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Haemolytic uraemic syndrome in childhood: An experience of 7 years at the Aga Khan University

S H. Ibrahim
Aga Khan University, shahnaz.ibrahim@aku.edu

Z A. Bhutta
Aga Khan University, zulfiqar.bhutta@aku.edu

I A. Khan
Aga Khan University, iqtidar.khan@aku.edu

Haemolytic Uraemic Syndrome in Childhood: An Experience of 7 Years at The Aga Khan University

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Shahnaz H. Ibrahim,Zulfiqar A. Bhutta,Iqtidar A. Khan (Department of Paediatrics, Aga Khan University Medical Centre, Karachi.)

Abstract

We reviewed the case records of all children admitted to the Aga Khan University Hospital (AKUH) with a diagnosis of Haemolytic Uremic Syndrome (HUS) over a 7 year period (July, 1988 - June, 1995). A total of 33 patients were admitted to the Pediatric ward at (AKUH) with a median age of 16 months (range 4 months -9 years). 97% cases identified were of the classic variety and no familial case was identified. The mean duration of illness was 27 days, 39% had an illness >28 days. Diarrhoea and prior antibiotic used was in 97% patients. Oliguria at admission was seen in 52.5% and seizures in 24% of cases. Thrombocy topenia, anemia and leucocytosis at admission was present in >72% of children, Hyponatremia was present in 42% while acidosis, hypocalcemia and hyperkalemia was seen in 30% of children. Despite optimal management and peritoneal dialysis in 14(42%) patients, 8(24%) died, No specific relationship was found between mortality and any clinical or laboratory feature at presentation. Our data highlights the importance of HUS in the Pediatric age group and the need for further studies to delineate risk factors for adverse outcome (JPMA 48:100,1998).

Introduction

Haemolytic Uraemic Syndmme (HUS) is a heterogenous group of disorders characterized by microangiopathic hemolytic anemia, th.rombocytopenia and azotemia. It is one of the leading cause of acute renal failure in children.

The classical type of HUS, most often occurs with a diarrhoeal prodrome in children younger than 5 years of age, although the syndrome has been reported in persons of all ages and in association with many different illnesses, organisms and medications[1,2]. Since the mid-seventies, the mainstay of treatment for children with HUS has been peritoneal dialysis and blood transfusions alongwith supportive care.

Peritoneal dialysis and adequate supportive care have played a major role in decreasing mortality from 40% to 4%[3], There is a paucity of information related to HUS in Pakistan. This retrospective review was carried out to investigate the clinical features, mode of presentation and outcome, as well as to see if there were any predictable prognostic factors for adverse outcome.

Patients, Materials and Methods

We reviewed the medical records of children seen at the Aga Khan Hospital, Karachi, between July, 1988 to June, 1995, with a discharge diagnosis ofHUS corresponding to the International Classification of Disease Code 9th Revision Clinical modification 283.11. Medical records were abstracted using standard data collection form. Information was collected on history, clinical course of illness and outcome.

The laboratory values abstracted included complete blood cell count, differential cell count, platelet count, peripheral smear, prothrombin time (PT), partial thromboplastin time (PTF), fibnn degradation products (FDP's), serum sodium, potassium, blood urea nitrogen, creatinine, calcium, phosphorus, stool

and urine routine analysis and culture and blood culture. These values were recorded at admission and at one week of hospital stay. The urine volume for each 24 hour period was recorded and calculated as mIJm^2 and the minimum value was identified for each patient. Facilities for detection of E. Coli verocytotoxin was not available. Oliguna was defined as urine output <400 ml/m2/24 hours. Thrombocytopema was defined as platelet count <150x10 6/l, leukocytosis as WBC >15x10 /1 and anemia was defined as haemoglobin level <10 gm/dl.
The association of risk factors with adverse outcome/mortality was then evaluated by univariate methods, computation of relative risks, corresponding 95% confidence intervals and analysis of variance. Significance was set at 5%. Marginal and significant factors were further evaluated in a logistic regression model using EGRET (SERC and CYTEL, 1991).

Results

A total of thirty three patients wcre admitted with the diagnoses of HUS.

