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Review Article

Abattoir and Bovine Tuberculosis as A Reemerging Foodborne Disease

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Abstract

Abattoir is the place in which the animals are slaughtered for human consumption. Abattoir plays important role in prevention of zoonotic diseases between animals and humans like Mycobacterium tuberculosis as reemerging foodborne disease and also prevent infectious diseases betwwen animals. Mycobacterium tuberculosis is caused by a species of pathogenic bacteria in the family Mycobacteriaceae . the causative agent bacteria of Bovine tuberculosis as reemerging foodborne disease tuberculosis bacteria has an unusual, waxy coating on its cell surface primarily due to the presence of mycolic acid. This coating makes the cells impervious to Gram staining, and as a result, the causative agent bacteria of Bovine tuberculosis as reemerging foodborne disease can appear weakly Gram-positive. Acid-fast stains such as Ziehl–Neelsen stain, or fluorescent stains such as auramine are used instead to identify the causative agent of Bovine tuberculosis as reemerging foodborne disease with a microscope. The causative agent bacteria of Bovine tuberculosis as reemerging foodborne disease is highly aerobic and requires high levels of oxygen. Primarily a pathogen of the mammalian respiratory system, it infects the lungs. The most frequently used diagnostic methods for Bovine tuberculosis as reemerging foodborne disease are the tuberculin skin examination , acid-fast stain, culture, and polymerase chain reaction.

Keywords: abattoir; cattle; mycobacterium tuberculosis; reemerging; foodborne disease

Introduction

Bovine tuberculosis as reemerging foodborne disease is still one of the largely neglected foodborne zoonotic diseases in the world, particularly in developing countries(1,2,3 and 4). Bovine tuberculosis as reemerging foodborne disease occurrence would be still important in many places. Thus, this zoonosis deserves further research and efforts to establish the real burden of disease in animals, role of abattoirs as well in humans. Developing strategies of interaction between academia and health care public sectors, including medical and veterinary disciplines, would generate more accurate data. Even more, as human tuberculosis due to Bovine tuberculosis as reemerging foodborne disease is still a public health concern internationally, in developing countries where detection is usually not fully based on molecular and more specific diagnostic methods, other than microscopy investigation for acid-fast bacilli bacteria in sputum and other biological samples as well as culture, Bovine tuberculosis bacteria would be causing many of M. tuberculosis-attributed human disease, particularly in the case of outside lung forms of disease, even more in rural areas where both diseases can overlap and where human–cattle contact as consumption of raw milk and dairy products contaminated with Bovine tuberculosis bacteria would be considerable[122,121 and120] . Control programs and human tuberculosis control programs, specially in those places, should consider the importance of Bovine tuberculosis and begin to introduce operational research into their activities as well surveillance to control and prevent disease from this bacteria[119,118,117 and 116].

Methods of Diagnosis of Bovine Tuberculosis as a reemerging foodborne disease[1,2,3,4,5,115, 114,113 and 6]

Bovine **Tuberculosis** clinical signs are not specifically distinctive and, therefore, do not enable veterinarians to make a definitive diagnosis based on clinical signs alone.

The tuberculin skin examination is the standard mean of Tuberculosis diagnosis in live cattle. It consists of injecting bovine tuberculin (a purified protein extract originated from M. bovis) intra-dermally and then measuring skin thickness at the site of injection 72 hours later to detect any subsequent swelling at the injection site.

Blood-based in vitro examinations that detect bacteria, antibodies, or cell-mediated immunity are also currently available, or under development. The most common used blood-based examination is a gamma interferon release assay which detects a cell-mediated immune response to infection with *M. bovis*. This examination is based on the principle that bovine blood cells that have previously been exposed to *M. bovis* through an infection are known to produce elevated levels of gamma interferon following in vitro incubation with *M. bovis* antigens.The definitive diagnosis means is confirmed by bacterial culture and identification in the laboratory, a process that can take eight weeks or more.The recommended examination methods, including the procedures for manufacturing and administering bovine tuberculin.Nature of Bovine tuberculosis as re emerging foodborne disease. Bovine tuberculosis as re emerging foodborne disease is a chronic bacterial disease of animals caused by members of the *Mycobacterium tuberculosis* complex primarily by Bovine tuberculosis, but also by *M. caprae* and to a lesser extent *M. tuberculosis[6,7,8,9,107and 108]*. It is a major infectious disease among cattle, and also affects other domesticated animals and certain wildlife populations, causing a general state of illness, pneumonia, weight loss, and eventual death[106,105,104,103 and 102]. The name Bovine tuberculosis as a reemerging foodborne disease comes from the nodules, called 'tubercles', which form in the lymph nodes and other affected tissues of affected animals[112,111,110 and 109].Cattle are considered to be the major reservoir Bovine tuberculosis as re emerging foodborne disease, and are the main source of infection for humans. Nevertheless, the disease has been reported in many other domesticated and non-domesticated animals[101,100,99 and 98].

