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Bacteriological survey of tuberculosis in Tabriz and suburbs farms

Monadi, A

Department of microbiology, Tabriz branch, Islamic Azad University, Tabriz, Iran

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ABSTRACT

Bovine tuberculosis is a chronic bacterial disease of cattle that occasionally affects other species of mammals. This disease is a significant zoonosis that can spread to humans, typically by the inhalation of aerosols or the ingestion of unpasteurized milk. The aim of this study was to bacteriological survey of tuberculosis in Tabriz and suburbs farms. For this mean, 23142 cows were examined by tuberculin test and of positives animals, samples from lymph nodes were achieved for bacteriologic and pathological studies. In this study revealed that of 23142 cases 919 were positive and 89 were suspicious. In this study revealed that Gogan town in east Azerbaijan province is focus of tuberculosis and must be take measures in this town to eradication of tuberculosis.

Key words: Bacteriological survey, tuberculosis, cows, Tabriz.

INTRODUCTION

Tuberculosis is a chronic bacterial disease in animals and humans characterized by the progressive development of specific granulomatous lesions of tubercles in affected tissues. The disease affects all age groups of susceptible hosts and is accountable for more deaths throughout the world than any other bacterial disease ever today [7]. Tuberculosis in cattle and other domestic animals is above all caused by two members of Mycobacterium tuberculosis complex (MTC): M. bovis and M. caprae [2, 8, 22, 23]. However, occasional occurrence of tuberculosis due to M. tuberculosis species with concurrent tuberculous lesions has been reported in pigs [12, 19, 15], in cattle [19, 3, 9], in dogs [11] and other animals [10]. The global prevalence of human tuberculosis due to M. bovis has been estimated at 3.1% of all human tuberculosis cases, accounting for 2.1% and 9.4% of pulmonary and extra pulmonary TB cases respectively [17]. Drinking raw milk is a primary route of M. bovis infection in humans; hence the occurrence of human tuberculosis is most commonly extra pulmonary form, particularly in the cervical lymphadenitis form.

M. bovis can be transmitted by the inhalation of aerosols, by ingestion, or through breaks in the skin. The importance of these routes varies between species. Bovine tuberculosis is usually maintained in cattle populations, but a few other species can become reservoir hosts. Most species are considered to be spillover hosts. Populations of spillover hosts do not maintain M. bovis indefinitely in the absence of maintenance hosts, but may transmit the infection between their members (or to other species) for a time.

Cattle shed M. bovis in respiratory secretions, feces and milk, and sometimes in the urine, vaginal secretions or semen. Large numbers of organisms may be shed in the late stages of infection. Asymptomatic and anergic carriers

occur. In most cases, M. bovis is transmitted between cattle in aerosols during close contact. Some animals become infected when they ingest the organism; this route may be particularly important in calves that nurse from infected cows. Cutaneous, genital, and congenital infections have been seen but are rare. All infected cattle may not transmit the disease.

Tuberculosis is usually a chronic debilitating disease in cattle, but it can occasionally be acute and rapidly progressive. Early infections are often asymptomatic. In countries with eradication programs, most infected cattle are identified early and symptomatic infections are uncommon. In the late stages, common symptoms include progressive emaciation, a low–grade fluctuating fever, weakness and in appetence. Animals with pulmonary involvement usually have a moist cough that is worse in the morning, during cold weather or exercise, and may have dyspnea or tachypnea. In the terminal stages, animals may become extremely emaciated and develop acute respiratory distress. In some animals, the retropharyngeal or other lymph nodes enlarge and may rupture and drain. Greatly enlarged lymph nodes can also obstruct blood vessels, airways, or the digestive tract. If the digestive tract is involved, intermittent diarrhea and constipation may be seen.

MATERIALS AND METHODS

The comparative intradermal skin test was conducted on 23142 cattle with the age of greater than six months in east Azerbaijan. A skin test with a bovine tuberculin was used. For inoculation of tuberculin, the middle of the neck was shaved and the thickness measured with a 0.01 mm graduated caliper; then 0.1 ml of bovine PPD was injected intradermally. The injection sites were examined for swelling and thickness after 72 hours. The interpretation of the results was done according to [18].

After slaughting of positive cows, samples from retropharyngeal, parotid, submandibular, prescapular, mesenteric and mediastinal lymph nodes were obtained and shipped to laboratory in sterile condition.
Bacteriological examination:

The diagnosis is confirmed by the isolation of M. bovis on selective culture media. Mycobacteria grow slowly, and cultures are incubated for eight weeks; growth usually becomes visible in 3 to 6 weeks. The identity of the organism can be confirmed with biochemical tests and culture characteristics, or polymerase chain reaction (PCR) assays.
In lab, bacterial smear from samples were achieved. Then this smear were cultured in specific culture Medias and incubated at $37^{\circ C}$ for 6 weeks. After 6 weeks results were read.

RESULTS

In this study of 23142 livestock which tuberculin test were exert on them, 919 were positive and 89 were suspicious. Of them, 902 cows were slaughtered. Of 902 cases, samples of 116 of them were cultured in specific culture Medias. Obtained data are listed in tables 1-5.

Table 1: obtained data from tuberculin test

Tested animals	Positives	Suspicious	Distribution rate of tuberculosis
23142	919	89	3.975

Table 2: data obtained from pathologic and bacteriological measurements

Type of examination	No. of samples	Positives	%
Culture	116	37	31.89
Microscopic examination	89	13	14.60
Pathologic examination	79	21	26.58

Table 3: data obtained from macroscopic survey of afflicted animals

Seized organ	No. of seized	%
Lung and pectoral region	295	34.14
Lung + pectoral region + viscera	195	22.56
Mesenteric region + proventriculus	43	4.97
NVL_S	247	28.58
General tuberculosis	46	5.32
Head	38	4.39
Total	864	100

Table 4: relationship between slaughtered animals and sex

Sum of slaughtered animals	Males	Females
912	96 (10.54%)	816 (89.46%)

Table 5: relationship between slaughtered animals and age

No. of slaughtered animals	3-4 years old	1-3 years old	<1 year old
912	652 (71.49)	222 (24.34%)	38 (4.17%)

DISCUSSION AND CONCLUSION

Recently, Kidane et al. (2002) indicated that M. bovis along with other MTC species were found to be a cause for tuberculous lymphadenitis in humans in Ethiopia [4]. According to Enarson (2006) literature review more than 50% of M. bovis infection in humans in Europe, USA, Canada, Argentina, Australia and New Zealand has pulmonary localization [6]. This proportion may however, change in other regions of the world, especially in Africa. Cases of pulmonary tuberculosis due to M. bovis were also reported [16, 20]. Currently, due to the upsurge of HIV/AIDS infection, the epidemiology of tuberculosis has been greatly affected as many HIV-infected individuals are co-infected with tuberculosis, the incidence of the disease may rise in coming years [1, 24]. The occurrence of M. bovis in humans, against the background of the soaring HIV/AIDS incidence particularly in eastern and southern Africa, implies that the risk of spillover of zoonotic tuberculosis to rural communities is rapidly increasing [13]. It was reported that a higher prevalence of tuberculosis in cattle owned by tuberculous patients was found than in cattle owned by non tuberculous owners, which suggests the significant role of M. bovis in the incidences of human tuberculosis. Thus, the correlation between the prevalence of M. bovis infection in humans and that of local cattle populations highlights the potential threat of this disease for humans [12]. In developing countries, animal tuberculosis is still prevalent and is responsible for significant economic loss in animal production and an increase in human health problems and even deaths [21, 17, 14]. According to literature data, approximately 85% of the cattle and 82% of the human population of Africa live in areas where animal tuberculosis is either partly controlled or uncontrolled. In contrast however, only a few African countries have applied disease control measures as part of "test and slaughter'' strategy and consider the disease as notifiable [17]. Despite this, in most developing countries pasteurization is not well practiced and therefore, 10% to 15% of human tuberculosis is considered to be caused by M. bovis [5]. Human tuberculosis due to M. bovis has become very rare in countries with pasteurized milk and bovine tuberculosis eradication programs. However, this disease continues to be reported from areas where bovine disease is poorly controlled. The incidence is higher in farmers, abattoir workers and others who work with cattle. In addition, humans can be infected by exposure to other species; documented infections have occurred from goats, seals, farmed elk and a rhinoceros. Wildlife may be a source of infection, particularly in countries where bushmeat is eaten.

Some human infections are asymptomatic. In other cases, localized or disseminated disease can develop either soon after infection, or many years later when waning immunity allows the infection to reactivate. Localized disease can affect the lymph nodes, skin, bones and joints, genitourinary system, meninges or respiratory system. Cervical lymphadenopathy (scrofula), which primarily affects the tonsillar and pre-auricular lymph nodes, was once a very common form of tuberculosis in children who drank infected milk. In some cases, these lymph nodes rupture and

drain to the skin; chronic skin disease (lupus vulgaris) may occasionally result. Humans infected through the skin can develop localized skin disease ("butcher's wart"), a form usually thought to be benign and self-limiting. Pulmonary disease is more common in people with reactivated infections than initially; the symptoms may include fever, cough, chest pain, cavitation and hemoptysis. Genitourinary disease can result in kidney failure. Bovine tuberculosis can be treated successfully with antimicrobial drugs, but untreated infections may be fatal.
Finally, can be concluding that tuberculosis is one of the contiguous diseases and its prevalence rate in Iran because of incomplete test and slaughter strategy is high. In this study revealed that Gogan town in east Azerbaijan province is focus of tuberculosis and must be take measures in this town to eradication of tuberculosis.

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