Post-Parturient Haemoglobinuria in a Buffalo - a Case Report

Asif Iqbal*, G. Mustafa*, A.K. Tripathi** and J.S. Soodan***

Division of Veterinary Clinic & Teaching Hospital, FVSc & AH, SKUAST-J, R S Pura-Jammu-India.

*MVSc Scholar, **Assistant Professor, ***Professor and Head

Abstract
The changes in some biochemical and haematological parameters in a 5 year old buffalo with post-parturient haemoglobinuria were described. The animal had calved 4 month before. Post-parturient haemoglobinuria in the buffalo occurred at a post-partum of about 3 weeks. The buffalo received phosphorus supplementation and supportive treatment. The mean serum phosphorus level in the affected buffalo was lower compared with reference range. In the meantime, the blood RBC and Hb values were also lower. In conclusion, the deficiency of phosphorus could be responsible for the development of post-parturient haemoglobinuria in the buffaloes.

Key words: Buffalo, post-parturient haemoglobinuria, biochemical and haematological parameters

Introduction
Post-parturient haemoglobinuria (PPH) is a sporadic disease in high producing dairy cattle characterised by intravascular haemolysis, haemoglobinuria, and anaemia (Macwilliams et al., 1982). The transition between late pregnancy and early lactation, from calving until a 3 to 4 week postpartum, is a high-risk period for the occurrence of the disease in the dairy cow. The risk is especially high around parturition (Jub et al., 1990; Moore et al., 1997 and Whitaker et al., 1999). Plasma inorganic phosphate can be used as a potential indicator of the bioavailability of feed phosphorus in dairy cows (Montiel et al., 2007). The inorganic phosphate level in the blood provided an indication of the dietary phosphate intake (Grunwaldt et al., 2005), and the haemoglobin was measured to assess the presence of anaemia (Turgut et al., 2000). The incidence of the disease in the total population is very low. The disease occurs within 30 d of calving, and it is usually seen in adult dairy cattle during their third to sixth lactation (Blood et al., 1989). The pathogenesis of erythrocyte destruction leading to anaemia and haemoglobinuria in post-parturient haemoglobinuria (PPH) is unknown. Otherwise, bacterial haemolysis and
blood parasites (Babesia sp., Anaplasma) in cows may cause red blood cell destruction (Macwilliams et al., 1982). This case report describes the changes of some biochemical and haematological parameters in a buffalo with post-parturient haemoglobinuria.

**Case History and Observations**

A 5 year old buffalo in her second parity was presented to Veterinary Clinics and Teaching Hospital of SKUAST-Jammu R.S.Pora with a history of parturition four month ago. The clinical signs observed and recorded with passing red colored urine since last 7 days. Animal was dull and depressed, completely anorectic with pale mucous membranes and milk yield reduced from seven liters to one and half liters. The haemoglobinuria occurred about three weeks after parturition. The animal had been fed on a little concentrated diet of hay and sugar beet pulp. For confirmative diagnosis blood samples were collected from the jugular vein before treatment. An aliquot of blood was placed into an EDTA–containing plastic tube for haematocytometry. The rest of the blood samples were placed into glass tubes for the serum. These tubes were centrifuged and harvested serum was immediately frozen at -20°C until analysis. The serum total protein (TP), albumin (Alb), calcium (Ca), phosphorus (P), magnesium (Mg), glucose, and iron concentrations were measured by an autoanalyser. The blood smears were stained by Giemsa’s stain and then examined for blood parasites in erythrocytes under a light microscope.

**Treatment Protocol**

The animal received phosphorus supplementation and supportive treatment. The treatment protocol for animal was designated as follows: Curon BH 5 mg (containing copper glycinate) was dissolved in 500 ml of NSS and administered intravenously, Injection Urimin-30 ml with NSS for 3 d intravenously, with other supportive treatment like Injection Ferritas, Avil, Lactomag, Rumentas, and Ecotas. Animal recovered after one week.

