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HAEMOLYTIC URAEMIC SYNDROME IN NIGERIAN INFANTS.

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ABSTRACT

BACKGROUND

Diarrhoea is one of the major causes of hospitalization, morbidity and mortality in children. Haemolytic uraemic syndrome (HUS) may occur as one of the complications associated with diarrhoea in acute gastroenteritis.

Objective: The objective of this study is to present laboratory evidence of HUS in hospitalized infants with acute gastroenteritis.

Method: Blood urea, electrolytes, creatinine, full blood count and platelets were investigated using standard techniques in children who presented with acute diarrhoea. Those with transient impairment of renal functions were excluded.

Results: The results indicate that 29 out of 181 (16%) had elevated levels of potassium, urea, creatinine, total white blood cell count, neutrophil, while there was diminished levels of bicarbonate, packed cell volume, haemoglobin and platelet count. Statistically significant difference was observed in all the of 29 patients ($p < 0.001$) when compared with those infants without laboratory evidence of HUS who had acute diarrhoea.

Conclusion: It is concluded that HUS is a common complication in infantile diarrhoea and physicians should therefore be on alert, good sanitary condition and exclusive breast feeding may reduce the incidence of HUS in infants.

INTRODUCTION

Haemolytic Uraemic Syndrome (HUS) is the most common cause of acute renal failure in young children. It is mostly followed by episode of gastroenteritis¹, caused by verocytotoxin producing *Escherichia coli* 01157:H7. Diarrhoea is one of the major causes of malnutrition, morbidity and mortality in children of developing countries². The studies in Lagos showed that in all the patients that had gastroenteritis, 37% show evidence of acute renal failure while, similar studies in Zaria showed a low percentage of acute renal failure (5.2%). The cause of acute renal failure in these patients was attributed to septicaemia (3,4) A high incidence of infantile diarrhea is still being recorded in this center and there had been no report on HUS. We are therefore reporting the presence of laboratory evidence of HUS in hospitalized infants with gastroenteritis in Aminu Kano Teaching Hospital, Kano, Nigeria.

MATERIALS AND METHODS

Haemolytic uraemic syndrome is define as micro-angiopathic haemolytic anaemia, thrombocytopenia (platelet less than $150 \times 10^9 / l$) and acute renal failure ($>50\%$ increase in serum creatinine level over baseline). Twenty nine (29) infants with laboratory evidence of HUS were studied out of a total of one hundred and eighty one (181) children who presented with diarrhoea were admitted into the study from January 2000 to December 2002. They were 106 males and 75 females aged range 1-36 months (mean 11 months). Those with transient impairment of renal function were excluded from the study group. That is infant with temporarily increased serum levels of urea, creatinine,

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following acute diarrhoea and dehydration which do not persist for more than 24 hours and which returned to their normal reference range value following appropriate dehydration therapy were excluded. The investigations carried out were urea, electrolytes, creatinine (CR), packed cell volume (PCV), haemoglobin (Hb), total white blood cell count (TWBC) and platelet count. Standard laboratory methods were used as obtained in Aminu Kano Teaching Hospital, Kano.

RESULTS

There were a total of one hundred and eighty one (181) infants admitted with acute diarrhoea. Twenty nine of them had HUS which accounted for 16.1% of total admission for diarrhoea. They comprised of fifteen males and fourteen females. The results show raised levels of sodium,

potassium, chloride, urea, creatinine, TWBC and neutrophil count. Diminished levels of bicarbonate, PCV, Hb, Lymphocyte and platelets counts were also recorded. (Table 1).

When these values were compared with those infants with gastroenteritis but without HUS, statistically significant difference were observed ($p < 0.001$). However, sodium and chloride were within normal limits. On the other hand, infants without HUS had reduced values of sodium, bicarbonate, PCV and Hb. These were lower when compared with apparently healthy infant of the same age group. Table 2 shows the age distribution of infants with gastroenteritis and HUS. Majority of them with gastroenteritis were within the ages of 7 –12 months, followed by those within the ages of 13 –18 months.