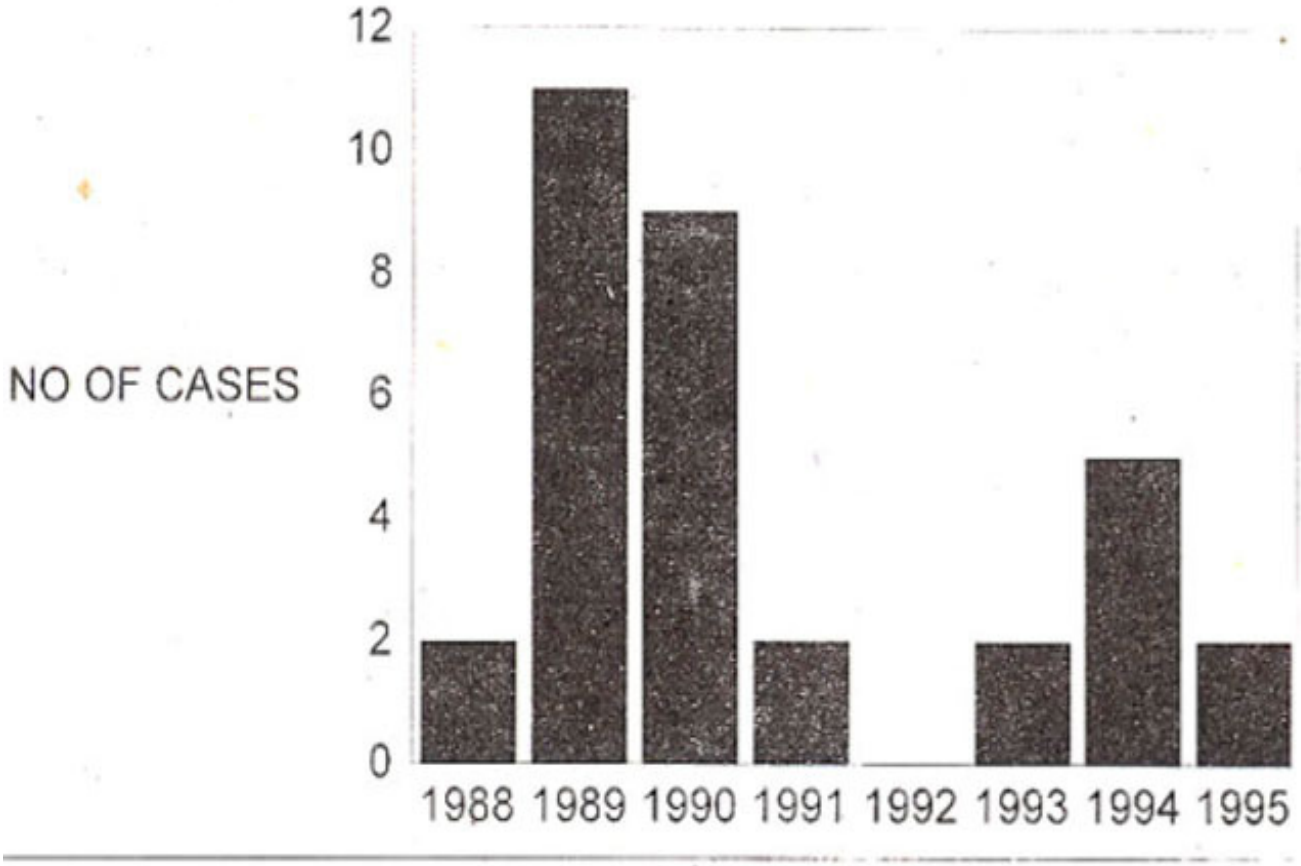

Figure 1. Incidence of HUS over 7 years period.

Figure 1 shows annual trend ofHaemolytic Uraemic Syndrome. There seems to have been an upsurge for the year 1989- 1990, as more than 50% of the total number of cases were seen during that period. Seasonal variation was also noted as majority of cases appeared in summer months.

Table I. Initial findings in HUS in 33 patients.

	No.	%
Gastroenteritis	32	97
Drowsiness	14	42.4
Oliguria	23	69.7
Hypertension (BP >90th centile)	15	45.5
Convulsion	9	27.3
Pallor	28	84.8
Oedema	15	45.5
Dehydration	10	30.3
Azotemia		
- BUN >20 mg/dl	28	84.8
- Cr. >1 mg/dl	28	84.8
Thrombocytopenia <150,000/mm^3	26	78.8
Anemia Hb <10 mg/dl	25	75.7
Burr cells	27	81.8
Leucocytosis WBC 15,000/mm^3	24	72.7
Hyponatremia Na <130 mmol/dl	21	63.6
Hyperkalemia K >5 mmol/dl	9	27.2
Acidosis HCo3 <10 mmol/dl	10	30.3
Hypocalcemia Ca <7 mg/dl	10	30.3

The ages of children ranged from 4-144 months with a mean of 31±37 months and median age of 16 months.

