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THE CORRECTION OF PHYSIOLOGICAL ACID OF METABOLIC ALKALOSIS IN DOMESTIC COWS(*Bos indicus*)

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ABSTRACT

The present study was designed on 21 model cows in Mesopotamia for diagnosis and treatment metabolic alkalosis cases. With a modern analytical instruments like VetStat Electrolyte Blood Gas Analyzer, our results showed an elevation in blood gases values accompanied with a significant ($P < 0.01$) decline in electrolytes levels especially K (1.2 mEq/l) and Cl (77 mEq/l)). Logarithmic statistical therapy recording an effective tool we are used for combat metabolic alkalosis in cattle.

It was concluded from the current study that supposed therapeutic therapy was effective in the correction and treatment of metabolic alkalosis in cows without less side effects.

INTRODUCTION

Metabolic alkalosis is a physiological condition in which the pH of tissue is elevated beyond the normal range (7.35–7.45). This result from decreased hydrogen ion concentration, leading to increased bicarbonate, or alternatively a direct result of increased bicarbonate concentrations. The condition typically cannot last long if the kidneys are functioning properly [(1)].

Metabolic alkalosis results from net exterior cellular fluid (ECF) acid loss or alkali gain. If alkalosis overwhelms blood pH buffering capacity, alkalemia (arterial pH > 7.45) results. Loss of acid-containing gastric secretions through protracted vomiting or nasogastric suction, excessive losses of acid via the urine or stool, and transcellular movement of H^+ ions into cells result in net acid loss from the ECF [(2)].

Metabolic alkalosis should be suspected when the history or physical examination suggests volume depletion, chronic gastrointestinal (GI) volume loss, or one of the other clinical settings, or one of the other clinical settings outlined previously. According to the suspect ion outlined, effective treatment of alkalosis is done by correction of the underlying defect causing impaired renal HCO_3^- excretion. Metabolic alkalosis usually resolves when ECF chloride (and volume) deficits are replaced with oral or IV saline. Administrations most commonly used as K, NaCl, dilute HCl solutions [(3)].

This project aimed to design the treatment for the cattle's metabolic alkalosis conditions.

MATERIALS AND METHODS

1- **Site of study**: all the research events applied in Mesopotamia area equal to 147 km from 32.5 latitude to 44.5 longitude.
2- **Models**: about 21 domestic cows (Jenubi) *Bos indicus* were isolated in three special chambers where they divided into three groups; control, mild metabolic alkalosis and severe cases.
3- **Clinical findings**: including determination of plasma HCO_3^-, arterial pH, Pco_2, Cl^-, K, Mg, Na, and renin. VetStat Electrolyte Blood Gas Analyzer from IDEXX company, USA were being used to investigate those variables.
4- **Treatment application**: the logarithm of therapy applied including provide oral saline, KCl, NaCl, dilute HCl, oral ammonium chloride, and inhibitors of renin drugs. This logarithm based upon pharmacokinetic and pharmacodynamics principles.

5- **Statistical analysis**: inputs and data were scheduled by modern computerized statistical programme (SPSS) which established on other interact articles to get fine assessment [4].

RESULTS

Outcomes numbers shows significant elevations in the levels of HCO_3, pH, Pco_2, and renin which accompanied with significant declines in the values of Cl, K, Mg, and Na. look at table-1 below.

Table-1: clinical chemical analysis of prominent variables correlated with cow's metabolic alkalosis.

