



ORIGINAL RESEARCH PAPER

Paediatrics

A STUDY OF SERUM ELECTROLYTE ,SERUM CALCIUM, BLOOD SUGAR STATUS IN SEVERE ACUTE MALNUTRITION.

KEY WORDS:

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INTRODUCTION

- Malnutrition is a significant public health concern and leading contributor to the global burden of children diseases affecting under the age of five years worldwide especially in developing country like India . Globally undernutrition account for approximately 33% of the death among under five year of age.As per NFHS-5 (2019-20) reports of Gujarat , 39.7 % under five children are underweight,25.1 % wasted and 39% stunted.
- The serum sodium and potassium may be low due to associated diarrhea and vomiting in malnutrition. Decrease potassium content is associated decreased muscle mass, poor intake and digestive losses while decreased sodium level is attributed to increased in ECF in plasma and a poor prognostic factor in protein energy malnutrition
- since linear growth creates an increased demand for calcium. It is speculated that the children who are severely malnourished and experiencing marked growth retardation will have a reduced calcium.
- Hypogycemia is most common and serious complication of malnutrition. Blood sugar level are low in malnutrition lead to lethargy and convulsion like life threatening condition.
- Therefore in the present study we set out To find out the serum sodium, potassium, calcium and blood sugar changes in severely acute malnourished children presented with and without complication.

Aim

To assess the clinical profile and relation of serum electrolyte , serum calcium and blood sugar of children admitted in the NRC with severe acute malnutrition.

Objectives

- To study the clinical profile of patients admitted in NRC for severe acute malnutrition.
- To study the serum electrolyte , serum calcium and blood sugar changes in children admitted in the NRC with severe acute malnutrition.

Methodology

- Fifty children under five year who were severely acute malnourished children diagnosed by anthropometry , (< 3 SD) weight for length/ height with or without edema and with or without complication were studied from NRC , pediatrics department , PDU medical college Rajkot.
- Children with organic cause like congenital heart disease, chronic renal/ hepatic failure, cerebral palsy, disseminated tuberculosis, malignancies were excluded from study.
- The study was approved by institutional ethics committee(Human) , P.D.U Medical College , Rajkot. Outward No- PDUMCR/IEC/110/2023,Date- 26/09/2023.
- Written informed consents were taken from parents or guardian of children prior to study.Then the blood sample was taken for serum sodium, potassium, calcium and

blood sugar measurement. Immediate serum electrolytes and calcium were measured using automated analyser and blood sugar using glucometer. The enrolled subjects were divided into two group, those presented with complication and those without complication.

Inclusion Criteria

- Children admitted in NRC , Pediatric department Rajkot fulfilling diagnostic criteria of severe acute malnutrition.

Exclusion Criteria

- Children who age less then 6 month and more then 5 year and not fulfilling diagnostic criteria of severe acute malnutrition
- Child with acute severe malnutrition with some organic cause.
- Patients with negative consent from parents/ guardians.

RESULTS

- Fifty children with severe acute malnutrition completed the study. 20 children with SAM with complication and 30 children with SAM without complication. 50 % of cases were male and 50% female with majority of the cases were in age group of 6-12 months age (48%) and 13-24 months of age (40%).
- Majority of the cases 20 % were having hyponatremia , 16% cases had hyperkalemia,14% had hypocalcemia, 10% had hypokalemia.
- The most common presenting complain was fever(56%) followed by lethargy(34%), according to diagnosis of cases most cases associated with acute gastroenteritis(14%) followed by sepsis(6%) and urinary tract infection(6%).

Table 1. Distribution of cases according complication & non complication with age & sex

AGE	complicati on		Non complicat ion		MALE	FEMA LE	TOT AL	%
	Male	Fema le	Male	fema le				
6 -12 Month	5	6	7	6	12	12	24	48%
13 – 24 Month	3	4	6	7	9	11	20	40%
25 – 36 Month	1	1	2	1	3	2	5	10%
37 to 60 Month	0	0	1	0	1	0	1	2%
Total	9 (18%)	11(22%)	16(32%)	14(28%)	25 (50%)	25 (50%)	50	100 %

Table 2. Distribution of cases according to presenting complains

Complain	Male	Female	Total	%
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Fever	16	12	28	56%
Lethargy	8	9	17	34%
Breathing difficulty	6	5	11	22%
Cough	7	4	11	22%
Poor weight gain	4	3	7	14%
Convulsion	4	2	6	12%
Vomiting	3	4	7	14%
Loose stool	9	8	17	34%
Loss of appetite	5	2	7	14%
Refusal to feed	3	3	6	12%

Table 3. Distribution of cases according to diagnosis

Diagnosis	Male	Female	Total	%
Pneumonia	1	1	2	4%
Acute Gastroenteritis	3	4	7	14%
Tuberculosis	0	1	1	2%
Urinary tract infection	1	2	3	6%
Febrile convulsion	1	1	2	4%
sepsis	2	1	3	6%
Severe anemia	1	1	2	4%
other	16	14	30	60%

Table 4. Electrolytes and blood sugar changes in severely acute malnutrition

Electrolyte and blood sugar	Sam with complication	Sam without complication	No of cases	Percentage (%)
HYPERNATREMIA (S. Na - >145 meq/l)	1	1	2	4%
HYPONATREMIA (S. Na - < 135 meq/l)	8	2	10	20%
HYPERKALEMIA (S. K - >5.1 meq/l)	5	3	8	16%
HYPOKALEMIA (S. K - < 3.5 meq/l)	3	2	5	10%
HYPOGYCEMIA (B.sugar- <54 mg/dl)	2	0	2	4%
HYPOCALEMIA (S. Ca - < 8.4 mg/dl)	5	2	7	14%

DISCUSSION

1. Our study was carried out to find out the serum electrolytes and blood sugar changes in children < 5 years of age who are severely malnourished as they are more prone for malnutrition as well the caregiver may not know when and how to initiate the complementary feeding.
2. In our study the severely malnourished children were more in age group of (6-12) and (13-24) months of age which explains that probably wrong time and methods of complementary feeding are risk factor for SAM.
3. Majority of the cases 20 % were having hyponatremia , 16% cases had hyperkalemia, , 14% had hypocalcemia, 10% had hypokalemia.
4. This explains that the electrolytes changes commonly presents in a malnourished children or may presents subclinically which becomes obvious during illness.
5. On comparisons between SAM with complication and SAM without complication dyselectrolytemia , hypoglycemia and hypocalcemia was common in SAM with complication groups.

CONCLUSION

The electrolytes changes like hyponatremia ,hyperkalemia, hypokalemia hypoglycemia and hypocalcemia are commonly presents in malnourished children which may be sub clinically which becomes obvious during illness. This may occur in SAM with complication or SAM without complication. Serum electrolyte, blood sugar and serum calcium level need to be measured in all cases of SAM to

detect asymptomatic patient. This help in triaging those with asymptomatic hyponatremia ,hyperkalemia, hypokalemia, hypoglycemia and hypocalcemia and better management and good outcome.

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