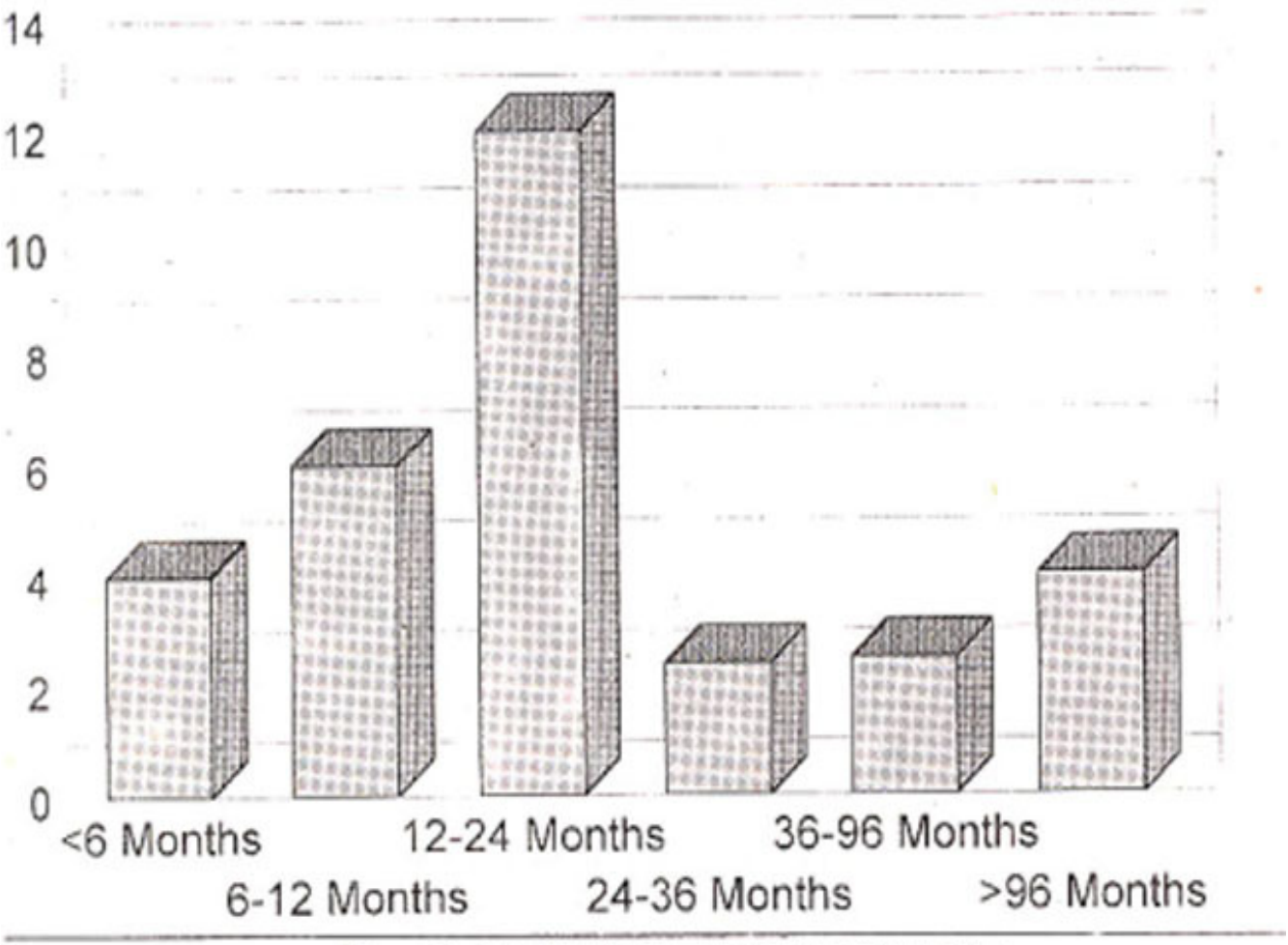

Figure 2. Age distribution of patients with HUS.

