

TREATMENT OF KLEBSIELLA MASTITIS IN A CROSSBRED JERSEY COW

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ABSTRACT

A four years old primiparous Jersey crossbred cow of one month lactating was presented with swelling of right fore quarter and straw yellow milk. The grade of CMT test on milk was (+++). *Klebsiella* spp., isolation done by bacteriological culture of milk using blood agar. Plasma fibrinogen and plasma protein ratio was used as an indicator for assessment of recovery. Inj. Gentamicin 5 mg /kg IV & 10 ml intramammary along with supportive therapies were given for 5 days. 12th day post treatment the milk quality drastically improved.

Keywords: Acute bovine mastitis, Cow, *Klebsiella* spp, Plasma fibrinogen.

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A four years old primiparous Jersey crossbred cow of a month lactation was presented to Large Animal Medicine Unit with the history of swelling of right fore quarter with previous day straw yellow milk with clots. On clinical examination, all parameters were normal except pyrexia (40.2°C). On physical examination of udder right fore quarter teat revealed pain, hot oedematous swelling compared to the other quarters (Fig. 1a and 1b). The examination of milk of all quarters was normal except right forequarter wherein the milk was straw yellow with clots.

CMT test examination revealed Grade (+++). Plasma fibrinogen was determined indirectly using heat precipitation technique described by Schalm, (1980). (Table.2). *Klebsiella* spp., was isolated from blood agar culture. Haematological and Biochemical parameters were also analyzed.

Escherichia coli, *Klebsiella pneumoniae*, and various species of *Enterobacter*, are common mastitis pathogens (Bannerman *et al.*, 2003). Though *Klebsiella* spp. is a one of the common cause of bovine mastitis (Podder *et al.*, 2014), reports regarding haematology and biochemistry changes is not concisely available. This case report addresses along with its 12 days of treatment.

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Singh *et al.* (2014) stated differential leucocytic count reveals neutrophilia and lymphopenia, serum biochemistry analysis shows higher average values of TPP, albumin, globulin and fibrinogen in clinical as well as sub-clinical mastitis (SCM) compared with control group; Significant change was observed in inorganic phosphorus, Mg, Na and K levels.

In the present clinical mastitis case, there were mild anaemia, leukocytosis with neutrophilia and lymphopenia recoded on the day of presentation. Anaemia could be a concurrent issue in this case. In early phase of severe infections and inflammations, reduction of neutrophils occurred on 3rd day when compared to first day of treatment. In this case monocytosis and eosinophilia observed, if mild anemia is there, there could be some forms of sub clinical parasitism, as the area is delta region, where concurrent parasitism is common. Cow also had hypoglycaemia, hypoalbuminemia and mild hypophosphatemia (Table 1).

Santos and Fonseca (2007) stated that treatment of coliform mastitis includes aggressive fluid therapy, with antimicrobial and mitigating drugs. Not with standing, a few cows die within six to 24 hours of the beginning of the clinical signs due to endotoxic and additionally septicaemic complexities. Silva and Costa (2001) reported Gentamicin gave a good results against acute mastitic outbreak in a dairy herd caused by *K. pneumoniae*.

In the present case the cow was treated with Inj. Calcium borogluconate

250 ml slow IV, Inj.5% DNS @ 10ml/ kg IV, Inj. Gentamicin @ 5 mg /kg I/V& 10 ml intramammary, Inj. Meloxicam @ 0.5 mg/ kg BW I/M given for 5 days and Inj. VitAD₃E 10 ml IM given for 3 doses an alternate day. Inflamin vet cream[®] (Himalaya Animal Health) was applied topically on the affected quarter for 5 days. Meloxicam was given to counteract inflammatory changes. As it is transition cow within a month of calving, calcium borogluconate was given as a prophylactic measure to prevent downer issues. It is not related to mastitis.

From 6th day onwards, the colour of milk returned to normalcy (Straw yellow to white without any clots), CMT was negative and there was no elevation of plasma fibrinogen level (Table.2).

Fibrinogen is used as a reliable indicator of the presence of inflammation, bacterial infection or surgical trauma in cattle (Hirvonen *et al.*, 1996; Hirvonen and Pyorala, 1998). In this cow the quantified concentration of fibrinogen became normal from 6th day onwards, but plasma protein and plasma fibrinogen ratio were lowering on day-by-day during clinical improvement of mastitis. As *Klebsiella* is capable of inducing microabscesses, Fibrinogen monitoring helped to ascertain reduction in inflammation and less chance for abscesses. Hence further studies need to be conducted in large sample size to correlate clinical improvement after therapy and due course laboratory assessment of plasma protein and plasma fibrinogen ratio in case of clinical mastitis.

