

**CLINICO-HAEMATOLOGICAL EFFECT OF SELECTED NSAID IN THE TREATMENT OF EXPERIMENTALLY PRODUCED MYOSITIS IN GOAT**

M. Aktaruzzaman<sup>1\*</sup>, J. Alam<sup>1</sup>, A. Rahman and M. M. Hossain<sup>2</sup>

Department of Medicine, <sup>2</sup>Department of Pathology, Faculty of Veterinary Science, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh, <sup>1</sup>Animal Health Research Division, Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh

\*Corresponding author's email address: maktar2003@yahoo.com

---

**ABSTRACT**

The present study was performed in the Department of Medicine and in Veterinary clinic of Bangladesh Agricultural University (BAU), Mymensingh from January to June 2002. Myositis was produced experimentally by injecting oil of turpentine in the gluteal muscles of 4 goats of which 2 goats were given treatment with Diclofenac sodium @ 1mg/kg body weight (treatment group) for consecutive 3 days and remaining 2 goats were reared as control without giving treatment (control group). All the goats were observed for 7 days. Myositis was characterized by reduced appetite, increased body temperature (1-2<sup>o</sup>F), lameness, local swelling and cellular changes in blood level. The appetite in both groups reduced sharply from 1<sup>st</sup> day of myositis and improved from day 2 and became normal on 3<sup>rd</sup> day after treatment. Body temperature reduced to normal level from 2<sup>nd</sup> day after administration of diclofenac sodium but in control group, it came down in the same condition from 4<sup>th</sup> day onward. Moderate lameness was observed in all the goats of both groups. In treatment group lameness reduced completely in 100% goats after 2 consecutive days of treatment but in control group similar result was observed on day 6. Moderate local swelling was reduced to normal level in treatment group 2 days post treatment remain moderate in control group. Total leukocyte count (TLC) was increased significantly ( $p < 0.05$ ) in both groups in myositic condition than in healthy condition and it came down to normal level in treatment group 3 days post treatment and in control group it remained higher. Similar changes were observed in Neutrophil count. The number of lymphocyte was reduced significantly ( $p < 0.05$ ) in myositic condition than in healthy ones which again reached to normal level within 3 days of treatment.

**Key words:** Myositis, goat, Non-steroidal anti-inflammatory drug (NSAID)

---

**INTRODUCTION**

Non-steroidal anti-inflammatory drugs (NSAIDs) comprise a large group of compounds that can be divided into two main sub-groups namely carboxylic acid and enolic acid sub-groups (Aiello, 1997). On the basis of the degree of anti-inflammatory actions Laurence and Bennett (1993) reported that diclofenac sodium is a strong anti-inflammatory drug. Like other NSAIDs, diclofenac sodium has three basic properties-anti-inflammatory, antipyretic and analgesic. The anti-inflammatory action is due to inhibition of prostaglandin (PG) synthesis, and preventing action of other mediators of inflammation locally (Mazue *et al.*, 1983). The agent enhances recovery by abolishing inflammation, diminishing pain and providing symptomatic relief and well being to the patient (Laurence and Bennett, 1993). In the field of veterinary practice, there are reports of uses of NSAIDs in different diseases of musculoskeletal systems and some other conditions but their uses have not been as extensive as found in human medical practice. This is due probably to differences in pharmacokinetics activity of these drugs in different species of animals and probably due to gastrointestinal and renal side effect (Mazue *et al.*, 1983). Clinical use of diclofenac sodium has been reported by Hans *et al.* (1999) as supportive treatment in bone fracture of dog.

Raza *et al.* (2000) used diclofenac sodium in 39 buffaloes and 11 cattle affected with hemorrhagic septicemia as supportive treatment along with antibiotics and reported that the recovery rates in the treatment group of diclofenac sodium were more than that of antibiotic treatment group alone. Mahajan *et al.* (1994) experimentally produced myositis and arthritis in 12 calves by injecting lactic acid and treated these animals with diclofenac sodium. The treatment group of myositis and arthritis responded well to treatment while the control group showed muscle atrophy and permanent lameness. At present in Bangladesh, Diclovet® (Renata Animal Health, Dhaka, Bangladesh) and Ketovet® (Techno Drugs, Dhaka, Bangladesh) are used in the practice of veterinary profession. Their therapeutic efficacy is not known to be evaluated. A review of available literature could not trace any information about the use of diclofenac sodium in goat in Bangladesh as well as in other countries. Therefore, the present study was undertaken to evaluate the therapeutic efficacy of diclofenac sodium in the treatment of experimentally produced myositis in goats.

