

Serological Epidemiology of Brucellosis in Cattle of Mymensingh District of Bangladesh

K. M. R. Amin, M. B. Rahman, S. K. Sarkar, S. M. L. Kabir and M. S. I. Akand
Department of Microbiology and Hygiene, Faculty of Veterinary Science,
Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

Abstract: The study was carried out to investigate the serological epidemiology of brucellosis in cows of Mymensingh districts of Bangladesh. Out of 250 animals tested, 2% showed positive reaction. The higher prevalence of bovine brucellosis was recorded in pregnant cows (3.45%) than non-pregnant cows (1.23%). The age wise prevalence of brucellosis in cows older than 4 years of age were found to be more susceptible to infection. The prevalence of brucellosis in cows above four years of age was recorded 2.56% whereas, 1.10% positive cases were found in cows having less than 4 years of age. The prevalence of brucellosis in cows with repeat breeders, previous abortion and retention of placenta was recorded 1(1.64%), 3(12%) and 2(7.41%) respectively. The highest prevalence was recorded in cows with a history of previous abortion. The prevalence was higher in retention of placenta in comparison with repeat breeder cases.

Key words: Brucellosis, prevalence

Introduction

Brucellosis is a zoonotic disease (Matyas and Fujikura, 1984; WHO, 1986) caused by gram-negative bacteria *Brucella* that are pathogenic for a wide variety of animals and human beings. According to WHO experts (1964) the important aspect of this disease is essentially of two folds: (1) the economic loss to animal industry, and (2) the public health significance (Rahman and Rahman, 1982). Economic importance of brucellosis in domestic animals has been widely investigated by many investigators (Islam *et al.*, 1983, Plommet and Fensterbank, 1984; Alton *et al.*, 1988; Nicoletti, 1990). Its prevalence in organized farms and domestic holdings are well documented in some parts of Bangladesh (Rahman *et al.*, 1978; Rahman and Rahman, 1982; Rahman *et al.*, 1983 and Ahmed *et al.*, 1992). The present investigation was carried out to investigate the sero-prevalence of brucellosis in rural cows of Mymensingh districts in association with age, pregnancy and non-pregnancy, abortion, repeat breeder, retained placenta, and mastitis.

Materials and Methods

The rural cows of Mymensingh districts of Bangladesh were included in this study. A total of 250 cows of different age groups, either pregnant or non-pregnant with a history of genital complications like repeat breeder, previous abortion, retention of placenta and mastitic udders were examined for the presence of brucellosis. For serological studies about 5 ml of blood was collected from the jugular vein of each cow using a sterile disposable syringe and needle. Then the sera was prepared by centrifugation and stored in vials at -20°C until used. The serum samples were subjected to Rose Bengal Test (RBT) and plate agglutination test (PAT) for initial screening of *Brucella* positive reactors. The positive sera samples were then subjected to tube agglutination test (TAT) for further confirmation. The preparation of diagnostic antigen and procedure were conducted according to the procedure of Baek *et al.* (2000).

Results and Discussion

The prevalence of brucellosis in cows of Mymensingh districts of Bangladesh is shown in Table 1, Table 2 and Table 3. In this study 250 sera samples were collected from rural cows and the overall prevalence of brucellosis was recorded 2% by TAT (Table 1). This result is more or less similar to the findings of Ahmed *et al.* (1992), who detected 2.76% positive reactors of brucellosis among rural cows. Gray and Martin (1980) recorded 3.90% prevalence of brucellosis in rural dairy cows. Similar results were also obtained by Mathur (1971), Sarker *et al.* (1987), Rahman *et al.* (1978), Rahman and Rahman (1982). In this study a total of 163 sera samples of non-pregnant cows and 87 sera samples of pregnant cows were tested and the prevalence of brucellosis was found to be 3.07% and 1.23% by RBPT and PAT, and TAT respectively in non-pregnant cows and 3.45%, and 3.45% by RBPT and PAT, and TAT respectively in pregnant cows (Table 2). Similar results were also reported by Ahmed *et al.* (1992) and they found 3.23% in pregnant cows and 3.13% in non-pregnant cows. However, Lavsén *et al.* (1988) found the higher prevalence of brucellosis among pregnant cows than the non-pregnant cows. This findings correlate with the observation of Plommet (1971). The high rate of infection in pregnant cows might be due to the

Table 1: Over all prevalence of brucellosis in cows of Mymensingh districts of Bangladesh

Species	Total number of animals	Number and % of positive
Cattle	250	2%

Table 2: Prevalence of brucellosis in cows of Mymensingh districts of Bangladesh (results based on RBT, PAT and TAT)