18 children were males while 15 were females. The mean length of stay in hospital was 16± 12 days. Mortality rate was 8 (24%). 13 patients had a stay >28 days. The mean duration of illness of 15-28 days was 17 days while mean duration of illness of>28 days was 13 days. 32 (97%) of children were admitted with diarrhoea as the prodromal symptom, 78% had invasive gastroenteritis as characterized by stool detailed report showing >20 WBC and >10 RBC. One atypical case was seen with diarrhoea not being the presenting symptom. Stool cultures showed a positive yield in 7 (21%) patients. 3 (9.1%) had stool cultures reported as E. coli. Salmonella group A, group B, Salmonella paratyphi B and Shigella Dysentrae Type 1 were isolated in the stools of the remaining 4 patients.

Table II. Risk factors for mortality in haemolytic uremic syndrome.

Features	Survival		Deaths		Relative	95% Confidence
	N	%	N	%	Risk	interval
Anuria	13	52	3	37.5	0.55	0.10-2.8
Oliguria	17	68	6	75	1.41	0.23-8.6
DoI 15-28 days	13	77	4	50	0.9	0.18-4.5
DoI >28 days	11	44	2	25	0.42	0.07-2.5
Coma	1	4	1	12.5	3.42	0.18-62
Hyperkalemia	4	16	3	37.5	3.15	0.5-19
Hypokalemia	7	28	2	25	0.85	0.3-5.3
Hyponatremia	17	81	4	50	0.47	0.09-2.3
Hypocalcemia	20	80	5	20	0.4	0.07-2.3
Ad. anaemia	19	76	5	62	0.52	0.09-2.88
Leucocytosis	18	72	6	75	1.16	0.18-7.2
Dialysis	11	44	3	37.5	1.07	0.75-1.56

* DoI. Duration of illness.

Blood cultures were positive in4 (12%). The organisms identified included S. typhirnurium, EPEC and Pseudomonas. One child was polyuric and was considered to be in the recovery phase of the illness.

Table III. Multivariate analysis of risk factors for mortality in a logistic regression model.

Feature	β Coefficient	Standard error	Odds ratio p-value	95% Confidence interval
Age	0.2	0.1	1.0	0.9-1.0
DOI. 15-28 dyas	-2.9	1.6	2.8	0.1-659
DOI. >28 days	-2.8	1.6	0.9	0.6-139
Drowsiness at admission	2.6	1.3	17	0.3-0.1

* DOI= Duration of illness.

60% of children continued to have oliguria for greater than one week during their hospital stay. There was no correlation between those children who were oliguric for >1 week in hospital and mortality. 60% children were oliguric and mortality in these children was 18%, while non oliguric children (39%) had a mortality of 6%.

Twenty-eight children had a raised creatinine value of >1 mg/dl. BUN values ranged from 3 mg/dl to 222rng/dl with a mean value of 65.5mg/dl. Creatinine values ranged from 0.6mg/dl to 19.3 mg/dl with a mean of 3.4 ing/dl. 25 (75%) were anemic on admission with a mean haernoglobin value of 8.4 gm/dl. Thrombocytopenia was correlated with age. 36% children <14 months had thrombocytopenia one week of hospital stay. 50% of children having seizures were hyponatremic. However, there was no significant correlation found between seizures and hyponatreniia. There was also no correlation between the occurrence of seizures and the neurological status at admission. Relative risk for seizure with hyponatremia was 0.94 (p= 0.78).
Serum p Potassium values ranged from 1.2-7.7 mmoI/I with hyperkalemia seen in 9 children. Management was mainly supportive including plasma infusion, fluids and electrolyte administration.

Table IV. Cause of death.

Patient No.	Dialysis	Cause of death
1	Y	Intracranial hemorrhage
2	Y	Continued renal failure
3	N	Encephalopathy and cardio resp. arrest
4	N	Peritonitis and cardio resp. arrest
5	N	Hemorrhagic shock
6	N	Gm-ve sepsis and peritonitis
7	Y	Gut perforation and sepsis
8	N	Continued renal failure

14 patients underwent dialysis but dialyzed while, in the remaining 25 children surviving, 11(44%) were dialyzed. Relative risk of survival with dialysis was 1.07 (P=0.73). Risk factors for mortality were assessed with hyponatremia, hyperkalemia, hypokalemia. hypocalcemia, anaemia, leucocytosis, oliguria, duration of illness, neurological illness and prior antibiotic therapy. No significant correlation was found with any variable (Table II).

Table V. Other causes of renal failure during 1988-1995.

Causes	No.
Infection	66
Acute nephritis	5
Nephrotic syndrome	2
Auto immune conditions	2
Congenital	13
Birth asphyxia	16
Leukemia and lymphonia	3
Hypotension and circulatory shock	8
Hematologic causes	14
Unknown cause	9
Misc.	15
Total	153

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