



OUTBREAK INVESTIGATION AND CONTROL OF BRUCELLOSIS

Biserka I. Vasileva¹, Milena D. Karcheva², Vanya A. Birdanova³, Metodi V. Valkov⁴, Georgi N. Nikolov⁵, Alexandar V. Valkov⁵

1) Department of Therapeutic Care, Faculty of Health Care, Medical University-Pleven, Bulgaria

2) Department of Epidemiology, Faculty of Public Health, Medical University-Pleven, Bulgaria

3) Department of Hygiene, Medical Ecology, Occupational Diseases and Disaster Medicine, Faculty of Public Health, Medical University-Pleven, Bulgaria

4) Regional Health Inspectorate-Pleven, Bulgaria

5) Department of Otolaryngology, Faculty of Medicine, Medical University-Pleven, Bulgaria

ABSTRACT

Background: Brucellosis is an infectious and contagious disease caused by bacterial species of the genus *Brucella*. It is a major zoonosis with an important social and economic impact.

Objective: The objective of this study was to investigate and analyze the measures application for control and eradication of brucellosis occurred in the region of Pleven.

Methods: We conducted a retrospective epidemiological study. Respective documents were reviewed. We analyzed Case report form and Questionnaire for persons suspected of having brucellosis. Conclusions were made of the possible source of the disease and the risk factors leading to infection of humans.

Results: A focus of Brucellosis among the animals to private goat farm in August was detected. The connection to other existing in the country focuses has been proved. Two of the persons, having had contacts with the animals developed clinical symptoms of the disease; referenced persons have consumed fresh goat cheese and milk. A joint epidemiological investigation with representatives of responsible authorities was carried out and measures undertook to restrict and liquidate the focus.

Conclusion: Brucellosis in man can only be prevented effectively by elimination of the animal reservoir. This necessitates a close interaction between the medical authorities concerned with public health authorities on the one hand and the veterinary authorities on the other.

Key words: brucellosis, epidemiological investigation, measures,

INTRODUCTION

Brucellosis is a zoonosis and the infection is transmitted by direct or indirect contact with infected animals or their products. It affects people of all age groups and of both sexes. The disease affects people in many parts of the world – Mediterranean countries of Europe, North and East Africa, the Middle East, South and Central Asia and Cen-

tral and South America [1, 2]. The importance of brucellosis for public health is associated with expanded trade in animals and animal products [3, 4]. The reduced control of hygienic measures poses a risk of spreading the disease and return into *Brucella*-free regions.

According to the data of Surveillance report (Annual epidemiological report 2014 – food- and waterborne diseases and zoonoses) in 2012, 376 confirmed cases of brucellosis were reported by 27 European Union (EU) and European Economic Area (EEA) countries (all except Denmark, Liechtenstein and Iceland). The overall rate was 0.08 cases per 100 000. Greece, Spain, Italy and Portugal were the countries that reported a higher number of cases, accounting for 73% of all reported confirmed cases. Male-to-female ratio was 2:1 in 2012. The majority of the cases were adults over 25 years [5]. About 20% of the cases are related to traveling abroad. France, Germany and Sweden were among the countries with higher proportion of imported cases. Seasonality was with case peaks were reported from May to August. The morbidity rate among people in Bulgaria is sporadic. Sporadic cases have been recorded – 8 (2008), 3 (2009), 2 (2010), 2 (2011), 1 (2012), 1 (2013), 2 (2014). In 2015 an epidemic situation occurs in Kyustendil district, tenths of people falling ill (37) on the background of occurred epizooty among domestic animals. It was suspected that the contagious disease was spread out by illegally transported animals from neighboring countries..