Animals	No. of Animals	Positive reactors (%) by RBPT and PAT	Positive reactors (%) by TAT
Non-pregnant cows	163	5 (3.07%)	2 (1.23%)
Pregnant cows	87	3 (3.45%)	3 (3.45%)
2.5-4 year old cows	91	2 (2.20%)	1 (1.10%)
>4 year old cows	159	6 (3.85%)	4 (2.56%)

Table 3: Prevalence of brucellosis in cows of Mymensingh districts of Bangladesh associated with certain reproductive complications (results based on RBT, PAT and TAT)

Animals	No. of Animals	Positive reactors (%) by RBPT and PAT	Positive reactors (%) by TAT
Non-pregnant cows	61	2 (3.28 %)	1 (1.64%)
Pregnant cows	25	4 (16%)	3 (12%)
2.5-4 year old cows	27	2 (7.41%)	2 (7.41%)
>4 year old cows	23	1 (4.35%)	0

infected reproductive tract of cows, which could act as a potential reservoir for the organism to propagate and later become active to infection exhibiting clinical symptoms of diseases. In this study 91 and 159 sera samples of cows were examined having age 2.5-4 years and more than 4 years respectively. The prevalence was 2.20%, and 1.10% by RBPT and PAT, and TAT respectively in cows having 2.5-4 years of age and 3.85%, and 2.56% by RBPT and PAT, and TAT respectively in cows having more than 4 years of age. The maximum prevalence rate of brucellosis was recorded in cows having more than 4 years of age (2.56%) than the animals having less than 4 years of age (1.10%). This findings correlate with the observation of Chantal and Thomas (1977), who found the high prevalence rate (8.7%) of brucellosis in cattle of 5-10 years old. Similar reports were also recorded by other investigators (Esuruoso, 1974; Cordes and Carter, 1979; and Botha and Williamson, 1989 and Muranalini and Ramasastry, 1999). So, it may be considered that the high prevalence rate of brucellosis among older cows might be related to maturity with the advance age and therefore the organism found there way to propagate to remain either as latent infection or it may cause clinical manifestation of disease (Robertson, 1976). However, the older animals supposed to be infection, because of more contact with infectious agents and sometimes from malnutrition during pregnancy.

The prevalence of brucellosis in cows of Mymensingh districts of Bangladesh associated with reproductive complications has shown in Table 3. In this study 61, 25, 27 and 23 sera samples were collected from cows with the history of repeat breeder, previous abortion, retention of placenta and mastitis respectively. The prevalence of brucellosis was recorded 16%, and 12% by RBPT and PAT, and TAT respectively in case of previous abortion. Ibrahim and Habiballa (1975) reported 14.2% positive cases of brucellosis among aborted cows. Similar reports were also available from various researchers (Sandoval *et al.*, 1979; Islam *et al.*, 1983; Jha *et al.*, 1993; Shaw, 1986; and Sarker *et al.*, 1987; Barman *et al.*, 1989; Bachh *et al.*, 1988 and Sandhu *et al.*, 2001). In this study the prevalence of brucellosis in animals with the history of previous abortion was highest of all other disorders. In case of retention of placenta, the prevalence of brucellosis was recorded 7.41% and 7.41% by RBPT and PAT, and TAT respectively. Similar results were also reported by Ahmed *et al.* (1992) and were found 7.14% positive cases in case of retention of placenta. In the present study the prevalence of brucellosis in repeat breeder cases was recorded 3.28% and 1.64% by RBPT and PAT, and TAT respectively. Ahmed *et al.* (1992) reported 3.16% prevalence of brucellosis in repeat breeding cases. This finding also correlates with the Bachh *et al.* (1988). In case of mastitis the prevalence of brucellosis was recorded 4.35% by RBPT and PAT, and no positive case was found by TAT. The present investigation suggests that the prevalence of brucellosis in our cow population is not negligible; it is worthwhile to consider adoption of preventive measures.

Reference

- Ahmed, J. U., M. G. S. Alam, M. M. Rahman and M. Hossain, 1992. Sero-prevalence of rucellosis in indigenous zebu cattle of Bangladesh. *Bangladesh J. Micrbiol.*, 9: 27-21.
- Alton, G. G., L. M. Jones, R. D. Angus and J. M. Verger, 1988. Bacteriological method, serological method. In: *Techniques for the brucellosis laboratory*, Institut National de Recherche Agronomique, Paris, France, 17-136.