## MATERIALS AND METHODS

The study was carried out in the Department of Medicine and Veterinary Clinic of Bangladesh Agricultural University (BAU), Mymensingh from January to June 2002. A total of 4 Black Bengal goats of either sex were randomly divided into two groups (treatment and control group) of 2 animals in each. The goats were aged between 1 to 1.5 years and their body weights ranged between 10-12 kg. The goats of both groups were kept on grazing and sheltered in two different stalls of the Veterinary Clinic at night. Myositis was produced by injecting 2 ml oil of turpentine per animal into the gluteal muscle of one leg in all the animals. After development of myositis the animals of treatment group were treated with Diclofenac sodium (Opsonin) @ 1 mg/kg body weight intramuscularly daily for 3 successive days and goats of the control group were reared without giving any treatment. Blood samples were collected before production of myositis and everyday after production of myositis for up to 3 days from all the animals of both groups.

Parameters studied were (a) body temperature before giving treatment and after myositic condition once daily for 7 days, (b) appetite was recorded by eating behavior, (c) local swelling and lameness after production of myositis, and were graded as mild (+), moderate (++) and severe (+++) and were recorded daily for 7 days and (d) total leukocyte count (TLC) and differential leukocyte count (DLC) according to method mentioned by Jain (1986).

### Statistical analysis

Data were statistically analyzed using analyses of variance (ANOVA) technique by using computerized statistical program (SPSS, Version-7.5) in accordance with the principle of the Completely Randomized Design Steel and Torrie, (1980). Data from premyositic or normal condition, myositic condition and after the course of treatment were compared only.

## RESULTS AND DISCUSSION

Usual clinical findings of myositis (lameness and local swelling) in goats of both groups were observed and recorded everyday and shown in Table 1 and Table 2. Lameness developed in goats of both groups within 30 to 60 minutes of injection of oil of turpentine and became moderate (++) within 8 to 12 hours. The animals were unable to bear body weight, reluctant to move and preferred to lie down with affected limb kept in extending position. While standing, the affected limb was either kept above the ground or was just hanging loose with pointing of the toe.

Table 1. Effect of diclofenac sodium on lameness in myositis produced by oil of turpentine in goat

Groups	Myositic Condition	Lameness						
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Treatment Group	++	++	+	-	-	-	-	-
Control group	++	++	++	++	+	+	-	-

Grading of lameness: ++ = Moderate, + = Mild.

Table 2. Effect of diclofenac sodium on local swelling in myositis produced by oil of turpentine in goat

Groups	Myositic Condition	Swelling						
		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Treatment Group	++	++	+	-	-	-	-	-
Control group	++	++	++	++	+	+	-	-

Grading of swelling: ++ = Moderate, + = Mild.

The body temperature increased by 1 to 2<sup>o</sup>F within 12 hours. The animals were moderately dull, depressed and anorectic. These findings support the findings of Mahajan *et al.* (1994). After 12 hours of diclofenac sodium injection, some improvement was noticed in goats of treatment group. At post treatment day 1, the lameness in all goats of treatment group were moderate (++) which reduced to mild level on the day 2, and completely subside from day 3<sup>rd</sup> post treatment. On the other hand lameness remain moderate (++) upto 3 days in control group and then reduced to mild (+) on day 4 and 5 and finally become nil on day 6. This means diclofenac sodium in the treatment of myositis produced by oil of turpentine was very effective. Moderate (++) local swelling developed simultaneously with the lameness. In the treatment group the swelling did not subside at post treatment day 1. On the day 2 the swelling reduced to mild (+) level and at day 3<sup>rd</sup> it become nil. In the control group, the swelling remain moderate (++) for upto 3 days, start to reduce mild (+) level from day 4 and become nil on day 6. The affected muscle was found to hard on palpation. It was found that consecutive 3 days treatment with diclofenac sodium in myositis produced by oil of turpentine can completely cure lameness and swelling in goats. These findings have similarity with the findings of Mahajan *et al.* (1994). The body temperature in all the animals of both groups was found to increase by 1 to 2<sup>o</sup> F within 12 hours of oil of turpentine injection. In the treatment group, the temperature came down to normal level from 2<sup>nd</sup> day and in the control group it became almost normal from 3<sup>rd</sup> day onward. The appetite in both groups reduced sharply from 1<sup>st</sup> day of myositis. It was found improved from day 2 post treatment in treatment group and became normal on day 3. In control group the appetite was reduced for upto 3 days and returned to normal condition from day 4.

The values of TLC at different stages in both groups are shown in Table 3. In the treatment group TLC before myositis varied from 11.24-11.27x10<sup>3</sup>/μl of blood with a mean value of 11.26±0.02 x10<sup>3</sup>/μl of blood. In the control group this value ranges from 10.99-11.78 x10<sup>3</sup>/μl of blood with a mean value of 11.39±0.40 x10<sup>3</sup>/μl of blood.

