Biotechnology in Animal Husbandry 25 (1-2), p 73-80, 2009 ISSN 1450-9156
Publisher: Institute for Animal Husbandry, Belgrade-Zemun UDC 619:636.2

RESEARCH OF MASTITIS PREVALENCE AT HEIFERS IN FARM BREEDING**

N. Varatanović[1]*, A. Katica[2], T. Mutevelić[1], B. Čengić[1], N. Mlaćo[2], E. Hamzić[2]

[1]Clinic for obesterics and repression of infertility, **Veterinary faculty** – Sarajevo, Bosnia and Herzegovina
[2]Depratment for anatomy and histology with embriology, **Veterinary faculty** - Sarajevo. Bosnia and Herzegovina
*Varatanoivć N., e-mail: porodiljac@yahoo.com
**Original scientific paper

Abstract: With 268 heifers in farm breeding, udder examination has been performed for clinical mastitis during 14 days after calving. From each quarter we took secretion samples and performed bacteriological analysis. From total number of heifers, 56 of them had shown clinical signs of inflammation, and 12 were bacteriologicaly positive.

By bacteriological analysis mastitis pathogens had been found, even in 14 heifers without inflammation signs, at least until the end of test period. From the total number of tested heifers in 3,35% of cases Streptococcus agalactiae have been found, 4,85% coagulase positive staphilococcae (CPS) and 1,49% Corynebacterium pyogenes.

Because coagulasa positive staphilococci were the most present bacteries in the period of 14 days, we made opinion that the same are the most often mastitis pathogen. Heifers with intramammarian infections like these, represent source of infection fot other non-infected animals in herd.

Keywords: heifers, mastitis, bacteriological analysis

Introduction

Mastitis represent one of more important diseases in dairy cows production. In this production in addition to expectations to get good health status of the udder from dairy cows intended for herd renew, it is proven to be great risk from developing subclinical mastitis in the period of early lactation and procent of intramammarian infections is high in postpartal period *Trinidad et al.* (1990), *Pankey et al.* (1991), *Olover et al.* (1992) and *De Viegner et al.* (2005).

Reports about appearence of clinical mastitis in fresh calved heifers are mostly scanty and different. According to statements of *Waage et al.*. (1998) in Norway 5% of fresh calved heifers have been treated for clinical mastitis, while *Barkema et al.*. (1998) allege data that in Holland rate of clinical mastitis after partus in heifers is higher in relation to older cows. For the most often causative agent of clinical mastitis during postpartal period in heifers *Jonson et al.*. (1991), *Myllys et al.*. (1995)) allege coagulasa positive staphilococci (CNS), Streptococcus dysgalactiae and coliform bacteries. According to *Waage et al.*. (1999) in Norway the most often isolated causative agent was Staphilococcus aureus, after him Streptococcus dysgactiae and CNS. *Matthews et al.*. (1992) bring data that CNS were the most often in cows and *Staphilococcus aureus* in fresh calved heifers. In Estonia (Tarfu, 2004) the most often causative agent of clinical mastitis in 20,5% of cases was *S. Aureus*, CNS in 11% of cases, Streptococcus agalactiae in 10,7% of cases and Streptococcus uberis in 10,5% of cases. On the appearence of clinical mastitis according to *Aland et al.*. (2003) and *Barkema et al.*. (1999) management have influence, like accommodation, nutrition and milking system. Period of three weeks before and after parturition are considered for key period in lactation cycle of dairy animals. During that period animals experience row of nutritional, phisiological and accommodation changes which made them sensitive for infectious and metabolical changes *Goff et al.*. (1997). Goal of this work is to percieve incidence of clinical mastitis appearance in fresh calved heifers and to identify the most often causative agents of clinical mastitis.

Material and methods

Research of clinical mastitis appearence and their causative agents in heifers, had been performed during three years at the farm of holstain-fresian cows. Total capacity of the farm is 500 animals. Examinated heifers have been sited in objects of half-open type. Feeding of pregnant heifers had been performed according to technological standards common for farm like this one and milking after parturition had been performed using machines, after washing and desinfection of the udder and teats.