**Results and Discussion**

The phosphorus requirements of buffalo vary depending on the stage of growth, lactation, and pregnancy. Early lactation is often associated with a decrease up to 35% in mean herd serum phosphorus concentrations from parturition to peak lactation (Betteridge et al., 1986). It is known that phosphorus deficiency can reduce the adenosine triphosphate content in red blood cells, influencing the structure and function of the cell, thereby increasing fragility and
haemolysis, which may lead to acute haemoglobinuria (Wang et al., 1985). In this case report, anorexia, depression, decreased ruminal movement, and milk production, moderate tachycardia, pale mucosa membranes, and haemoglobinuria were detected in a buffalo. Moreover, we determined that serum phosphorus was very low. Jub et al. (1990) reported that circulating oxidants may cause erythrocyte damage, which may be predisposed to hypophosphataemia. The phosphorus deficiency commonly occurs two to four weeks after calving. Stockdale et al. (2005) determined that fat cows developed acute haemoglobinuria two to four weeks after calving. In the current study, we detected that post-parturient haemoglobinuria occurred about three weeks after calving. No blood parasites were detected in buffaloes with post-parturient haemoglobinuria. Phosphorus is an essential element for cellular function. It is absorbed in the small intestine and excreted either via the faeces or urine. Factors reducing the flow of saliva, such as anorexia, may cause increased losses of phosphorus via urine (Reinhardt et al., 1988). It is necessary for glycolysis, the formation of adenosine 5’-triphosphate, and is also required for the maintenance of the erythrocyte cell membranes. Low serum inorganic phosphorus is a frequent finding in cow with postparturient haemoglobinuria (McCaughan, 1993). Stockdale et al. (2005) reported that marginal dietary phosphorus deficiency may leave cattle predisposed to acute haemoglobinuria. Thompson and Badger (199) found that the serum phosphorus level in the cattle with haemoglobinuria was markedly decreased. In addition, Karapınar et al. (2006) also detected that the serum phosphorus level in cows with haemoglobinuria was very low (0.5 and 1.5 mg/dL). In this study, the mean serum phosphorus level in 5 year old buffalo with post-parturient haemoglobinuria was lower (Table 1). The cause of postparturient haemoglobinuria in this case may be related to dietary phosphorus deficiency. Because of this, the buffalo had been fed on a little concentrated diet of hay, and sugar beet pulp. Sugar beet pulp contains low amounts of phosphorus. Moreover, we determined that the serum glucose, Ca, Mg, TP, Alb and iron capacity concentrations in this case before and after treatment were within the normal range limits.
Table 1. Haematological and some biochemical parameters in the buffalo with post-parturient haemoglobinuria

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Before treatment</th>
<th>After treatment</th>
<th>Reference range</th>
</tr>
</thead>
<tbody>
<tr>
<td>P (mg/dl)</td>
<td>2.2 mg/dl</td>
<td>5.8 mg/dl</td>
<td>5.6 – 6.5 mg/dl</td>
</tr>
<tr>
<td>Ca (mg/dl)</td>
<td>8.9 mg/dl</td>
<td>10.2 mg/dl</td>
<td>9.7 – 12.4 mg/dl</td>
</tr>
<tr>
<td>Glucose (mg/dl)</td>
<td>30 mg/dl</td>
<td>50 mg/dl</td>
<td>45 – 75 mg/dl</td>
</tr>
<tr>
<td>Mg (mg/dl)</td>
<td>0.80 mg/dl</td>
<td>1.7 mg/dl</td>
<td>1.8 – 2.3 mg/dl</td>
</tr>
<tr>
<td>TP (g/L)</td>
<td>5.1 g/dl</td>
<td>6.2 g/dl</td>
<td>5.7 - 8.1 g/dl</td>
</tr>
<tr>
<td>Alb (g/L)</td>
<td>2.2g/dl</td>
<td>2.6 g/dl</td>
<td>2.1 - 3.6 g/dl</td>
</tr>
<tr>
<td>Hb (g/dl)</td>
<td>3 g/dl</td>
<td>8.5 g/dl</td>
<td>8 - 15 g/dl</td>
</tr>
<tr>
<td>Iron (μg/dl)</td>
<td>40 μg/dl</td>
<td>75 μg/dl</td>
<td>57 - 162 μg/dl</td>
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<tr>
<td>RBC (× 10⁶ / μL)</td>
<td>2.06 × 10⁶ / μL</td>
<td>5.08 × 10⁶ / μL</td>
<td>5 – 10 (× 10⁶ / μL)</td>
</tr>
</tbody>
</table>

Thompson and Badger (1999) reported that RBC, Hb, and PCV in cows with haemoglobinuria decreased significantly. In this study, RBC and Hb concentrations with post-parturient haemoglobinuria was lower compared to reference range (Table 1). In conclusion, a deficiency of phosphorus in the organism could be responsible for the development of post-parturient haemoglobinuria in buffaloes.

References:


