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The Effect Of Intra mammary Infusion of Tilmicosin As A Dry Cow Therapy On The Rate of Sub-clinical Mastitis

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In order to evaluate tilmicosin efficacy in dairy cows to reduce the rate of intra mammary infections in dry period and new infections in post partum period, sixty quarters of 30 Holstein cows in the dairy farms of Fashapoye in Tehran suburb infected by gram positive bacteria were divided equally in two , test and control groups .Bacterial examination and somatic cell count were examined at the first day of drying ,and then , the animals of test group were infused by tilmicosin(5 ml, intra mammary 30% ,Razak,Tehran,Iran) and control group by Cloxacillin (10 ml ,500 mg, Cloxalmo, DC oint; zistkimia. CO.Tehran. Iran.).Bacterial examination at 7 days and somatic cell count at 10 days after parturition were examined repeatedly .The rates of intra mammary infections and new infection rates were compared by chi esquire and student T test in two groups .Results showed that tilmicosin has less effect on reduction of intra mammary infection due to Chorine bacterium bovis and has no effect on streptococcus agallactiae but has the same effect as Cloxacillin against coagulase negative staphylococci and has more effect against staphylococcus aureus ($p<0.01$) . Tilmicosin were more effective than cloxacilline against new infections. In conclusion, tilmicosin might be an acceptable antibiotic to dry cow therapy**,** but more information is needed before recommendation.

Keywords: Tilmicosin, Intramammary Infection, New Infection Rate, DC treatment.

Introduction:

Dry cow therapy and post milking teat dipping are the most important efforts in mastitis prevention(Radostits etal 2000).The goal of mastitis control during the dry period is to have as few infected quarters as possible at the next calving (Eberhart 1986). Achieving this goal involves eliminating existing Intramammary Infection (IMI) present at the end of lactation, as well as preventing new IMI during the dry period. Systemic, Intramammary and combination antibiotic therapy have been used to control gram positive *streptococci* and especially *staphylococcus aureus* mastitis(Boddie and Nickerson 1986 ,and Radostits etal 2000). However compared with elimination of other pathogens DCT is generally acknowledged as being less successful in eliminating IMI caused *Staphylococcus aureus* .Actual cure rates of *Staphylococcus aureus* may vary between 20 to 78% (Dingwell etal 2003).Variation of cure rate may be explained by pathogen ,cow, herd and finally antibiotic factors(Radostits 2000, Dingwell etal 2003).Reduction in IMI is more pronounced early than later in dry period(Smith1985).Many antibiotics such as Nafcillin, Cloxacillin ,Cephapirin benzathine and Tylosin were used successfully via parentral (IM or IV) or intramammary infusion (DC). Antibiotic resistance is a perpetual challenge in drug selection and so, evaluation and recommendation of a new antibiotic are very important to prevent of the event .The objective of this study is to evaluate Tilmicosin efficacy in dairy cows to reduce the rate of intra mammary infections in dry period and new infections rat in post partum period,

Materials and Methods:

Sixty quarters of 30 Holstein cows in the dairy farms of Fashapoye in Tehran suburb infected by gram positive bacteria were divided equally in two, test and control groups .Bacterial examination and somatic cell count were examined at the first day of drying, and then, the animals of test group were infused by Tilmicosin (5 ml, intra mammary 30%, Razak, Tehran, Iran) and control group by Cloxacillin (10 ml, 500 mg, Cloxalmo, DC oint; zistkimia.CO.Tehran. Iran).Bacterial examination at 7 days and somatic cell count at 10 days after parturition were examined repeatedly .The rates of

intra- mammary infections and new infection rates were compared by chi esquire and student T test in the test and control groups .

Results:

It has been shown that tilmicosin has less effect on reducing intra-mammary infection due to *Corinebacterium bovis* (20% reduction compared with 50%) and has no effect on s*treptococcus agalactiae*(0% reduction compare with 10%) but has the same effect as cloxacillin against *Coagulase Negative staphylococcus* (23.6 % reduction compared with 23.4%) and the most effect against *staphylococcus aureus*(13.3 % reduction compared with 0 %) ($p<0.01$) .Less new intramammary infections were encountered in tilmicosin treated animals for *staphylococcus aureus* (0 against 41.17 %) ,*Escherichia coli*(0 against 11.76 %) and *Arcanobacterium pyogenes* (0 against 17.64 %) , but more new intramammary infections were encountered in Tilmicosin treated animals for

Coagulase Negative Staphylococci(23.07 against 5.88 %) , *Corynebacterium bovis*(46.15 against 17.64 %), *Streptococcus agalactiae* (23.o7 against o %)and *Klebsiella pneumonia*(7.69 against 5.88%) .Tilmicosin was more effective than Cloxacillin against important new infections.

Table (1) Relative and absolute frequency of different kinds of intra-mammary infection in tilmicosin and cloxacilline treated animals before and after parturition.

Kind of Intramammary	**Tilmicosin**		**Cloxacillin**	

	Before parturition		After parturition		Before parturition		After parturition	
	No	%	No	%	No	%	No	%
Staphylococcus aureus	5	16.6	1	3	1	3	1	3
Coagulase Neg.Staphylococci	8	26.6	1	3	7	23.4	0	0
Corynebacterium bovis	15	50	9	30	21	70	6	20
Streptococcus agalactiae	3	10	3	10	3	10	0	0

Table(2)Relative and absolute frequency of new infection rate in Tilmicosin and Cloxacilline treated animals after parturition.