- Bachh, A. S., M. A. Nowsheri, A. Rashid, A. K. Rajna and S. Wani, 1988. Seroprevalence of brucellosis in exotic cattle in Kashmir. *Indian-J. Comp. Microbiol. Immunol. and Infec. Dis.*, 9: 23-27.
- Baek, B. K., K. H. Lim, J. Hur and M. J. Choi, 2000. Immunological suis. *Kor. J. Vet. Publ. Hlth.*, 24: 133-142.
- Barman, N. N., K. Ahmed, G. K. Saikia, B. R. Boro, 1989. Seroprevalence of brucellosis in organized cattle farms of Assam (India). *Indian J. Ani. Hlth.*, 28: 2: 99-102.
- Botha, C. J. and C. C. Williamson, 1989. A serological survey of bovine brucellosis in four district of Bophuthatswana. *Vet. Bull.*, 50: 716.
- Chantal, J. and J. F. Thomas, 1977. Serological study of bovine brucellosis in dakas abattoir. *Vet. Bull.*, 47: 819.
- Cordes, D. O. and M. E. Carter, 1979. Persistence of *Brucella abortus* in sex herds of cattle under brucellosis eradication. *Newzealand Vet. J.*, 27: 255-259.
- Esuruoso, G. O., 1974. the incidence and implication of *Brucella* infection rang in cattle. *Bull. epi. Dis. Afr.*, 22: 35-40.
- Gray, M. D. and S. W. Martin, 1980. An evaluation of screening programme for the detection of brucellosis in dairy cattle. *Canadian J. Comp. Med.*, 44: 50-60.
- Ibrahim, A. E., N. Habiballa, 1975. A survey of brucellosis in Messeriya cows of sudan. *Trop. Hlth. Prod.*, 7: 245-246.
- Islam, A., M. Haque, A. Rahman, M. M. Rahman, A. Rahman and F. Haque, 1983. Economic losses due to Brucellosis among cattle in Bangladesh. *Bangladesh Vet. J.*, 17: 57-62.
- Jha, V. C., Thakur-RP and J. N. Yadav, 1993. Sero-prevalence of brucellosis in cattle and buffaloes in the Koshi Hills of Nepal. *Veterinary Review Kathmandu*. 8: 17-19.
- Lavsen, J. W., J. J. Wevver and L. D. Edard, 1988. A field outbreak of bovine brucellosis. *Aust. Vet. J.*, 65: 30-31.
- Matyas, Z. and T. Fujikura, 1984. Brucellosis as a world problem. *Dev. Biol. Stand.*, 56: 3-20.
- Mathur, T. N. M., 1971. Brucellosis and farm management. *Ind. Vet. J.*, 48:219-228.
- Muranalini, N. and P. Ramasastry, 1999. Serological survey on the occurrence of brucellosis in domestic animals and man in Andhra Pradesh. *Indian Vet. J.*, 76: 483-484.
- Nicoletti, P., 1990. Vaccination In : Animal brucellosis, Nielsen K and Duncan JR, CRC Press, Boca Raton. Florida, USA, 283-299.
- Plommet, 1971. Effect of brucellosis in bovine Reproductive Efficiency. In *Current Therapy in Theriogenology*. 2nd Ed. (1986) by morrow, D. A., W. B. Saunders Co. Philadelphia P: 272.
- Plommet, M. and R. Fensterbank, 1984. La vaccination antibrucellique administree par voi conjontivale. *Dev. Boil. Stand*, 56: 681-687.
- Rahman, M. M. and M. S. Rahman, 1982. Study on the prevalence of brucellosis in cows in organized farms and domestic holdings in Bangladesh. *Bangladesh Vet. J.*, 16: 53-58.
- Rahman, M. M., T. I. M. F. Chowdhury and M. U. A. Chowdhury, 1978. Investigation of brucellosis among cattle. *Bangladesh Vet. J.*, 12: 12-15.
- Rahman, M. M., T. I. M. F. R. Choudhury, A. Rahman and F. Haque, 1983. Sero-prevalence of Human and Animal brucellosis in Bangladesh. *Indian Vet. J.*, 60:165-168.
- Robertson, A., 1976. *Handbook on the Animal Diseases in Tropics*. 3rd Ed. Published by Bri. Vet. Assoc., p: 96.
- Sarker, S. C., K. K. Baxi and S. S. Sodhi, 1987. Studies on the incidence of infertility and abortion n dairy animals. *J. Res. Punj. Ag. Univ.*, 24: 105-110.
- Shaw, A. A., 1986. Studies on infection, infertility and abortion incidence of bovine brucellosis in Kashmir. *Vet. Bull.*, 57: 625-627.
- Sandhu, K. S., G. Fila, D. R. Sharma, N. K. Dhand, J. Singh and S. S. Saini, 2001. Prevalence of brucellosis among dairy animals of Punjab. *Indian J. Comp. Microbiol. Immunol. and Infec. Dis.*, 22: 160-161.
- Sandoval, L. A., W. Gorgi and L. B. S. Amoral, 1979. Role of brucellosis in reproductive disorder. *Vet. Bull.*, 50: 536.
- World Health Organization Technical Report Series, 1964. Joint FAO/WHO Expert Committee on brucellosis, Fourth report, 289.
- WHO, 1986. Joint FAO/WHO Expert Committee on brucellosis. 6th report, WHO Technical Report Series, 740.