

Short communication

Salt poisoning in sheep at Noakhali coastal area of Bangladesh- A case report

Mohammad Sahab Uddin¹, Amir Hossain Shaikat⁴, Mohammad Abdul Jabbar¹, Mohammad Muktader Mowla¹, Hervey Demaine², Shahnaz Sultana³, AKM Saifuddin⁴ and SKM Azizul Islam^{4*}

¹Community Veterinary Surgeon, ²Regional Fisheries and Livestock Development Component,

³Department of Agricultural Economics and Social Sciences, Chattogram Veterinary and Animal Sciences University, Khulshi, Chattogram-4225, Bangladesh

⁴Department of Physiology, Biochemistry and Pharmacology, Chattogram Veterinary and Animal Sciences University, Khulshi, Chattogram-4225, Bangladesh

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*Corresponding author:

Cell: +88-01912511289

E-mail:

anwarcvasu@gmail.com

ABSTRACT

Salt poisoning in livestock especially in coastal area is due to tidal upsurge which caused huge mortality. Acute salt poisoning was happened in sheep, Noakhali coastal area. The cases of poisoning were diagnosed on the basis of history, clinical signs including abnormal enlargement below the jaw and surrounding of the eye, thirst, diarrhoea in early stage, nervous signs like tremor, circling and followed by electrolyte analysis of serum of affected and non-affected sheep, water and soil of that particular region. The electrolytes including magnesium, potassium and chloride were tested using commercial kits through biochemical analyzer (Humalyzer 3000®). Upon analysis, serum magnesium (2.28 ± 0.62 vs 1.05 ± 0.44 mEq /dl; case vs control); potassium (2.35 ± 0.06 vs 1.9 ± 0.08 mmol/l; case vs control); and chloride (121.9 ± 4.51 vs 112.58 ± 4.29 mmol/l; case vs control) levels were found higher in affected sheep than non-affected sheep. In conclusion, serum electrolytes imbalance in sheep caused from acute salt toxicity.

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1. INTRODUCTION

Geomorphologically and hydrologically coastal zone of Bangladesh is dominated by the Ganges Brahmaputra Meghna (GBM) river system and Bay of Bengal. The coastal zone of Bangladesh covers an area of 47,201 km², 32% of the country, being the landmass of 19 districts. Noakhali is a district situated in southeastern part of Bangladesh. Most people engaged in fish culture, catching and processing round the year. Besides, rearing buffalos, cows, sheep and goats are very popular in vast pastures and islands. However, sudden flash floods one or two times

in a year contaminate fresh water reservoirs by salt intrusion. Salt (NaCl) poisoning is a common problem in livestock especially in coastal region following sudden rise of sea water (saline water) during cyclone if the livestock solely dependent on surface water (Ohman, 1939 and Peirce, 1957). Casualty of animals also occurred from poisoning of excessive salt in prepared feed (Blood, and Henderson, 1968). Acute salt poisoning is manifested by disorders of central nervous system including tremor, circling and digestive tract disorder including diarrhoea in ruminants (Monlux et al., 1971). Diagnosis of salt poisoning

is based on history of concentrated sea water intake during grazing in vast pastures and islands. In sheep, normal serum magnesium, potassium, and chloride concentrations range from 1.94-3.24 mg/dl, 3.68-4.48 mEq/L and chloride 99.39-105.77 mEq/L (Eshratkah et al., 2008).

2. HISTORY

Sheep rears mainly in open grazing areas where grass grows naturally. The provision of providing concentrate feed is very limited except no option of grazing during flood, tidal surge and heavy rain. During flash floods, salt intrusion contaminates reservoirs of fresh water. Reservoirs are only sources of fresh water for grazed animals in Char areas of Noakhali.

On October, 2010, Farmers of Community based organizations of Regional Fisheries and Livestock Development Component (RFLDC) reported that large number of mortality of sheep in char land of Companiganj under Noakhali, Bangladesh. A team lead by community veterinary surgeons, community-based animal health care services, Subornachar, operated by Chattogram Veterinary and Animal Sciences University, Chattogram, Bangladesh visited to investigate the affected area. During investigation, farmers reported that the sheep were grazing as free range in char of the coastal area at day and take shelter at night. Farmers also reported that the marshy land area has been submerged with tidal water for two years during cyclone and flash floods. After the flood water recede, the amount of water decreases due to overheating and the concentration of salt in the water increases. Whenever, sheep drinking water from reservoirs resulted in the initial onset of diarrhea followed by weakness, oedema, abdominal pain and death. However, not all sheep were affected at a time as the incident solely depended on access to salty water. In an earlier study showed that sheep intoxicated with salty water found with watery diarrhea, anorectic, gaunt, and excitable state (Blohm et al., 2018). Due to the acute onset and point epidemic nature of the outbreak, investigation was focused on sources of herd-wide exposure, air, feed, and water; husbandry; and geographic and environmental factors.

3. MATERIALS AND METHODS

A total of eight blood samples were collected from affected (case) (n=4) and normal (control) (n=4) sheep in without anticoagulant containing vacutainer tube and serum samples were separated and stored at -20°C until analysis. The case was defined as those sheep found with edema below the jaw and surrounding of the eyes, thirst, diarrhoea in early case, tremor, circling and fast breathing and control sheep were healthy without any above-mentioned signs. Serum electrolytes magnesium, chloride, and potassium were tested using commercially available kits. However, we could not measure the sodium levels due to unavailability of kit. Soil and water samples were also collected and tested to determine the same parameters. Soil and water samples were tested in the Bangladesh Agricultural Research Institute, Maizdee, Noakhali and serum samples were analyzed for Magnesium (Mg^{++}), Potassium (K^{++}) and Chloride (Cl^-) at the Biochemistry laboratory, Department of Physiology, Biochemistry and Pharmacology, Chattogram Veterinary and Animal Sciences University, Chattogram by using commercially available kits through biochemical analyzer (Humalyzer 3000®).

4. RESULTS AND DISCUSSION

Three types electrolytes in serum of sea water intoxicated sheep, water and soil in cyclone affected coastal area were analyzed (Table 1). Serum potassium level was low whereas chloride level was high as compared to normal limit (Kaneko et al., 1999). The affected sheep exhibited signs were consistent with those described for the acute syndrome (Blood and Henderson, 1968; Jones, 1930; Mc Connell, 1945; Peirce, 1957; Ratlife, 1942; Smith, and Fyee, 1971). Paresis and knuckling followed by recumbence without convulsions have been reported (Ohman, 1939). Acute neurological derangement with similar signs has been described in sheep (Moule, 1945; Smith and Fyee, 1971). Salt poisoning more often occurs with salty well water consumption (acute and/or chronic), excessive salt in a ration or following water restriction (George, 1990).

Table 1. Electrolytes level in serum of sea water intoxicated sheep and corresponding water and soil of affected area (Mean \pm SD).

Parameters	Sample types		
	Serum	Water	Soil
Mg mEq/dl(case)	2.28 \pm 0.62	-	-
Mg mEq /dl(control)	1.05 \pm 0.44	-	-
K mmol/l(case)	2.35 \pm 0.06	0.9 \pm 0	0
K mmol/l (control)	1.9 \pm 0.09	-	-
Cl mmol/l (case)	121.9 \pm 4.51	122.55 \pm 39.24	23.2 \pm 0
Cl mmol/l (control)	112.56 \pm 4.29	-	-

5. CONCLUSION

The findings suggest that the sheep had been suffering from sodium chloride poisoning is due to frequent submerging of grazing land with sea water followed by drinking of concentrated saline water from water logged area.

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