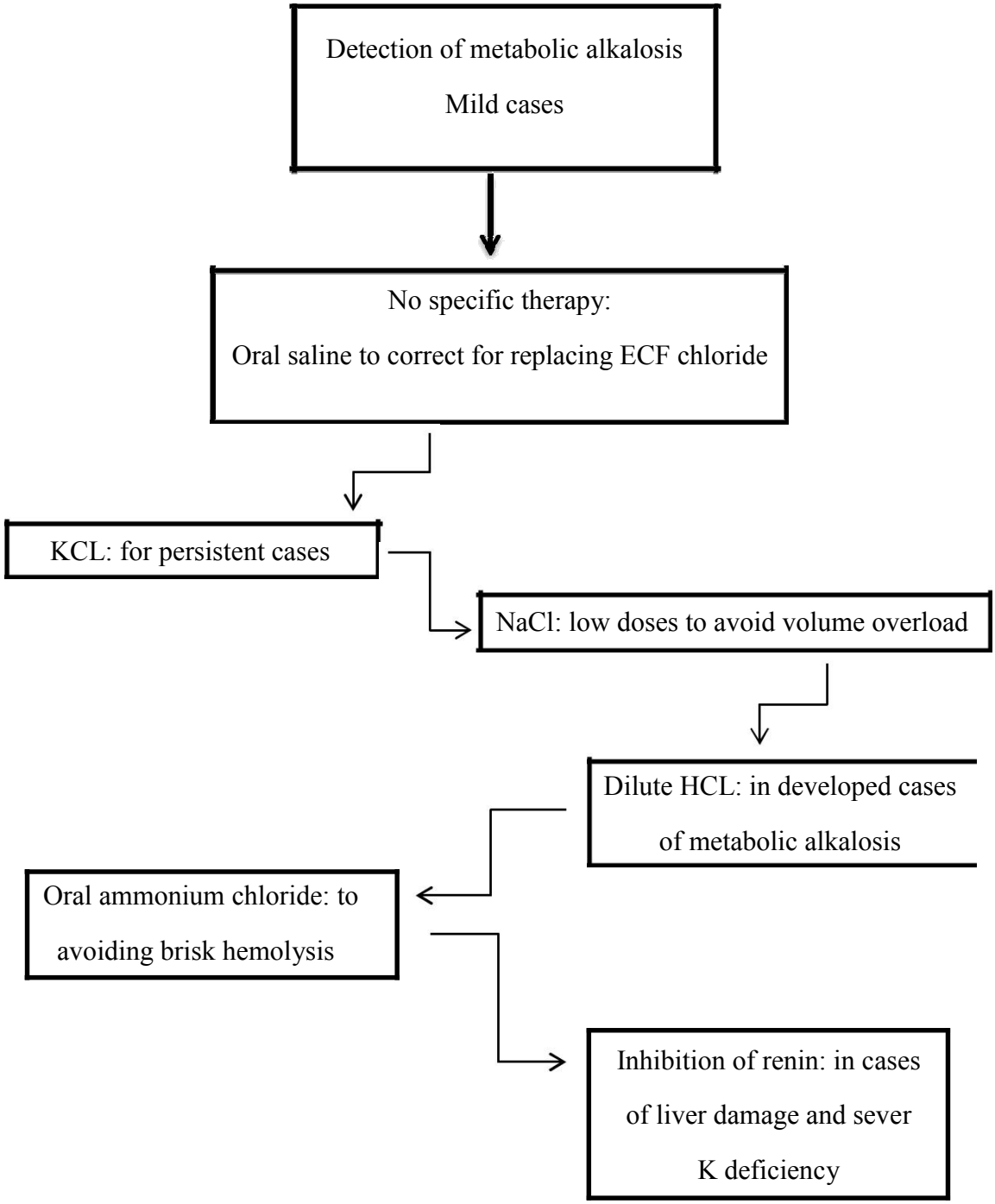
Variable/unit	Test	Control	Standard
HCO_3:-	50 **e***	25-33	24-34
pH:-	> 7.5 **e***	7.36-7.46	7.36-7.46
PCo_2:mm-Hg	77 **e***	30-50	30-50
Cl: mEq/L	77 **d***	98-103	93-105
K: mEq/L	1.2 **d***	3.5-4.4	3.2-4.7
Mg: mEq/L	0.58 **d***	1.7-2.5	1.6-2.5
Na: mEq/L	91 **d***	137-142	137-143
Renin:ng	4.8 **e***	< 0.3-4.1	< 0.3-4.1

***: indicates a significant difference on the p < 0.05 level.**

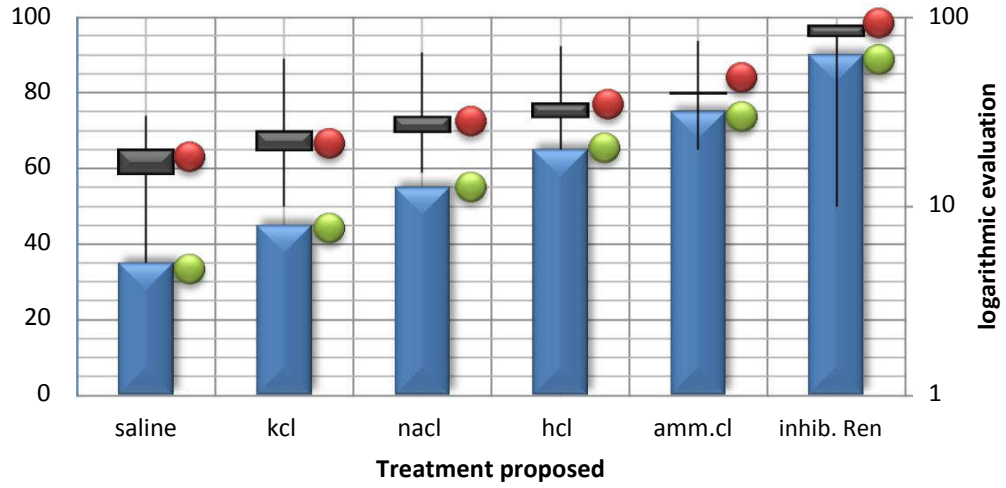
e: indicates a signifigant elevation values.

d: indicates a significant decline values.

