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SUMMARY

Diarrhea is still one of the most important causes of calf mortality and morbidity that lead to severe economic losses to all livestock procedures. Death in addition to direct financial cost, cause a loss of genetic material for herd improvement and consequently for herd replacement and expansion. Neonatal calf diarrhea is an example to disease complex of a multifactorial disease as it result from an interaction between the calf, environment, management and enteropathogens.

This study aimed to achieve an etiologically diagnosis of neonatal calf diarrhoea and to correlated the severity of the clinical signs of diarrhoea and dehydration with the actual changes in the values of acid base balance and some other diagnostic biochemical parameters as well as studying the effect of two therapeutic measurements (Oral and continuous IV. drip infusions) neonatal diarrheic calves according to the severity of illness.

Ninety nine neonatal buffalos calves, 1-55 days old were involved in this study. Thirty calves were clinically healthy and Kept as control. The remaining sixty-nine were naturally diseased showed various signs of diarrhoea and sever dehydration. The affected calves were selected during the prevalence of 3 outbreaks of gastro-enteritis at different localities at Sharkia Governorate during two successive season of breeding (Oct.-May) 2002-2004.

At the time of initial examination, profuse watery diarrhoea was observed. All calves were extremely dehydration and either so weak. Lethargic with lead to weak suckling affinity, able of unable to stand and rise or in lateral sternal recumbency with complete or incomplete loss of consciousness with no suckling affinity. The diarrhoeic neonatal calves

were then subsequently classified on the basis of clinical findings and severity of illness into

- Group I** mild diarrhoeic neonatal calves
- Group II** moderate diarrheic neonatal calves
- Group III** sever diarrhoeic neonatal calves
- Group IV** diarrhoeic neonatal calves associated with respiratory

All groups of affected calves were carefully examined and the severity of diarrhoea could be assessed under field condition by the degree of deterioration in general systemic state such as dehydration and acidosis. Skin elasticity, sunken of eyebell, calf demeanor and suckling affinity in addition to body temperature and heart rate, all had a great clinical importance for making prognosis

Most of the affected calves developed diarrhoea which varied from soft passage of faeces to profuse watery grayish diarrhea, which in some cases blood tinged.

Rectal swabs and faecal samples were taken for bacteriological and parasitological examination.

On basis of clinical and laboratory findings, the condition was diagnosed as concurrent acute bacterial and protozoal diarrhoea. The recognized etiological agents were mostly bacterial agents such as *E. coli*, wither alone or in association with *Proteus sp.* or *klebsiella sp.*, 1 or *pseudomonas* or *compylobacter sp* and or *salmonella sp.* Protozoa (*cryptosporidium spp.* and *eimerial* only (13.0%) diarrhoic calves combines bacteria and *cryptosporidime* or *Emeria* (27.5%) of detected calves. No enteropathogens are identified (7.3%) of diarrhoic calves. On the basis of

the results of bacterial culture and sensitivity, Enrofloxacin was the antibiotic of choice for the most bacterial isolates.

The main clinical findings in the groups of diarrhoeic calves were as follows:

Neonatal calves with mild diarrhoea had maintained suckling affinity and were able to stand with mild dehydration while calves that suffered from moderate diarrhoea had weak suckling affinity and unable to stand or presented sternal recumbency with mild to moderate dehydration. On the other hand, severely diarrhoeic neonate calves had no suckling affinity, presented lateral recumbency with marked loss of consciousness. Calves with severe diarrhoea showed also severe dehydration with marked tachycardia. Associated respiratory signs in the form of serous, seromucoid nasal discharge, congested conjunctiva and nasal mucous membranes and abnormal respiratory sounds (exaggerated vesicular sound to moist rales) were recorded, moderate and severe diarrhoeic neonatal calves.

Acid-Base balance, haematology and some biochemical indices including BUN, serum creatinine, total plasma protein, serum glucose, serum sodium and potassium were recorded in all groups of calf diarrhoea and revealed a very clear changes in different stages of diarrhoea. The present study recorded that, mean values of blood gases and Acid-Base balance including pH, PCO₂, PO₂, HCO₃, O₂ sat. and B.E sat. in mild diarrhoeic neonate calves were (7.37±0.31), (46.50±4.56) mmHg, (32.17±7.08) mmHg, (22.42±1.89) mmol/l, (47.29±12.81) mmol/l and (-3.80±3.60) while in moderate cases of diarrhoea were 7.27±0.05 (46.70±5.31) mmHg, (30.86±5.31) mmHg, (19.15±7.49) mmol/l, (54.96±15.26) mmol/l and (-5.50±1.5) mmol/L respectively. In severe diarrhoea were 7.12±0.12 (45.46±16.59) mmHg,

(35.46±8.48) mmHg, (14.18±2.27) mmol/l, (42.06±3.21) and (-12.25±3.11) mmol/L respectively. Mean values of blood gases and acid-base balance severe diarrhoea associated with respiratory distress were 7.15±0.76 (55.6±15.00) mmHg, (29.17±7.14) mmHg, (16.20±3.10) mmol/l, (40.60±6.11) mmol/l and (-6.30±5.9) mmol/L respectively.

Mean values of haematological picture regarding TRBCs, Hb, and PCV in mild diarrheic neonate calves were (9.06±1.82) T/L, (116.77±19.71) g/l, and 34.02±4.04 % respectively. While in moderate diarrhoea were (9.81±2.05) T/L, (123.00±14.4) g/l and 38.10±6.02 respectively. In severe cases of neonate diarrhoea were (13.66±2.00) T/L, (133.50±9.90) g/l and 40.07±5.56% respectively.

