

BLOOD COAGULATION IN BUFFALOES III*

Prothrombin Time, Prothrombin Activity and Prothrombin Consumption Time in Different Age Groups

By

S.C. ADAVAL AND P.C. GANGWAR†

College of Veterinary Science and Animal Husbandry, Jabalpur,

Normal prothrombin time indicates that all the factors taking part in the formation of thrombin with the exception of thromboplastin and calcium are normal in concentration and activity as quoted by Stefanini and Dameshek (1). If all other factors are normal, prothrombin time becomes a measure of prothrombin concentration or prothrombin activity. Prothrombin consumption time is a useful test for finding out the defect in step I and step II of blood coagulation. All these factors have received very little attention in buffaloes.

Therefore, this study was designed to find out : (1) prothrombin time, (2) prothrombin activity, and (3) prothrombin consumption time in different age group buffaloes.

MATERIALS AND METHODS

Sixteen male buffalo calves were used in this experiment, out of which four were 8 to 10 days old (group-A), four 14 to 15 days old (group-B), four 1 to 2 years old (group-C) and four 2 to 3 years old (group-D). Eight new born buffalo calves were kept on whole milk while the adults were given concentrates in the morning and then left on the pasture. The animals were kept under uniform managerial conditions.

The blood was collected from the jugular vein at 9.00 A.M. before feeding. The following methods were adopted :

1. *Prothrombin time* :- One stage prothrombin time was determined by the method of Quick (2).

2. *Prothrombin activity* :- For the preparation of standard curves for prothrombin activity, the pooled plasma from 16 buffalo calves including 8 new born and 8 adult buffalo calves diluted with normal saline in the proportion of 9: 1, 8: 2, 7: 3, 6: 4, 5: 5, 4: 6, 3: 7, 2: 8, 1: 9 was used. Prothrombin time of all the samples was determined. A curve was plotted with prothrombin activity in percent. As various factors other than prothrombin also get diluted with normal saline, a modified curve mentioned by Cartwright (4) was also prepared. In this case, deprothrombinised plasma was used instead of normal saline. Deprothrombinised plasma was prepared by adsorption of prothrombin on barium sulphate.

3. *Prothrombin consumption time* :- Method recommended by Quick (3) was followed. Prothrombin free plasma was prepared by the method recommended by Cartwright (4)

*The data has been taken from senior author's M.V. Sc. thesis in Physiology submitted in 1969 to J.N.K.V.V., Jabalpur.

†Received 25-2-1970.

Present address : Department of Animal Sciences, (Production Physiology) Punjab Agricultural University, Ludhiana.

RESULTS AND DISCUSSION

1. *Prothrombin time* :- Table 1 shows the mean and range of prothrombin time of male buffalo calves of different groups. There was no significant difference in between different groups. It may, however, be noted that the new born animals had a higher range (14.3 to 17.0 sec) as compared with adults (15.0 to 16.0 sec) which shows that the value of prothrombin time is more constant in adult animals.

TABLE 1

Prothrombin Time and Prothrombin Consumption Time in Male Buffalo Calves

Groups:—	A	B	A+B	C	D	C+D
Age:—	8-10 days	14-15 days	New born	1-2 year	2-3 years	Adult
	<i>Prothrombin Time (In Sec.)</i>					
Mean	16.0	15.4	15.8	15.5	15.7	15.6
Range	(15.3—17.0)	(14.3—16.0)	(14.3—17.0)	(15.0—16.0)	(15.5—16.0)	(15.0—16.0)
	<i>Prothrombin Consumption Time (In Sec.)</i>					
Mean	28.0	19.7	23.9	16.6	16.9	16.8
Range	(17.8—33.5)	(16.8—23.0)	(16.8—33.5)	(16.2—17.0)	(16.5—17.2)	(16.2—17.2)

The prothrombin time of buffaloes determined by using the same thromboplastin reagent was more than all other species except cow, opossum and chicken. Buffalo calves younger than 8 days were not studied in the present series, this may be a probable reason of not detecting any such difference before this age.

2. *Prothrombin activity* :- The prothrombin activity was more in adults as compared to new born animals. 50 to 60% activity was found only in two animals out of 8 in new borns while in adults the activity was not less than 70% in any animal. Standard reference curves for converting prothrombin time into prothrombin activity in terms of percent of normal by both the methods showed a hyperbolic curve. Because of dilution with normal saline, the prothrombin time is prolonged more as compared with deprothrombinised plasma.

3. *Prothrombin consumption time* :- Table 1 shows the mean and range of prothrombin consumption time of male buffalo calves of different age groups. This shows a highly significant difference ($P < 0.01$) in groups A and B, C and D. The mean value of new born (23.9 sec) was significantly higher ($P < 0.5$) than that of adult (16.8 sec). The range in new born was also more as compared with adults. There was a fast decline in prothrombin consumption at 14 to 15 days of age and it was more or less constant in the adult age. A higher prothrombin consumption time is a better index of intrinsic thromboplastic activity. As the prothrombin consumption time gets reduced and approaches nearer the prothrombin

time, it shows a defect in blood coagulation. Thus, in the present study a better intrinsic thromboplastic activity is found in new born as compared with the adults.

SUMMARY AND CONCLUSIONS

The purpose of the present study was to investigate prothrombin time, prothrombin activity and prothrombin consumption time in different age groups of 16 male buffalo calves with a view to compare them in new born and adult animals. The results were : (1) The mean value of prothrombin time did not differ significantly in different age groups. (2) Prothrombin consumption time was found to be significantly high at 8 to 10 days of age. Thus, it is concluded that the blood coagulation in new born buffaloes has a better intrinsic thromboplastic activity as indicated by the high prothrombin consumption time.

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