.66%,(30,31),the brucellosis incidence In sheep in 2008 recorded 80 infection in Anbar city west Baghdad in this study the results showed that the infection rate has increased about four times higher than it was during the five and thirty years past(32), based on the results of previous studies For each of the (33) when it was 1.5% and (34) where the infection was 0.78%. these results demonstrated the seriousness of the disease through increasing proportion of infection among farm animals that depend upon man in an important part of its food and tributary streams of the national economy, it has been observed that the Malta fever ratios in Human has been increasing as well (32).

Etiology

Brucellosis is caused by infection with Brucella species. which are aerobic, non-motile, Gram-negative, facultative intracellular coccobacilli. The genus Brucella belongs to the alfa-2 subgroup of the class proteobacteria(24),they lack a capsule, plasmids, and flagella(35), traditionally Brucella classification based on the preferred hosts table2 .

Table 2 Currently Recognized Brucella Species
. source:Al-Nassri,2014 (36)

Organism	Animal Reservoir
Brucella melitensis	Goats, sheep, camels
Brucella abortus	Cows, buffalo, camels, yaks
Brucella suis	Pigs (biotype 1-3)
Brucella canis	Canines
Brucella ovis	Sheep
Brucella neotomae	Rodents
Brucella pinnipediae and *Brucella cefaceae*	Marine animals, minke whales, dolphins, seals

Brucella species (*B abortus, B melitensis, B canis, B suis*) can cause disease, *B melitensis* is the most virulent, severe and acute cases of brucellosis (36). Recently, a new strain affecting marine mammals isolated and tentatively named (*B.maris*), was first described in 1994 when a bacterial isolate from an aborted fetus of a bottlenose dolphin (Tursiops truncates) was characterized as a no typical Brucella species(37).All Brucella species characterized non-existence of specific host ,can be transmitted between species when there are appropriate conditions (38).*Brucella spp.* can live for long time in meat and dairy products dust, water, slurry, aborted ,and soil, the precise duration of survival is dependent on many variables such as the nature of the substrate, number of organisms, temperature, pH,sunlight, the presence of other microbial contaminants(1)

TransmissionBrucellosis is commonly transmitted to animals by direct contact with infected animals or with an environment that has been contaminated with discharges from infected animals,(Aborted fetuses, placental membranes or fluids, and other vaginal discharges present after an infected animal has aborted)(39),after an initial infection in the reservoir animal several consequences can occur including miscarriage or delay childbearing or permanent infertility (1),after the susceptible animal ingests the organism, the bacteria invade epithelial cells of the host after the incubation period, which may range from two weeks to over months the bacteria move to the blood stream, and localizes in the uterus, placenta, udder, and/or regional lymph nodes (40). Human infection is usually acquired by consumption of unpasteurized, contaminated animal dairy products, direct contact with infected animal parts ,and inhalation of infected aerosolized particles and Person to person transmission is less common(41,42), but of more potential significance is transmission through blood donation or tissue transplantation. Bone marrow transfer in particular carries a significant risk (1).

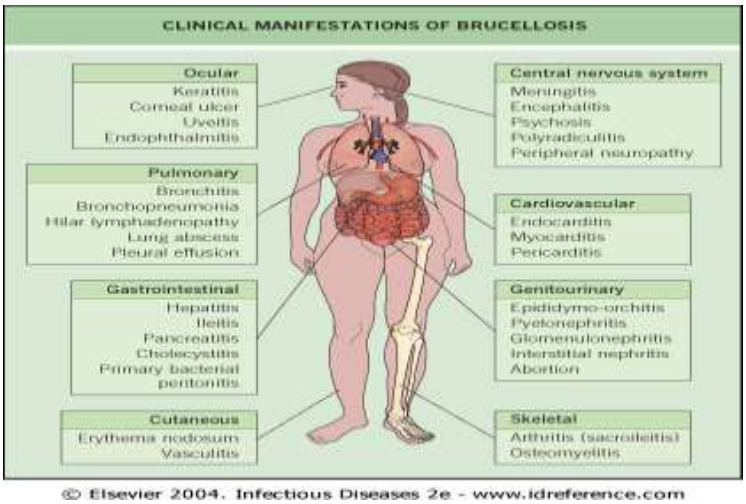

Fig 1 clinical manifestations source:(44)

Signe and symptoms

Brucellosis is a systemic infection with a broad clinical spectrum, ranging from asymptomatic disease to severe and/or fatal illness, in the beginning symptoms can include (headache ,high body temperature , sweats, anorexia, pain in muscles and fatigue), while Some clinical future may continue for longer time like(recurrent fevers, arthritis,swelling , endocarditis, in up to 5% of all cases neurologic symptoms was recorded , depression, and swelling of the liver or spleen) (43).

Brucellosis and Bioterrorism

Bioterrorism is the use of microorganisms as a weapon,the world view for this weapon has changed after 2001 where the anthrax spreaded in america through the postal system (45),bioterrorism agents can be separated in to three categories(A,B,C) according to established criteria(24), the death rate can occur, the stability of the microorganism, and availability, and the degree of the expected panic (45).

Brucella has considered as a biological weapon. in the past it was subject of extensive offensive in many researches, and it still classified in category B pathogens because it can transmitted by air, induce chronic disease requiring combined antibiotic for treatment, although it is sensitive to exposure to heat and most disinfectants but can survive in the environment for up to two years under specific conditions, becoming a continuing threat to both humans and animals (46,47) ,the severity of this disease, lack of vaccines suitable for use in man and failure in correctly identify isolates led to the investigation of Brucella as an agent for bioterrorism.

Prevention

Prevention of brucellosis in humans still depends on the control of the disease in animal hosts(3) but there is some steps important to minimize brucellosis infection rate like (avoid consuming unpasteurized milk and milk derivatives, careful handling and disposal of after births especially in cases of abortion, periodic lab testing of animals, ranchers, farmers, must be clean and disinfect calving areas ,all individuals should wear plastic gloves when handling tissues from wildlife and feral swine, (5,39) to control the brucellosis in animal we should develop diagnosis methods and vaccination.

Conclusion

Brucellosis wide spread zoonosis disease in Iraq among animal and human, until now there is no vaccine for human so the controlling very difficult, in the past before the war in Iraq there was low cases but now the incidence increased , from the previous studies could observed that the infection higher in female than male this is because they are more contact with the infected animal and the animal products that uses in cooking like (milk, meat, contaminated food, dairy product, etc.).

To control and reduce incidence disease we should apply One Health Program principle involve three trends

(animal, human, and environment) that work together to get best result ,this is implemented through a network of veterinarians, farmers and consumers and public health professionals to get a comprehensive and complete information about the disease, causes and methods of prevalence, through this data survey we can determine the spread degree of the disease, indicate the early warning of potential outbreaks and search for new ways to control and collaborate between physicians and veterinarians to develop vaccine more effective against the Iraqi isolates and it can immunized human and animal.

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