On the other hand, mean values of these parameters in neonate calf diarrhea associated with respiratory distress were (9.66±1.47) T/L (117±17.4) g/l, (36.10±5.21) % respectively.

Mean values of studied biochemical parameters including level of total plasma proteins/albumin, globulin an A/G ratio blood sugar level, BUN, serum creatinine, serum Na⁺ and K⁺ in mild diarrheic neonatal calves were 71.89±9.78 g/l, 37.17±6.88 g/l, 34.71±13.12 g/l, 4.72±1.47 mmol/l, 6.91±0.72 mmol/L, 109.63±12.83 µmol/L 137.17±7.51 mmol/L, 5.00±0.55 mmol/L and 86.79±9.02 mmol/L respectively. While in moderate diarrhoea were 86.26±4.75 g/l, 46.34±5.89 g/l, 39.93±7.39 g/l, 2.16±0.69 mmol/L, 8.18±1.66 mmol/L and 121.34±51.00 µmmol/L, 130.63±7.29 mmol/L, 6.10±0.88 mmol/L and 81.54±7.12 mmol/L respectively.

While mean values in severe cases the above mentioned parameters were 94.22±6.38 g/l, 53.9 ±6.69 g/l, 41.31±10.91 g/l, 2.08±0.49 mmol/L,

11.50±4.40mmol/L, 212.33±90.11 μ mol/L, 136.60±5.10 mmol/L, 6.31±0.40 and 79.85±14.72 mmol/L respectively.

On the other hand, mean values of these parameters in neo-nate calf diarrhoea not associated with respiratory distress were (89.80±12.12) g/l, 45.76±7.37 g/l, 43.04±10.83 g/l, 2.97±0.85 mmol/L, 12.13±3.30 mmol/L, 231.17±70.10 μ mol/L, 139.00±4.16mmol/L, 5.95±0.34 mmol/L, 80.16±13.11 mmol/L.

Blood gases and Acid-Base balance and blood urea nitrogen had a significant diagnostic importance in neonatal calf diarrhoea. Moreover these indices could be used also as a prognostic tools.

Different formula of rehydation solutions either oral or parental had been applied in this study according to the severity of diarrhoea (depending upon presence or absence of suckling affinity). Rehydration solutions were prepared according to needs of the diarrheic calves. It was found that, rehydration therapy that fulfill the requirement of calf diarrhoea from energy, ions replacement and alkaline base as antiacid were essential for the diarrheic neonatal calves. it was found that oral solution which contains glucose and glycine as energy source, sodium, potassium and chloride as ionic replacement and bicarbonate as antiacid have a great benifit for diarrheic neonatal calves that had maintained suckling affinity and able to stand. On the other hand parentral rehydration therapy regarding bicarbonate or bicarbonate precursors such as lactated ringer's with dextrose were essential for diarrhoeic neonatal calves that had no suckling affinity and unable to stand. It has been clearly observed that rehydration therapy is a life saving and has been considered as a corner stone for all forms of neonatal diarrhoea associated with metabolic acidosis.

CONCLUSIONS

Neonatal calf diarrhoea has been studied clinically and laboratory. From these it could be concluded the following:

1- Clinical examination:

Provide noticeable information about the degree of deterioration in the general systemic state regarding dehydration and acidosis and could help in the predilection of the outcome condition as well as to which extent can medically interfere under field condition.

Calf demeanor, sucking affinity, skin elasticity, rectal temperature play an important role in the assessment of the degree of neonatal calf diarrhoea under field condition and on this basis we classify calf diarrhoea into mild, moderate and severe.

2- Laboratory findings:

1- Most of the outbreaks of neonatal diarrhoea in calves are associated with two mixed infection and the results of this study proved a rational starting point for planning to control this syndrome. Stress of diet, environment, nursing requirements and management system has allowed the pathogen to causes significant loses.

2- Regarding acid-base balance, PCV, BUN, and K^+ ion provide a very accurate indication about the diagnostic and prognostic aspects of diarrhoea and consequently proper medical approach.

* Some diarrheic neonatal calves that have pH and B.E. below 7.0 and -20 mmol/L respectively could be observed survive and respond to rehydration therapy.

* Diarrheic neonatal calves that have higher BUN (above 12 mmol/L) seem to be poor prognostic and poor response to fluid therapy.

- * Marked alteration in the values of PCO_2 , PO_2 and O_2 sat. were of major diagnostic significant in the interpretation of mixed acid-base disturbance in case of diarrhoea associated with respiratory distress.

From the clinical, laboratory and therapeutical point of view, it could be finally concluded that.

- 1- Diarrheic neonatal calves suffering from mild dehydration and acidosis with maintained suckling affinity could be treated with oral rehydration therapy in addition to whole milk.
- 2- Diarrheic neonatal calves with moderate dehydration and moderate acidosis and their suckling affinity is not absolutely diminished could be treated by parantal rehydration therapy using lactate ringer plus dextrose 5% or isotonic $NaHCO_3$ 1.3% plus dextrose 5% in addition to whole milk.
- 3- In severely diarrheic calves with severe dehydration and severe acidosis and their suckling affinity is lost, continuous IV drip infusion is the important therapeutic measurement using isotonic or hypertonic $NHCO_3$.
- 4- Whole milk should be given in an amount of 10% of he living calf's weight fore energy and nutrient supply for diarrheic calves, the daily required amount of milk should be divided into 3-4 times daily.
- 5- Antibacterial agent after sensitivity test in conjunction of non-steroidal anti-inflammatory agent shorten the period of illness and aid the calf to counteract infection and endotoxmemia.