TABLE 1: CHEMICAL AND HEAMATOLOGICAL VALUES IN INFANTS WITH ACUTE DIARRHOEA (MEAN + SEM)

PARAMETERS	Infants with haemolytic Uremic syndrome n=29	Infants without haemolytic Uremic n=152
Sodium (mmol/l)	138 ± 0.48	131 ± 0.06
Potassium (mmol/l)	5.3 ± 0.06	3.7 ± 0.03
Chloride (mmol/l)	102 ± 0.56	96.9 ± 0.07
Bicarbonate (mmol/l)	16.8 ± 0.21	19.2 ± 0.03
Urea (mmol/l)	20.8 ± 0.35	4.87 ± 0.02
Creatinine (umol/l)	282 ± 6.79	68.5 ± 0.06
Packed cell volume (%)	23.4 ± 0.21	33.6 ± 0.01
Hemoglobin (g/dl)	8.5 ± 0.009	12.2 ± 0.04
White blood cell (x 10 ⁹ /l)	13.8 ± 0.29	6.7 ± 0.01
Neutrophil (x 10 ⁹ /l)	8.6 ± 0.08	7.6 ± 0.01
Lymphocyte (x 10 ⁹ /l)	4.7 ± 0.07	5.21 ± 0.01
Monoocyte (x 10 ⁹ /l)	-	0.2
Eosinophil (x 10 ⁹ /l)	0.2	0.1
Platelet (x 10 ⁹ /l)	92.0 ± 2.00	156.8 ± 0.46

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TABLE 2: AGE DISTRIBUTION OF INFANTS WITH GASTROENTERITIS AND HUS

AGE (MONTH)	FREQUENCY	PERCENTAGE	NUMBER WITH HUS
0-6	23	12.8	2
7-12	79	43.9	20
13-18	48	26.7	4
19-24	18	10	2
25-36	13	7.2	1
Total	181	100	29

DISCUSSION:

The study indicates that 16% of the proportion of infants admitted for acute diarrhoea had HUS. This proportion appears high compared to study in Zaria where the proportion was recorded to be 5.2% many years ago.^(3,4)

The causes of diarrhoea is associated with condition such as illiteracy, poverty, poor sanitary condition and malnutrition. All are related to low social economic status⁶ of patients/parents. This explains the high incidence of this condition in the subpopulation within the low social economic class. Infection appears to be common cause of acute renal failure in early life^{4,7,8}. The wide spread use of artificial baby foods has also contributed to the high incidence diarrhea in children of the poor and illiterate parents³. There is likelihood that a fair proportion of diarrhea may also be caused by viruses. But majority of the cases are attributed to bacterial infections. *Escherichia coli* is the organism most commonly isolated in infants in this centre (unpublished observation). Majority of the infants with gastroenteritis (43.9%) were within the ages 6 – 12 months and twenty out of twenty nine with HUS were within this age group. This is the period when the breast milk is becoming inadequate and the mother use feeding bottles to supplement breast milk. Poor sanitary condition may have contributed to the high incident of diarrhoea.

There are different mechanisms responsible for the fluid and electrolytes loss which occur in bacterial

gastroenteritis. Some bacterial penetrate and disrupt the intestinal mucous thereby producing watery/blood stool. While others produce toxins which acts by activating adenylase within the epithelial cells of the mucosa. This raises the concentration of adenosine- 3,5 cyclic monophosphate which in turn stimulates active secretion of water and electrolytes into the gut⁶. Infantile diarrhea was more frequent in boys. There was no significant sex difference in those infants with laboratory evidence of HUS.

The microangiopathic anaemia is commonly observed in infants with HUS and is probably due to mechanical damage of the blood cells as they pass through the vasculature of the Kidney. This is attributed to alteration due to water and electrolyte imbalance. While thrombocytopenia may be due to intrarenal platelets adhesion or damage. Increased total white blood cell and neutrophilia are due to bacterial infection.

From the present study it showed that HUS is a common complication in infantile gastroenteritis and laboratory investigation such as urea, electrolytes, creatinine and simple hematological indices will be of help in the diagnosis of HUS in infantile diarrhoea. Good personal hygiene and environmental cleanliness are conditions that will reduce infantile diarrhea. Attending physicians should therefore be on an alert for the possibility of HUS in every acute diarrhea case in children.

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