Table 3. Effect of Diclofenac Sodium on Total leukocyte Count (TLC 10<sup>3</sup>/μl) and differential count (%) in goat

Groups	Parameters	Premyositis (Mean ± SE)	Myositis (Mean ± SE)	Post-treatment		
				Day 1	Day 2	Day 3
Treatment	TLC	11.26±0.02 <sup>a</sup>	14.21±0.03 <sup>b</sup>	13.48± 0.06	12.47± 0.06	11.39±0.02 <sup>a</sup>
	Neutrophil	30.5±0.50 <sup>a</sup>	43.5±0.50 <sup>b</sup>	40.5±0.50	35±1.00	31.5±0.50 <sup>a</sup>
	Lymphocyte	64.5± 0.50 <sup>a</sup>	52.5± 0.50 <sup>b</sup>	55.5±0.50	59.5± 0.50	64±1.00 <sup>a</sup>
Control	TLC	11.38 ± 0.39 <sup>a</sup>	14.14±0.35 <sup>b</sup>	14.13± 0.35	14.11± 0.34	14.05±0.34 <sup>b</sup>
	Neutrophil	31±1.0 <sup>a</sup>	42.5±0.50 <sup>b</sup>	41.5±0.50	41±1.00	39.5±0.50 <sup>b</sup>
	Lymphocyte	64.5± 1.50 <sup>a</sup>	52± 1.00 <sup>b</sup>	52.5±1.50	51.5±1.50	51±1.00 <sup>b</sup>

Figure with different superscript differ significantly (P<0.05).

After production of myositis and before giving treatment with diclofenac sodium TLC increased in treatment group which ranged from 14.18-14.24  $\times 10^3/\mu\text{l}$  of blood with a mean value of  $14.21 \pm 0.03 \times 10^3/\mu\text{l}$  of blood. The mean value of leukocytic response after production of myositis was compared with the count of premyositis period and which differ significantly ( $p < 0.05$ ). In the treatment group the TLC after 1<sup>st</sup> day of treatment was found 13.42-13.54  $\times 10^3/\mu\text{l}$  of blood ( $13.48 \pm 0.06 \times 10^3/\mu\text{l}$  of blood). On day 2<sup>nd</sup> the number reduced and day 3<sup>rd</sup> it reduced to  $11.39 \pm 0.02 \times 10^3/\mu\text{l}$  of blood which is more or less similar to the count of premyositis condition. But in control group increased number of leukocyte persists up to 3 days.

The percentages of neutrophil was 30-32 in both groups at healthy condition that is before production of myositis which increased significantly ( $p < 0.05$ ) at myositis condition. After treatment with diclofenac sodium the number of neutrophil reduced to normal level in treatment group where as it reduced slightly in control group. Reverse condition was recorded in case of lymphocyte count when compare with neutrophil count. The number of lymphocyte ( $52 \pm 1.00$ ) decreased in myositis condition than premyositis condition ( $64.50 \pm 1.50$ ). The mean value of lymphocytic response after production of myositis was compared with premyositis period and was found decreased significantly ( $P < 0.05$ ) in both the treatment and control groups. During the course of the myositis, the lymphocyte count was increased gradually to almost normal level in treatment group that was not found in the control group. These findings of hematological parameters of this study are also similar to those reported by Mahajan *et al.* (1994).

Form this study it appeared that diclofenac sodium is effective in the treatment of clinical myositis which is moderate. It is also effective to return cellular changes that are leucocytic responses of blood in normal level that either increased or decreased during myositis condition produced experimentally by injecting oil of turpentine.

#### REFERENCES

1. Aiello SE (1997). *The Merck Veterinary Manual*. 8<sup>th</sup> edn., Merck and Co. Inc. N. J. USA.
2. Hans-Raj, Amarpal, Singh GR, Aithal HP and Raj H (1999). Role of preemptive epidural analgesia with lignocaine and pethidine in the management of postoperative inflammation and pain dogs. *Indian Journal of Veterinary Surgery* 20: 70-74.
3. Jain NC (1986). *Schalm's Veterinary Haematology*. 4<sup>th</sup> edn., Lea and Fabiger, Philadelphia, USA.
4. Laurence PN and Bennett TT (1993). *Arthritis and anti-inflammatory drugs*. In: *Clinical Pharmacology*. 7<sup>th</sup> edn., Lea and Febiger, Philadelphia, USA.
5. Mahajan DN, Salabat AM and Singh B (1994). Therapeutic efficacy of diclofenac sodium in clinical and experimental Myositis in cattle and buffalo. *Indian Veterinary Journal* 71: 703-707.
6. Mazue G, Richez P and Berthe J (1983). Pharmacology and comparative toxicology of non-steroidal anti-inflammatory agents. In: *Veterinary Pharmacology and Toxicology*. Ruckebusch Y, Toutain PL and Koritz GD (eds.). MTP Press, Boston. pp. 321-331.
7. Raza MA, Muhammad G, Athar M and Khan MZ (2000). Comparative efficacy of three protocols for the treatment of haemorrhagic septicemia in buffaloes and cattle. *Pakistan Veterinary Journal* 20: 35-39.