Geographical distribution of Bovine tuberculosis as reemerging foodborne disease. Bovine tuberculosis as reemerging foodborne disease is found throughout the world, but some countries have never detected **tuberculosis**, and many developed countries have reduced or eliminated bovine tuberculosis from their cattle population and kept the disease limited to certain areas[60,61,62,63,64,65,66,67 and 68]. However, significant zones of infection remain in wildlife. The highest prevalence of bovine tuberculosis is in Africa and parts of Asia, the disease is also affects countries in Europe and the Americas[69,70,71,72,59,58,57, and 56].The most prominent Clinical signs of Bovine tuberculosis as a reemerging foodborne disease in animals , Bovine tuberculosis as re emerging foodborne disease may be sub-acute or chronic, with a variable rate of progression[55,54,53,52,51,50,69,70,71,and 72]. A small number of animals may become severely affected within a few months of infection, while others may take several years to develop symptoms. The Bovine tuberculosis bacteria can also lie dormant in the host without causing symptoms for a long times[73,74,41,42,43, and 80].The usual symptoms of Bovine **tuberculosis** as re emerging foodborne disease in humans include Weakness, loss of appetite and weight, fluctuating fever, dyspnoea and intermittent hacking cough, signs of low-grade pneumonia, diarrhea, enlarged, prominent lymph nodes[6,7,8,9,10,11,90 and 91].

Discussion:

Mycobacterium bovis has been isolated from numerous wildlife species, including cattle, buffalo, sheep, goats, equines, camels, deer, antelopes, dogs, cats, foxes, mink, badgers, ferrets, rats, primates, llamas, kudus, elands, tapirs, elks, elephants, sitatungas, oryxes, addaxes, rhinoceroses, possums, ground squirrels, otters, seals, hares, moles, raccoons, coyotes and several predatory felines including lions, tigers, leopards and lynx[1,2,3,4,5,6,7,20,21,22 and 23]. Bovine **tuberculosis** as re emerging foodborne disease is an infectious disease[24,25,26,27,28,29,93 and 94].

Most cases of human **tuberculosis** are caused by the bacterial species, Mycobacterium tuberculosis. Zoonotic **tuberculosis** is a form of **tuberculosis** in human predominantly caused by a closely related species, Bovine tuberculosis , which belongs to the M. tuberculosis complex[41,42,43,44,45,46,88and 89].'

Transmission and spread of Bovine **tuberculosis** as re emerging foodborne disease.The disease is contagious and can be transmitted directly by contact with infected domestic and wild animals or indirectly by oral route[30,31,32,33,34,68,69 and 70]. The usual route of infection within cattle herds is by inhalation of infected aerosol, which are expelled from the lungs. Calves can be infected by ingesting colostrum or milk from infected cows[35,36,37,38,39,80 and 81].Humans can become infected by ingesting raw milk from infected cows, or through contact with infected tissues at abattoirs or butcheries(40,41,42,43,44,45,77 and 78].The course of disease is slow and takes months or years to reach the fatal stage. An infected animal can shed the bacteria within the herd before the clinical signs. Movement of subclinical infected domestic animals is a main route of spreading the disease [46,47,48,49,50,66 and 67]. Detection of Bovine tuberculosis as re emerging foodborne disease, Bovine **tuberculosis** as re emerging foodborne disease clinical signs are not specifically distinctive and, therefore, do not enable veterinarians to make a definitive Detection based on clinical signs alone[51,52,53,54,55,77 and 78].

The tuberculin skin examination is the standard method for tuberculosis Detection in live domestic animals[56,57,58,59,60,81 and 82].

Blood-based in vitro examinations that detect bacteria, antibodies, or cell-mediated immunity are also currently available, or under development [61,62,63,64,65,66 and 67]. The most widely used blood-based examination is a gamma interferon release assay which detects a cell-mediated immune response to infection with Bovine tuberculosis[7,8,9,10,11,12,119,118 and 117]. This examination is based on the principle that bovine blood cells that have previously been exposed to Bovine tuberculosis through an infection are known to produce elevated levels of gamma interferon following in vitro incubation with Bovine tuberculosis antigens [68,69,70,71,72 and 73]. The definitive Detection is confirmed by bacterial culture and identification in the laboratory[74,75,76,77 and 78]. The recommended detection methods of Bovine **tuberculosis** as re emerging foodborne disease, including the procedures for manufacturing and administering bovine tuberculin[79,80,81,82,83,84 and 85].