Heifers in high pregnancy have been transfered in delivering area 7-10 days before parturition. In colostral period milking had been performed using machines and calves were feeded using milk from their mothers. In delivery area after parturition heifers have stayed 7-15 days, depending on puerpery status. Out of delivery area primiparous heifers were transfered into objects for dairy cows. In this category insemination of the same animals had been performed and they have stayed there next eight months until dryoff period.

After dryoff they were transfered into objects for dry cows where they have stayed 7-10 days before parturition, when they have moved to delivery area.

We have examinated udder by routine clinical methods (adspection, palpation) and secretion using black background.

Samples for bacteriological research were taken by placing secretion in sterile, labeled tubes, separate from every quarter. Before we have took the samples for bacteriological analyze, udders were washed with clean hot water and dried with cloth, and teat tips were desinfected with cotton moistened in 70% etil alcohol. First milk squirt we have taken into separate dish and after, from every quarter we have milked 5-10 ml of milk for analyze. Udder secretion from primiparous heifers we have taken until 10 days after parturition and we took it from heifers with clear signs of inflammation as from heifers without inflammation signs. Bacteriological research we have comprehended specifical causative agents of mastitis: Streptococcus agalactiae, Staphilococcus aureus and Corynebacterium pyogenes. During research we had examinated 268 udders in primiparous animals, in whose 56 had clinical mastitis. Milk inoculation for detection of causative agents has been worked in standard nutrition mediums for diferentiation of searched causative agents: blood agar (CAMP test), Chapmanova nutritional medium, blood plasma and Gimsa colouring technique. Identification and diferentiation of searched causative agents has been performed based on growth of bacterias and their hemolisis in defined nutrition mediums.

Results and discussion

By researching of 268 udders in primiparous animals in 20,90% of cases clinical mastitis had been diagnosed (Table 1). From taken udder secretion of all examinated primiparous animals we had isolated specifical mastitis caustive agents in 9,69% of cases. At 4,85% of samples, what was the most often case, we have isolated staphilococcae, and in only 4 samples Corynebacterium pyogenes had been isolated, or in 1,49% of cases.

From udder secretion in primiparous cows with clinical mastitis, we have isolated specifical causative agents of mastitis in 21,45% of cases. The most often were staphilococci with 12,50%, Streptococcus agalactiae with 5,35% and Corynebacterium pyogenes with 3,57%.

Table 1. Bacteriological findings of udder secretion from primiparous cows

Bacteriological examination of milk	Number of examinated primiparous		Isolated Sc. Agalactiae		Isolated coagulasa positive staphilococci		Isolated Corynebacterium pyogenes		Not isolated specific causative agents	
	n	%	n	%	n	%	n	%	n	%
No clinical signs	212	79,10	6	2,83	6	2,83	2	0,94	198	93,37
With clinical mastitis	56	20,90	3	5,35	7	12,50	2	3,57	44	78,57
Total	268	100	9	3,35	13	4,85	4	1,49	242	90,30

Specifical causative agents of mastitis had been isolated even from udder secretion from primiparous cows without symptoms of clinical mastitis. Pathogenic staphilococci as well as Streptococcus. agalactiae were equally presented in procent of 2,83% of cases and Corynebacterium pyogenes in 0,94% of cases. In 78,57% of samples even those came from primiparous cows with expressed signs of clinical mastitis we did not isolated particular causative agents in udder secretion. Breeding conditions, specially from hygienic aspect in half-open system breeding of dairy cows, in our regions are in most cases not satisfying. Also, contact between animals which is in those conditions impossible to avoid, anticipate spreding of bacterial infections, specially in heifers whose organism with first gestation experience "stress" which helps disturbing imune system status in those animals. Condition of mammary gland will without suspicion affect general health status of animal and with that on quality of colostrum for feeding newborn calves and quality and hygienic propriety of milk. It is extremely important data that from 212 researched heifers whose did not show clinical signs of mammary gland inflammation, in percentage watched it is not negligible presence of pathogenic causative agents found in milk, which is ranged from 0,94% to 2,83%. Comparing results of bacteriological analyze onSc. Agalactiae between researched animals with clinical signs of mastitis and without manifested clinical signs, we had ascertained not so significant percentual difference in presence of this pathogenic causative agents. Namely, in clinical manifested mastitis Sc.

Agalactiae had been found in 5,35% of cases, while in clinical healthy animals that percent was a little lower 2,83%.