Kind of new infections	**Tilmicosin**		**Cloxacillin**	
	N	**%**	**N**	**%**
Coagulase Neg. Staphylococci	3	23.27	1	5.88
Staphylococcus aureus	0	0	7	41.17
Corynebacterium bovis	6	46.15	3	17.64
Streptococcus agalactiae	3	23.07	0	0
Escherichia coli	0	0	2	11.76
Klebsiella pneumonia	1	7.69	1	5.88
Arcanobacterium pyogenes	0	0	3	17.64
Total	13	100	17	100

Discussion:

Tilmicosin phosphate (20-deoxo-20-desmycosin) is a newer synthetic macrolide antibiotic that is closely related to erythromycin and has been shown to have important interactions with bovine phagocytes and epithelial cells, demonstrating a potential role in its clinical efficacy against intra-cellular organisms. Spectrum activities of tilmicosin is similar to that of erytheromycin, but most of the in vitro data concern its activity against *pasturella spp.* and *Haemophilus somnus* , for which it maintain good activity. Other *gram negative bacteria* are resistant to tilmicosin (Adams 2001).Tilmicosin was more effective than cloxacillin against intramammary infections and new IMI of *staphylococcus aureus,* but had contradictory

effects against *Coagulase negative streptococci* and any effects against s*treptococcus agalactiae* in this study. Nickerson etal (1999) demonstrated that an experimentally intramammary formulation of tilmicosin was equally as effective as Cephapirin benzathine for eliminating *staphylococcus aureus* mastitis at both cow and quarter levels ,with tilmicosin achieving 64.3 and 78.1 % cure rates respectively. Dingwell etal(2003) showed that the cure rates following administration of tilmicosin was 67.3 and 72.5 % for cows and quarters respectively, and following administration of cloxacillin was 56.9 and 62.9% for cows and quarters respectively.

Owens and Nickerson (2001) showed that Cephapirin benzathine, penicillin –streptomycin , penicillin-novobiocin , and tilmicosin infused intramammary 180 to 270 days prior to parturition had similar effects against *staphylococcus aureusin* in pregnant heifers. Erskine and Gombas (1994) showed that intramuscular oxytetracycline was efficient as a dry cow treatment for staphylococcus aureus mastitis. Basic aim of dry cow therapy is elimination of intramammary infection and prevention of new IMI due not only to *staphylococcus aureus,* but also to hemolytic streptococci such as s*treptococcus agalactiae*(Radostits-etal 2000), which was not encountered with tilmicosin in this study.

In conclusion**,** tilmicosin might be an acceptable antibiotic to dry cow therapy**,** but more information is needed before recommendation.

References:

1- Adams R.H. (2001) Veterinary Pharmacology and therapeutics. Iowa State University Press. PP869-880.

2- Boddie R.J and Nickerson S.C.(1986) Dry cow therapy. J. Dairy .Sci . VOL .69.NO.1.253 – 257.

3- Castillo J . Boucbard E. and Dutil I. (2001) Evaluation of Two Treatment protocols Against Staphylococcus Aureus a Drying off , the AABP Proceeding- VOL34.NO.31.159- 160.

4- Dingwell R.T., Leslie T.E., Duffield T.F. and Schukken Y.H., DesCoteaaux L., Keefe G.P.Kelton D.F., Lissemore K.D.Shewfelt W., Dick P., and Bagg R.(2003).Efficacy of Intramammary Tilmicosin and Risk Factors for Cure of staphylococcus aureus Infection in the Dry period . J.Dairy .Sdi.VOL.86.159- 168.

5- Eberhart, R.J.,(1986)Management of dry cows to reduce mastitis .J. Dairy Sci.69:1721-1232.

6-Erskine R.j Gombas D.M.(1994).Efficacy of interamuscular oxytetracycline as a dry cow treatment for staphylococcus aureus mastitis J. Dairy .Sci. Vol. 77.NO.11.3347- 53.

7-Nickerson S.C.(1987).Mastitis and Its control In Heifers And Dry cow JAWMA.VOL.161.NO.36.82- 91.

8-Nickerson S.C.(1985).Immune Mechanisms of the Bovine udders.An over view.VOL.187.NO.12.41-46.

9-Nickerson S.C. Owens W.E.(1999).comparison of tilmicosin and cephapirin as therapeutics for staphylococcus aureus mastitis at dry–off .J.D.SCI.VOL.82.NO.4.696- 703.

10-Owens W.E and Nickerson S.C. (2001).prevalance of mastitis in dairy heifers and effectiveness of antibiotic therapy.J.D.SCI.VOL 84.NO.4. 814.7.

11 -Radostitis,O.M.And Blood , D.C. (2000) Verterinary Medicine. WB Saunders. London , pp:603-700.

12-Smith,K.L., Todhunter D.A., and Schoenberger P.S. (1985) Environmental pathogens and environmental infection during the dry period. J. Dairy Sci.68 :402-417.

13 - Vestweber J. (1996).Staphylococcus Aurous Mastitis and Prevention and control. Proceeding BCVA Edinburgh .VOL.231.NO.81.235- 238.