Coagulation Parameters in Bovine Mastitis

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Abstract
Blood samples were collected from healthy and mastitic cattle and buffaloes. Platelet Count, Prothrombin time, Activated Partial Thromboplastin Time and Fibrinogen Degradation Products were estimated. There was no significant difference between healthy and affected animals.

Key words: Mastitis, Coagulation, PT, APTT, FDP

Haemostatic disturbances are observed in various diseases as well as in mastitis. Welles et al. (1993) have demonstrated that in endotoxin induced mastitis, significant alterations are found in the mean value of most haemostatic analytes. Moreover disseminated intravascular coagulopathy has also been observed in cow with mastitis caused by Pasteurella haemolytica (Kiper and Paulsen, 1988). Alterations in the coagulation parameters in mastitis were observed in this study.

Materials and Methods
The study was conducted at 10 commercial dairy farms in and around Ludhiana. Forty eight mastitis positive and twelve apparently healthy bovines were selected for investigation. Blood samples were collected in tubes containing 3.2% sodium citrate. Prothrombin time (PT), Activated Partial Thromboplastin Time (APTT) and Fibrinogen Degradation Products (FDP, conc. in µg/dl) were estimated using commercially available kits (Tulip Diagnostics (P) Ltd). Platelet Count was determined by method described by Jain (1986) and results were expressed as no x 10⁶/cumm. The data was analyzed by “student-t-test” using Microsoft Office 2007 software.

Results and Discussion
Average Prothrombin time (PT) (sec) of healthy animals was 15.68±0.49 in cattle and 17.10±0.87 in buffaloes. Whereas, in affected animals, it was 17.07±0.49 and 18.78±0.55 in cattle and buffaloes, respectively. Activated Partial Thromboplastin Time (APTT) (sec) in cattle was 42.57±2.44 and 46.35±1.26 in healthy and mastitic animals. Whereas, in buffaloes it was 45.13±2.30 and 49.95±1.42 in healthy and mastitic animals, respectively.

FDP (log_{10} (µg/dl)) concentration of healthy animals was 0.71±0.09 in cattle and 0.83±0.08 in buffaloes and of affected animals was 0.82±0.07 and 0.92±0.08 in cattle and buffaloes, respectively. Average platelet concentration (10⁶/cumm) in healthy cattle and buffaloes was 3.74±0.15 and 4.11±0.38, respectively and the corresponding figures for mastitic animals were 3.75±0.14 and 3.88±0.14 for cattle and buffaloes, respectively. There was no significant difference between healthy and affected animals.

Generally, coagulopathies or disseminated intravascular coagulopathy (DIC) can be diagnosed based on laboratory findings of prolonged APTT, PT, TT, thrombocytopenia, hypofibrinogenemia, finding fibrinogen degradation products in the plasma, and decreased concentrations of coagulation factors V and VIII and antithrombin III (Jain, 1993). At least 3 abnormal coagulation parameters are usually required for the definitive diagnosis of DIC (Ritt et al., 1997). Activated partial thromboplastin time test is used to evaluate the intrinsic and common hemostasis pathways (Radostits et al., 2007). Prothrombin time is usually used

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to indicate abnormalities in the extrinsic and common pathways of coagulation. Prolonged PT usually results from an increased consumption of clotting factors during DIC. Thrombocytopenia (≤15000 platelets/μl) indicates excessive consumption of platelets in cases of DIC (Radostits et al., loc. cit).

Ismail and Dickinson (2010) observed that cows affected with *E. coli* mastitis had significantly prolonged activated partial thromboplastin time (APTT) (P<0.01), prothrombin time (PT) (P<0.05) and decreased (P<0.05) platelets numbers. Cows with *S. aureus* mastitis had only significantly prolonged APTT (P<0.05) and decreased (P<0.05) platelet counts. Their results indicated that dairy cows affected with acute *E. coli* mastitis are more likely to develop clinical manifestations of DIC than cows affected with *S. aureus* mastitis.

Similarly, Welles et al. (1993) have demonstrated that in endotoxin induced mastitis, significant alterations are found in the mean value of most haemostatic analytes. Moreover DIC has also been observed in cow with mastitis caused by *Pasteurella haemolytica* (Kiper and Paulsen, loc. cit).

In our study, there was no significant difference between affected and healthy animals for these parameters. This may be due to that the majority of organisms that were associated with the mastitis were gram positive organisms and/or the severity of infection may be localized not resulting to disseminated intravascular coagulopathy. However, there was increase in Prothombin Time, Activated Partial Thromboplastin Time, Fibrinogen Degradation Products in animals suffering from clinical mastitis with gram –ve organisms (individual animal data not given). This could be explained by release of endotoxins by Gram –ve bacteria which is not in the case of Gram +ve organisms.

**Summary**

Forty eight mastitis positive and twelve apparently healthy bovines were selected for observation of coagulation parameters. There was no significant difference between affected and healthy animals. This may be due to that the majority of organisms that were associated with the mastitis were gram positive organisms and/or the severity of infection may be localized not resulting to disseminated intravascular coagulopathy.

**References**


