Hypokalemia in Postparturient Animals and its Management - A Clinical Study in 18 Cows

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Abstract
Hypokalaemia was observed in post-parturient cows subsequent to increased loss in milk, reduced intake due to anorexia, gastrointestinal or urinary loss or due to administration of isoflupredone or corticosteroids or sodium bicarbonate for treatment of rumen lactacidosis. The present article describes successful management of post-parturient recumbent cows with intravenous administration of potassium and its differential diagnosis.

Keywords: Hypokalaemia; post-parturient; potassium

Introduction
Hypokalemia occurs commonly in inappetant adult cattle, particularly in lactating dairy cows because of additional loss of potassium in milk. Hypokalemia in cattle is also encountered secondary to anorexia and many primary conditions of gastrointestinal and urinary systems. However, types of clinical signs seen with these conditions are rarely attributed specifically to hypokalemia, which is an electrolyte abnormality not typically associated with muscle weakness, recumbency and downer cow syndrome. Recently, a syndrome of severe muscle weakness, recumbency and hypokalemia was reported in association with ketosis and intramuscular administration of isoflupredone acetate to lactating dairy cattle. Hypokalemia also has been documented as a potential cause of muscle weakness in cattle of varying ages, independent of corticosteroid administration. Very little work has been done in relation to supplementation of potassium in hypokalaemia in cattle. The present article describes successful management of post-parturient recumbent cows with intravenous administration of potassium.

Materials and Methods
Post parturient cows (weighing between 325 to 350 kg b.wt.) that were admitted during the period of six months were taken for the study. These cows were subjected to detailed clinico-pathological examination to rule out musculo-skeletal abnormalities, toxaemia and peri-parturient diseases. The cow were weak, in sternal recumbent with flaccidity of limbs and inability to keep the head upright. Haematology and blood smear examination was done to rule out anaemia and blood protozoan diseases. The serum was collected without haemolysis and subjected to estimation of serum calcium, phosphorus, magnesium and potassium. Those cows that had serum potassium of less than 4.0 mg/dl were administered with potassium chloride (Isotonic 1.15% solution @ less than 3.2 ml/kg per hour so as not to exceed 0.5 mEq of potassium /kg per hour) as per Radostits et al. (2006).

Results
Out of 18 post parturient non ambulatory cows, three cows were found to be treated for ketosis while another eight cases were treated for acute carbohydrate engorgement based on anamnesis and previous treatment instituted by practicing Veterinarian before being referred. Four cow were reported to have had been treated for non specific diarrhoea and no specific etiology could be established for remaining cases. The average serum calcium, phosphorus, magnesium and potassium concentration in these cases were 6.82+0.13 mg/dl, 4.56+0.33 mg/dl, 3.1+0.11 mg/
dl and 2.13+0.24 mg/dl respectively. Following intravenous administration of potassium in normal saline, twelve animals showed clinical improvement and were able to stand following lifting and massage of limbs. Three animals continued to be recumbent and their serum values were found to be hypokalemic. These three cows also recovered following another dose of administration of potassium on the next day. Remaining three cows did not show any improvement in condition following even after second dose of potassium administration, they further deteriorated, developed decubitus ulcers and were subsequently discharged as per request by the owner.

Discussion
Hypokalemia in cattle may occur secondary to anorexia, diarrhoea upper gastrointestinal obstruction, right-sided displacement and torsion of abomasum impaction of abomasum. In most cases, the hypokalemia was not severe enough to cause weakness and recumbency (Radostits et al., 2006). Hypokalemia resulting in severe weakness and recumbency had occurred in dairy cattle treated with isoflupredone acetate for ketosis (Sielman et al., 1997). Affected cows were recumbent, profoundly weak, appeared flaccid and lay in sternal or lateral recumbency. They were unable to support weight of their heads off the ground and commonly hold them in their flanks. Profound weakness of lateral cervical muscles might occur (Johns et al., 2004). Most had been also treated with insulin, IV glucose and oral propylene glycol for ketosis. However, not all cases have been treated with corticosteroids (Peek et al., 2000). Hypokalemia causes muscle weakness by lowering the resting potential of membranes, resulting in decreased excitability of neuromuscular tissue. Thus, differential diagnosis of animal with muscle weakness should always include hypokalemia (Radostits et al., 2006). The history of anorexia, treatment for ketosis / acidosis in present case would have caused hypokalemia in animals as was supported by reports. Potassium should be administered intravenously or orally. The intravenous route is used only for initial treatment of recumbent ruminants with severe hypokalemia and rumen atony, as it is much more dangerous and expensive than oral treatment (Radostits et al., 2006).

References

Women Involvement into Indian Dairy Sector to be enhanced
During the Golden Jubilee celebrations of National Dairy Development Board (NDBB), Anand, Gujarat; Shri Radha Mohan Singh, Union Agriculture Minister stressed on the need to further enhance involvement of women into the Indian Dairy sector so that Indian maintains its lead and growth in the global milk market. He also emphasized that the Government is set to remove all bottle necks and inertia in the growth of the dairy sector, it intends to emulate growth of Gujarat in whole country. He also said that value of milk produced is now more than the value fetched by rice and paddy.