Brucellosis is a disease of animals caused by bacteria of the genus *Brucella*. Main reservoirs of bacteria are sheep and goats (*B. melitensis*), cattle (*B. abortus*), swine (*B. suis*), dogs (*B. canis*). In endemic areas, reservoirs can be bison, buffalo, camels, dogs, horses, rodents and other animals. *B. neotomae* has been isolated on few occasions and has never been implicated in human disease. Brucellosis may produce abortion in goats or sheep at about the fourth month of pregnancy [3]. *Brucella melitensis* is a major problem in many countries [1, s2]. The possible means of acquisition of brucellosis include: infection from a con-

taminated environment, occupational exposure usually resulting from direct contact with infected animals, and food borne transmission, bacteria breathing, person-to-person transmission (extremely rare). Food borne transmission is usually the main source of brucellosis for urban populations [5]. The objective of this study was to investigate and analyze the measures application for control and eradication of brucellosis occurred in the region of Pleven.

MATERIAL AND METHODS

We conducted a retrospective epidemiological study. Respective documents were reviewed. We analyzed Case report form (2 forms) and Questionnaire, suspected for brucellosis – 11 contact persons were interviewed. Data collection form containing questions about age, sex, residence place, occupation, education, contact with animals, food consumption, risk habits, geographical risk. Conclusions are made of the possible source of the disease and the risk factors leading to infection of humans.

RESULTS

In August 2015 on the territory of Pleven district there broke out a focus of brucellosis among animals in private farm, Rakita village, Cherven Bryag municipality. Competent authorities were notified – Regional Health Inspectorate-Pleven and Regional Food Safety Authority-Pleven. Representatives of those authorities conducted together epidemiological investigation and established the following: there are 60 goats in the farm; 25 bought from Rila town, where in spring a focus of brucellosis was recorded. Three of newly purchased animals died within the period May-August. The laboratory examinations of veterinary authorities discover brucellosis. The remaining 22 goats were also positive to the disease. Meeting was summoned of district and municipal epizootic commissions. Following measures were undertaken:

I Regarding the animals

- Prohibition the movement of big, small ruminating and odd-toed animals to and from the affected area..
- Identification of animals and recording in Information System of Bulgarian Food safety agency (BFSA) was done.
- Epizootic investigation to establish the source of infection was carried out.
- Traceability of big and small ruminating animals' movement to and from the village was performed in order to discover focus of the disease.
- Serological examination of all animals in the settlement was done. The new samples from animals in Rakita village proved to be negative, so the disease brucellosis remained localized only to the initial site. Samples were taken from the neighboring village Radomirtsi.
- Killing of all positive for brucellosis small ruminating animals and burning out in incinerating furnace in good practice was ordered.
- Sending of fetuses to miscarried animals for examination in National reference laboratory in brucellosis, National Diagnostic Science-and-Research Veterinary Medi-

cal Institute – Sofia.

- Sending blood samples for serological examination of animals within 15 days after proven miscarriage.
- Forbidding the slaughtering of sheep and goats from inflicted area.

II Regarding animal products and exterior environment

- Available milk and milk products, own production with positive reaction to brucellosis animals to be demolished according requirements of Regulation (EO) 1069/2004 dated 21 October 2009.
- The milk, produced from big and small ruminating animals, intended for personal consumption, to be used for consumption or for production of milk products with ripening period at least 60 days or upon thermal processing - pasteurization at min. 72 degrees for 15 sec or at 63 degrees for 30 minutes.
- The milk, produced from big and small ruminating animals, intended for processing in milk processing enterprises, should be used in compliance to specific hygienic rules, regarding the foodstuffs from animal origin.
- Disinfection of yards, premises, inventories and dunghills in agricultural areas with positive reaction to brucellosis animals.

At the herein above described focus, 15 persons have been in contact with sick animals who consumed fresh goat cheese and milk. At the time of survey two persons with symptoms of the disease since a week (temperature, headache, fatigue, night sweating, muscle and joint pains). Blood for hemoculture was taken from those persons and directed for consultation and treatment. Three of contaminated persons left the settlement and for their new residences the respective Regional health authority being notified. Blood was taken from remaining 11 persons for serological examination in NRL for Biohazard Level III Infections. Two of the samples were positive (of the persons with symptoms). Health-promotion activities were performed to the stock-breeders of the village. GP doctors in the municipality were notified for occurred epidemiological situation.

As a result of described measures the seat of contamination was restricted and liquidated.

DISCUSSION

To the 40-ies of XX century the brucellosis among animals in Bulgaria had endemic nature and widely spread out. The first case with a person was diagnosed in 1903. Since then to the beginning of present century, single, sporadic cases among people have been registered. Distinguished merits in that regard is the contribution of strict veterinary control on brucellosis in animal farms as well border veterinary-medical control. The disease was liquidated among animals and only imported cases were registered with people. After 2007 when the country became a member of EU there came into force the principle for free movement of goods, capitals, services and people. So there were imported from Greece on the territory of South Bulgaria animals, contaminated with brucellosis [6]. They were sold in various areas of the country and renewed the en-

demic nature of the diseases and respectively the risk for people, the evidence for that, registered cases in 2015. As in neighboring countries the disease is widely spread, the risk to import the contamination is always existing. Restriction shall be achieved by measures to liquidate the seats among animals as well prevent illegal import of such animals.

Presented evidence about described focus of brucellosis place on the current agenda two basic issues:

- probable source of infections are goats, bought from area where a focus of brucellosis has been identified [7];
- the persons, suffering from brucellosis have consumed fresh goat cheese and milk which is the main reason for the alimentary way become a means of contamination [8].

Common routes of infection include direct inoculation through cuts and abrasions in the skin, inoculation via the conjunctiva sac of the eyes, inhalation of infectious aerosols, and ingestion of infectious unpasteurized milk or other dairy products [9]. Blood transfusion, tissue transplantation and sexual transmission are possible but rare routes of infection.

In countries with moderate or cold climates there is a marked seasonal variation in the incidence of acute brucellosis, with most cases occurring in spring and summer. This coincides with the peak period for abortions and parturitions among farm animals and hence for the highest level of exposure of those attending the animals and consuming their milk.

So the prophylactic measures should envisage all possible manners of contamination. The recommendations in that regard are:

- Public health education. Training of health workers and farm staff [10].
- Personal hygiene. All persons carrying out high-risk procedures should wear adequate protective clothing. This includes an overall or coat, rubber or plastic apron, rubber gloves and boots and eye protection (face shield, goggles or respirator). The hands should be rinsed in dis-

infectant, washed in soap and water and then treated with cream. Eye protection is particularly important as conjunctival contamination carries a high risk of infection. Should any infectious material enter the eye, it should be removed under clean or aseptic conditions away from the working area. The eye should be thoroughly rinsed with running water and chloramphenicol or tetracycline eye drops or ointment applied. Respiratory contamination is also a high risk in heavily infected environments. Inhalation of dust or aerosols derived from dried excreta or tissues released at abortion, parturition or slaughter should be prevented by the use of suitable respirators [10].

- Prevention of foodborne brucellosis. Boiling or high temperature pasteurization will kill *Brucella* in raw milk [11, 12]. Ideally all milk produced in areas in which brucellosis is present should be pasteurized. If pasteurization facilities are not available, the milk should be heated to a minimum temperature of 80 - 85°C and the temperature held at that level for at least several minutes, or boiled. Cheese from non-pasteurized raw milk should not be produced [13].

- Strengthening veterinary and epidemiological control in private farms [2, 9, 14].

- Ensure an accurate diagnosis - serological and microbiological and adequate therapy [15].

The lack of safe, effective, widely available vaccines approved for human use means that prophylaxis currently plays little part in the prevention of human disease.

CONCLUSION

Expansion of international travel, urbanization, the lack of hygienic measures in animal husbandry and in food handling partly account for brucellosis remaining a public health hazard. The disease in man can only be prevented effectively by elimination of the animal reservoir. This necessitates a close interaction between the medical authorities concerned with public health authorities on the one hand and the veterinary authorities on the other. Surveillance in animals and humans is an important step on the success of the eradication program.

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Correspondence to:
Milena Karcheva, MD, PhD;
Department of Epidemiology, Medical University-Pleven, Bulgaria;
e-mail: milena_karcheva@abv.bg