We believe that with bacteriological analyze of milk from clinically healthy animals and revelation of potentially bacterial causative agents, we can prevent escalation of latent-subclinical mastitis which cause big economical damage in dairy cows breeding.

Altought heifers had been breeded in special conditions, 20,90% of revealed clinical mastitis presenting high percentual representation. *Pankey et al.*. (1991) during their research had diagnosed 45,5% of intramammarian infections in quarters from primiparous cows within three days after parturition. They cited that the most often isolated bacteries were staphilococcae in 25,4% of cases and coliform bacteries and streptococcae except Streptococcus agalactiae in 14,9% of cases. In samples od udder secretion from 32 heifers *Oliver and Mitchell* (1983) had isolated 15,5% coagulasa negative staphilococcae, 4,4% various streptococcae except Streptococcus agalactiae, 3,8% coliform bacteries, 8% coagulasa positive staphilococcae and 1% Corynebacterium bovis. During examinations of 100 heifers *Sibiraj et al.*. (1988) had revealed clinical changes in 35 heifers and had diagnosed causative agents of these changes. They gave data that out of total isolated causative agents 70% were gram positive coccae and 30% gram negative bacteries. Our research indicate presence of mastitis pathogen agents in: clinically healthy heifers Streptococcus agalactiae and Staphylococcus aureus 2,83% and Corinebacterium pyogenes in 0,94% of cases, in new revealed clinical mastitis Streptococcus agalactiae 5,35%, Staphylococcus aureus 12,5% and Corinebacterium pyogenes 3,57% of cases. Infections with Streptococcus agalactiae we take for arising in the period of breeding heifers and feeding with milk from their mothers whereat set us lang syne research of *Schalma et al.*. (1971) and *Šipke et al.*. (1967). Series of authors *Tenhagen et al.*. (2007), *Ferguson et al.*. (2007) and *Roberson et al.*. (1994) believe that staphilococcal udder infections are most often in heifers, which is the same case with our research. To stop and to reduce infections of mammary gland in heifers with pathogen bacteries from surroundings it is necessarily to take care about complete production management (nutrition, accomodation, bedding, programs for mastitis preventions and similar) whereat direct research of *Comptona et al.*. (2007), *Kalmusa et al.*. (2006) and *Fergusona et al.*. (2007)

We made oppinion that infections with coagulasa positive staphilococcae during parturition of heifers represent significant source of infections for non-infected animals in herd.

Conclusions

After finished research of mastitis frequency in heifers at farm breeding we deduce that:

1. from 268 primiparous cows clinical mastitis had been diagnosed in 56 animals or 20,90% of cases.
2. in clinically healthy primiparous cows we had isolated Sc. Agalactiae and coagulasa positive staphilococcae in 2,83%, and C. Pyogenes in 0,95% of cases,
3. in primiparous cows with expressed clinical mastitis we had isolated Sc. Agalactiae in 5,35% of cases, staphilococcae in 12,5% and C. pyogenes in 3,57% of cases.

Results of our research indicate that in primiparous cows prevailed mastitis caused by staphilococcae as that infections incurred most probably during breeding heifers with bacteries from surroundings.

STANJE KLINIČKIH MASTITISA I NJIHOVI UZROČNICI KOD JUNICA

N. Varatanović, A. Katica, T. Mutevelić, B. Čengić, N. Mlaćo, E. Hamzić[2]

Rezime

Obzirom da mastitisi predstavljaju ozbiljan problem u proizvodnji kod mlječnih grla našim istraživanjem smo pokušali „dokučiti“ izvor njihovog nastanka u farmskom uzgoju.

Prevencijom mastitisa poboljšala bi se ukupna proizvodnja mlijeka , kvalitativno ali kvantitativno, a obzirom da smo istraživanje sproveli na junicama u toku 14 dana nakon teljenja kvalitet i zdravstvena ispravnost mlijeka bi se nedvojbeno odrazila i na prirast novorođene teladi.

Istraživanjem smo obuhvatili 268 crno-šarih junica u farmskom uzgoju.Vimena istraživanih životinja smo pregledali uobičajenim kliničkim metodama (adspekcija i palpacija), a sekret na crnoj podlozi. Sekret za bakteriološko istraživanje smo uzeli izmlazanjem u sterilne označene epruvete i to posebno iz svake četvrti.Zasijavanje sekreta vimena radi otkrivanja

specifičnih uzročnika mastistisa rađeno je na podlogama za diferencijaciju specifičnih uzročnika: krvni agar (CAMP TEST), Chapmanova podloga, krvna plazma i bojenje po Gimzi.