The observation of udder and milk quality drastically improved after treatment (Fig. 2 and b). Hygienic measures are the most appropriate control strategy for *Klebsiella* mastitis (Munoz *et al.*, 2006), animal owner

was advised on importance of animal and premises hygiene. The reduction of plasma fibrinogen clearly indicated the successful management of *Klebsiella* mastitis in a Transition cow.

Table -1: Haematology and Serum biochemistry of cow with *Klebsiella* mastitis

| Parameter | 1 st day | 3 rd day | 5 th day | 12 th day | Reference value (Radostits <i>et al.</i> , 2010) |
|----------------------|---------------------|---------------------|---------------------|----------------------|---|
| Hb (g/dl) | 6.8 | 6.8 | 7.7 | 7.2 | 8-15 |
| PCV (%) | 20 | 16.84 | 20.96 | 18.4 | 24-46 |
| RBC (mil/cmm) | 5.01 | 4.43 | 5.08 | 5.08 | 5-10 |
| WBC (/cmm) | 14.06 | 9.63 | 12.89 | 12.89 | 4000-12000 |
| Neutrophils (%) | 75.4 | 9.2 | 7.7 | 46.1 | 15-45 |
| Lymphocytes (%) | 22.6 | 70.1 | 73.4 | 47.4 | 45-75 |
| Monocytes (%) | 0.5 | 10.8 | 9.2 | 2.5 | 2-7 |
| Eosinophils (%) | 1.1 | 8.8 | 8.0 | 2.8 | 2-20 |
| Basophils (%) | 0.4 | 1.1 | 1.5 | 1.1 | 0-2 |
| Total protein (g/dl) | 6.3 | 5.9 | 7.0 | 7.2 | 6-8 |
| Glucose (mg/dl) | 21 | 55 | 26 | 49 | 42-74 |
| Albumin (g /dl) | 2.32 | 2.11 | 2.39 | 2.4 | 2.8-3.9 |
| AST (U/L) | 86 | 67 | 109 | 78 | 45-110 |
| ALP (U/L) | 113 | 99 | 150 | 130 | 0-500 |
| ALT (U/L) | 66 | 31 | 34 | 31 | 30 |
| BUN (mg /dl) | 23 | 22 | 21 | 21.3 | 7.8-24.6 |
| Creatinine (mg/dl) | 0.41 | 0.43 | 0.48 | 0.59 | 0.8 – 1.8 |
| Calcium (mg/dl) | 12.9 | 5.4 | 9.5 | 8.0 | 9-12 |
| Phosphorus (mg/dl) | 4.82 | 3.16 | 4.24 | 4.24 | 5.5-6.5 |

(cmm – Cubic milli meter, mil- million, ALT – Alanine transaminase, AST - Aspartate amino transferase, BUN – Blood Urea Nitrogen)

Table -2: Plasma fibrinogen and PP:PF ratio of cow with Klebsiella mastitis

| Parameters | 1 st day | 2 nd day | 3 rd day | 4 th day | 5 th day | 6 th day | Reference range (Radostits <i>et al.</i> , 2010) |
|------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--|
| Plasma fibrinogen (mg/dl) | 900 | 500 | 700 | 1500 | 300 | 300 | 300 to 700 |
| PP:PF | 12.4 | 10.6 | 5.5 | 5.0 | 5.5 | 6.5 | 10-37 |

**Fig. 1a. Acute udder swelling on 1st day****Fig. 1b. Acute udder swelling on 3rd day**

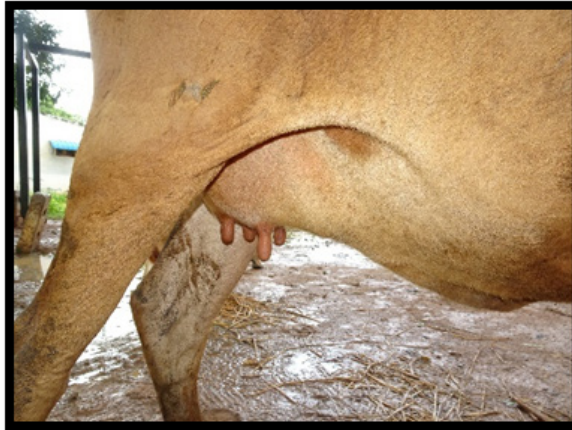


Fig. 2a Recovered udder on 5th day



Fig. 2a Recovered udder on 5th day

CONCLUSION

The present case reports the parenteral as well as intramammary administration of Gentamicin and assessment of plasma fibrinogen for entire course of therapy helped in faster recovery from *Klebsiella* mastitis of

transition cow, avoiding the toxemic and/or septicemic complications.

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