A COMPARISON OF THE USE OF COMPOUND SODIUM LACTATE AND BICARBONATE SPIKED SODIUM CHLORIDE FOR THE INTRAVENOUS TREATMENT OF COLLAPSED DIARRHOEIC CALVES

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Oral fluid therapy is extremely effective in the early stages of diarrhoea, but in severely affected calves intravenous fluids are required. Sodium bicarbonate is considered the treatment of choice to restore acid-base balance. However, it is also claimed that simply providing fluid will allow kidney function to restore balance, particularly if glucose is provided as an energy source, and that bicarbonate may be deleterious in less severely acidotic calves. There are insufficient comparative studies to definitively conclude that the theoretical advantages of bicarbonate match clinical response. Also the seasonal nature of NZ calving means that time available to treat calves is limited, so rapid response to a low volume of IV fluids is required. This study compared the response to treatment with either 2L of compound sodium lactate or bicarbonate-spiked sodium chloride of 60 calves with severe diarrhoea. All calves showed signs of dehydration and moderate to severe acidosis. Fifty-one were collapsed and unable to stand, with no suckle reflex; nine had markedly reduced suckle reflexes and had to be helped to stand. Calves were randomly allocated to treatment with either 2L of lactated ringers and 100mL of 50% glucose or 2L of sodium chloride with 500mL of 5% sodium bicarbonate, given at a rate of 80mL/kg/hour. Serum electrolyte concentrations, serum pH and base deficit were measured prior to treatment and six hours later. Calves unable to stand at this point were retreated using the bicarbonate mix.

Only 3 calves did not improve over 24 hours - these calves had meningitis and septicaemia confirmed post-mortem. Mean pH at the start of treatment was 7.2 (range 6.9 to 7.41). There were no significant differences between treatment groups in mean pH at the start, but 6 hours later the mean pH of the group treated with bicarbonate was 0.2 units higher. The difference was particularly marked in the group of calves with severe acidosis (initial pH < 7.21). There was also a marked difference in clinical response in this group. Only 1/13 calves with severe acidosis treated with bicarbonate required additional therapy whereas 8/13 treated with lactate did. No evidence of clinical alkalosis was noted in any calf treated after bicarbonate, none had a pH > 5 after treatment. This study shows that 2L sodium chloride spiked with 25g of sodium bicarbonate is an effective, rapid and safe treatment for severe acidosis and dehydration due to neonatal diarrhoea in calves.