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RESEARCH ARTICLE

ACUTE GASTROENTERITIS WITH SEVERE METABOLIC ACIDOSIS IN A CHILD TREATED WITH BICARBONATE THERAPY – A CASE REPORT

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ABSTRACT

Metabolic acidosis is commonly observed in critically ill children, particularly those admitted to Paediatric Intensive Care Units (PICUs). Severe acidosis, if untreated, can result in significant morbidity and mortality. While the use of sodium bicarbonate infusion in metabolic acidosis remains controversial, it may be indicated in cases with pH <7.2. We present the case of a 2½-month-old infant with acute gastroenteritis, shock, and severe metabolic acidosis who responded well to bicarbonate therapy along with standard supportive treatment. The timely correction of acidosis contributed to stabilization, faster recovery, and reduced PICU stay

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INTRDUCTION

Metabolic acidosis is frequently encountered in hospitalized children, especially those admitted to PICUs. It is characterized by an increase in hydrogen ion concentration and a corresponding decrease in serum bicarbonate (<22 mmol/L)[1] . Severe acidosis (pH <7.2) is associated with poor cardiac output and increased mortality [2]. Although sodium bicarbonate infusion is a therapeutic option, its efficacy is debated due to potential complications such as hypernatremia, hypokalaemia, and hypocalcaemia [3]. Current evidence suggests it should be reserved for severe cases with careful monitoring [4].

Case Presentation: A 2½-month-old girl was referred with complaints of loose stools, recurrent vomiting, and fast breathing. History revealed faulty feeding practices. On arrival, the child exhibited signs of critical illness: severe dehydration, shock, acidotic breathing, and about 30% weight loss (3.4 kg to 2.4 kg). VBG showed pH 6.85, HCO_3^- 3 mmol/L, and BE -30. Oxygen and fluid boluses were administered, followed by maintenance fluids and a stat dose of 1 meq/kg sodium bicarbonate. A bicarbonate infusion was initiated for 8 hours [1]. Subsequent investigations confirmed sepsis; antibiotics were started. Fluid management was adjusted for rising sodium and persistent dehydration. After therapy, metabolic parameters improved (pH increased to 7.13), AKI started resolving, and feeds were gradually initiated. The child was shifted out of PICU in 36 hours and discharged after stabilization. On follow-up, the child's weight improved to 3.5 kg with normalized inflammatory markers.

DISCUSSION AND CONCLUSION

Metabolic acidosis, particularly in cases of acute gastroenteritis and shock, is a paediatric emergency. While correcting the underlying cause remains the priority, bicarbonate therapy can be lifesaving in severe cases (pH <7.2)[2]. Our case supports findings from studies like those by Takia et al., who observed early resolution of acidaemia with bicarbonate therapy in non-anion gap metabolic acidosis[4], whereas Wang et al. argue against routine use due to electrolyte disturbances [5]. Judicious use with electrolyte monitoring, as done in our case, proved beneficial and helped reduce PICU stay[6].

Conclusion Timely initiation of bicarbonate therapy in a child with severe metabolic acidosis can be lifesaving.

List of Abbreviations:

PICU: Paediatric Intensive Care Unit

Declaration:

Ethical Clearance: The Institutional Ethics Committee (IEC) has exempted the case report from full ethics review because as per the provisions of biomedical research guidelines, such studies may qualify for exemption when they involve anonymized retrospective data and pose no more than minimal risk to the participant.

Ethical Consent and Consent for Participation:

The authors declare that the research presented in this manuscript adheres to the ethical principles outlined by [name of the relevant ethics committee or institutional review board]. All procedures involving human participants were conducted in accordance with the ethical standards of the [institution, university, or country] and the Declaration of Helsinki (1964), as revised in 2013

Consent for Publication: Written informed consent was obtained from the legal guardians for publication of this case report and any accompanying data or images.

Availability of Data and Materials: All relevant data supporting the findings of this case report are included within the article. Additional information is available from the corresponding author upon reasonable request.

Competing Interests: The authors declare that they have no competing interests.

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Learning Points: Metabolic acidosis, particularly in cases of acute gastroenteritis and shock, is a paediatric emergency. While correcting the underlying cause remains the priority, bicarbonate therapy can be lifesaving in severe cases (pH <7.2).

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