Bakteriološkom analizom smo obuhvatili specifične, ako ne i najčešće uzročnike mastitisa: Streptococcus agalactiae, Staphilococcus aureus i Corynebacterium pyogenes.

Nakon završenih analiza došli smo do značajnih rezultata obzirom na ukupan broj istraživnaih životinja. Od 268 istraživanih junica 56 je imalo klinički mastitis ili izraženio u priocentima 20.90 %, dok od 212 junica u 14 slučajeva ili 6,603% su izolirani mogući uzročnici kliničkih mastitisa. Dakle, kod 6,603% istraživanih junica postoje uvjeti od krucijalnog značaja za razvoj kliničkih mastitisa uz naravno odgovarajuće negativne inpute iz vanjske sredine kao što su ishrana, njega, higijenski uvjeti i sl.

Sprovođenjem mjera prevencije kliničkih mastitisa kod mlječnih grla u farmskom uzgoju, kao što je redovna bakteriološka kontrola znatno bi se manjili troškovi uobičajenog liječenja već nastalih klioničkih mastitisa, što je značajnije proizvodnja izdravstvena ispravnost mlijeka bi se primjenom ovih mjera prevencije optimalno poveećala.

References

ALAND A. (2003): Lüpsikarja teryise seiremundel niny sellerakendamine loomade teruise hindamisel ja parandamisel. Agricultural University, Tarfu,

BARKEMA H.W., VAN DER PLOEG J.D., SCHUKKEN Y.H., LAM T.J.,BENEDICTUS G., BRAND A. (1999): Management style and its association with bulk milk somatic cell count and incidence rate of clinical mastitis. J.Dairy Sci. 82, 1655-63,.

BARKEMA H.W., SCHUKKEN Y.H., LAM T.J., BELOHER G.M., WILMINK M.L., BENEDICTUS G., BRAND A. (1998): Incidence of clinical mastitis in dairy herds grouped in three cartergories by bulk milk somatic cell counts. J. Dairy Sci. 81, 411-19,.

COMPTON C.W., HEUER C., PARKER K., MCDOUGALL S. (2007): Epidemiology of mastitis in pasture grazed peripartum dairy heifers and its effects on productivity. J. Dairy Sci. 90(9), 4157-70,

DE VIEGHER S., BARKEMA H.W., STRYHN H., OPSOMER G., DE KRUIF A.(2005): Impact of early lactation somatic cell count in heifers on milk yield over the first lactation. J. Dairy Sci. 88, 938-47,

Estonian Veterinary and Food Laboratory (2004). Animal report, Tertu

FERGUSON J.D., AZZARO G., GAMBINA M., LICITRA G. (2007). Prevalence of mastitis pathogens in Ragusa, Sicily from 2000 to 2006. J. Dairy Sci. 90(12), 5798-813,

GOFF J.P., HORTS R.L. (1997). Physiologocal changes at Parturition and their relationship to matabolic disorders. J. Dairy Sci. 80, 1260-68,

JONSSON P., OLSSEN S.O., OLOFSON A.S., FÄTLH C., HOLMBERG O., FUNKE H. (1991). Bacteriological investigation of clinical mastitis in heifers in Sweden: J. Dairy Research. 58, 179,

KELMUS P., VILTROP A., AASMÄE B., KASR K. (2006). Occurence of clinical mastitis primiparous Estonian dairy cows in different housing conditions. Acta. Vet. Scand. 10. 1186/1751-0147-48-21,

MATTHEWS K.R., HARMEN R.J., LANGLOIS B.E. (1992). Prevalence of Staphylococcus species during the periparturient period in primiparous and multiparous cows. J. Dairy Sci. 75, 1835-37,

MYLLYS V. (1995). Staphylocci in heifer mastitis before and after parturition. J. Dairy Sci. 62, 51-60,

OLIVER S.P., LEWIS M.J., GILLESPIE B.E., DOWLEN H.H. (1992). Influence of prepartum antibiotic therapy on intramammary infections in primigravid heifers during early lactation. J. Dairy Sci. 75, 406-408,