Public health risk of Bovine **tuberculosis** as re emerging foodborne disease. The most common form of **tuberculosis** in *human* is caused by *M. tuberculosis* bacteria [86,87,88,89 and 90]. However, it is not possible to clinically differentiate infections caused by *M. tuberculosis* bacteria from those caused by Bovine tuberculosis, which is estimated to account for up to 10% of human tuberculosis cases in some countries[1,2,3,11,12,13,14,15,16, 77 and 93]. Detection of Bovine **tuberculosis** as re emerging foodborne disease may be further complicated by the tendency of Bovine tuberculosis infections to be located in tissues other than the lungs and the fact that Bovine tuberculosis bacteria is naturally resistant to one of the antimicrobials that is commonly used to treat human tuberculosis[1,2,3,4,17,18,19,20,21,22,23 and 24]. The technical standards and recommendations that are intended to manage the human and animal health risks associated with infection of animals with a member of the *Mycobacterium tuberculosis* complex, including Bovine tuberculosis [122,121,120,25,26,27,28,29 and 30]. Roadmap for zoonotic Bovine **tuberculosis** as re emerging foodborne disease. Human tuberculosis is a major cause of illness and mortality worldwide. It is primarily caused by Bovine **tuberculosis** as re emerging foodborne disease and is usually transmitted through the respiratory route by close contact and inhalation of infected aerosols[119,118,117,31,32,33,34,35,and 36]. Zoonotic tuberculosis is a less common form of human tuberculosis that is caused by a related member of the *Mycobacterium tuberculosis* complex (Bovine tuberculosis) [116,115,114,37,38,39,40,41,and 42]. The zoonotic form is primarily transmitted indirectly, through the consumption of contaminated milk, dairy products, or meat containing infected material. In regions where food hygiene is consistently applied, the risk to the general public has been reduced; however zoonotic tuberculosis infection remains an occupational hazard for farmers, abattoir workers, and butchers [113,112,111,43,44,45,46,47 and 48]. Zoonotic **tuberculosis** is depend up on a One Health approach recognizing the interdependence of human and animal health sectors for addressing the main health and economic effects of this disease [110,109,108,107,49,50,51,52,53 and 54]. Concerted action from government agencies, donors, academia, non-governmental organizations and private stakeholders across political, financial and technical levels. [106,105,104,55,56,57,58,59 and 60]. It defines ten priorities for tackling zoonotic **tuberculosis** in *human* and bovine **tuberculosis** in animals. Through Improve the scientific evidence base, Reduce transmission at the animal-human interface, Strengthen intersectoral and collaborative approaches, Prevention and control of Bovine **tuberculosis** as reemerging foodborne disease[103,102,101,100,61,62,63,64,65,66,67 and 68].National control and eradication system based on examination and slaughter of infected cattle under certain precautions have been successfully implemented in many countries, as the preferred approach to managing Bovine **tuberculosis** as a reemerging foodborne disease[99,98,97, 69,70,71,72,73,74 and 75]. This approach remains impractical in some heavily infected countries because it could necessitate slaughtering large numbers of cattle, and this may not be feasible, due to human resource or financial limitations within the animal health program, or for cultural reasons [74,85,65,13,14,15,16,17 and 18]. Therefore, countries use varying forms of examination and segregation in early stages, and then switch to examine-and-slaughter methods in the final stage [10,11,12,13,76,77,78,79 and 80].

Several disease eradication system have been very successful in reducing or eliminating the disease in cattle, by employing a multi-faceted approach that includes, post mortem meat inspection (looking for tubercles in the lungs, lymph nodes, intestines, liver, spleen, pleura, and peritoneum), for detection of infected animals and herds, intensive surveillance including on-farm visits, systematic individual examination of cattle, removal of infected and in-contact animals, adequate local legislation, effective movement controls, individual animal identification, and effective traceability [96,95,94,93,14,15,16,17,18 and 19]. Detecting infected animals prevents unsafe meat from entering the food chain and allows Veterinary Services to trace-back to the herd of origin of the infected animal which can then be examined and eliminated if needed [20,67,68,10,9,8,7,6 and 5]. Pasteurisation or heat treatment of milk from animals to a temperature sufficient to kill the bacteria has proven effective for preventing the spread of disease to humans [88,95,76,21,22,23,24,25,26 and 27]. Antimicrobial treatment of infected animals is rarely attempted because of the doses and duration of treatment that would be required, high cost of medications, and interference with the primary goal of eliminating the disease, and potential risk of developing resistance [122,121,120,111,28,29,30,31,32,33 and 34].

Conclusion:

Vaccination is practiced in human medicine, but it is, so far, not used as a preventive measure in animals, due to the lack of availability of safe and effective method of vaccination, and potential interference with bovine tuberculosis surveillance and examinations, due to false reactions in vaccinated animals. Researchers and studies are actively investigating potential new or improved bovine tuberculosis types of vaccines and alternate routes of vaccine delivery for use in cattle and wildlife reservoirs, as well as new examinations to reliably differentiate vaccinated animals from infected animals.

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