The logarithmic pattern was calculated for the therapeutic cycle given for the metabolic alkaloid cattle as it is cleared in shape-1 below. So it was been designed minutely in a way compatible to the degree of this case recorded in the model animal. According to this logarithm the drug (treatment) submitted gradually till the curing happened or continues therapies applies so on.



Scheme-1: Algorithm for cow's metabolic alkalosis therapy supposed by our proposal research.



Scheme-2: Two faces statistical analysis histogram of parameters related to metabolic alkalosis in cows.

DISCUSSION

According to the lab findings, elevation of HCO_3 and pH as a less striking it be due to chronic respiratory acidosis. Pco_2 elevation levels may be pointed for compensatory hypoventilation, especially in mild renal insufficiency cases [5].

The electrolyte decline synchronically pattern give an obvious prove for the metabolic alkalosis in our tested model. When there is association between ECF volume depletion and metabolic alkalosis, the Cl of urine is predominantly low (as it'll shown) controversy to the high Na in the same sample [6].

Primary adrenal steroid and renin excess conjugated with metabolic alkalosis and volume expansion is a main cause for high urine Cl but not necessarily pH record a high levels in those cases [7].

The logarithmic ideal therapy application of supposed treatment stems from a gradual following of the curing cases during exposure for therapy. So in the earlier cases of metabolic alkalosis, oral saline applied first to compensate the underlying defect causing impaired HCO_3 excretion, so this therapy replacing ECF chloride deficiency. Other alternatives like NaCl and HCl solutions were considered as effective choice and safe alternatives with weak side effects [8].

The last therapeutic select demonstrate avoiding of severe side effects and repairing the hormonal and enzymatic disturbance occurred during hard course of metabolic alkalosis. A significant curing appears during the final events of therapeutic logarithm will reflect the best choices for neutralizing alkalosis in blood of cattle [(9)].

Conclusion of our study proving that supposed therapeutic therapy was effective in the correction and treatment of metabolic alkalosis in cows without less side effects.

REFERENCES

1. Beers, M. H. (1999). The merck manual. (17 th edn.). Merck research laboratories. N.J.; USA. ISBN: 0911910-10-7.

2. Gunn, A. J. and Abuelo, A. (2017). Atypical hypocalcemia in 2 dairy cows, after having been fed discarded vegetable cooking oil. Can Vet J. 2017 Dec; 58(12): 1306–1308. PMC5680730.

3. Hussain, S. A., Uppal, S. K., Hussain, T., Nabi, S. U., Beigh, S. A. and Ashraf, Sh. (2017). Vagus indigestion in bovines: A review in historical perspective. The Pharma Innovation Journal 2017; 6(12): 157-163.

4. Wagon, B. 2017. Veterinary Biostatistics. (2ed). Cbs pvt ltd, Delhi. ISBN-13: 978-9386217707.

5. Berg, S. M., Plöntzke, J., Leonhard-Marek, S., Müller, K.E. and Röblitz, S. (2017). A dynamic model to simulate potassium balance in dairy cows. Journal of Dairy Science. Volume 100, Issue 12, Pages 9799-9814.

6. Roussel, A. J. (2014). Fluid Therapy in Mature Cattle. Veterinary Clinics: Food Animal Practice. Volume 30, Issue 2, Pages 429–439.

7. Goff, J. P. (2014). Calcium and Magnesium Disorders. Veterinary Clinics: Food Animal Practice. Volume 30, Issue 2, Pages 359–381.

8. Smith, B. P. (2015). Large Animal Internal Medicine. (5 th edn). Mosby Co. USA. ISBN: 978-0-323-0-8839-8.

9. Constable, P. D., Hinchcliff, K. W., Done, S. H. and Grünberg, W. (2017). Veterinary Medicine: 5 - Disturbances of Free Water, Electrolytes, Acid-Base Balance, and Oncotic Pressure. (11 th edn). Saunders Ltd. USA. ISBN: 978-0-702052460.