

Heart Failure in an Emergency Room Setting

F BONDI*, AND F JAIYESIMI†

SUMMARY

Bondi FS and Jaiyesimi F. Heart Failure in an Emergency Room Setting. *Nigerian Journal of Paediatrics*, 1990; 17:1. Heart failure was observed in 91 (3%) of 2766 children who were admitted into Children's Emergency Room, University College Hospital, Ibadan, during a 12-month period. The main causes were acute lower respiratory tract infections intrinsic heart diseases and anaemia. They accounted for 35.2%, 35.2% and 26.3% of the 91 cases respectively. Bronchopneumonia and cardiac malformations precipitated heart failure mainly in infants whereas 71% of the children with anaemic heart failure were aged between one and five years. The mean haematocrit in the latter patients was 12% (range 4-21%) and the main causes of anaemia were malaria, sickle cell haemoglobinopathy and septicaemia. The mortality rates for patients in whom heart failure complicated anaemia, bronchopneumonia and primary cardiac disorders were 25%, 36% and 47%, respectively. These figures are significantly higher than the 8% overall mortality rate for all children admitted into the Emergency Room during the study period. Thus, if such gravely ill children are to be salvaged, both the primary diseases and their complications must be identified promptly and treated effectively.

Introduction

WITH increasing urbanization and awareness of the advantages of modern health care, paediatric services in Nigeria continue to be inundated with enormous patient loads. Consequently, the limited facilities

available have to be organized in such a way that medical care can be given to all those who seek it. Besides, sick children are often brought to hospitals in such advanced stages of ill-health that urgent life-saving measures are commonly required. The steady stream of such gravely ill children promoted the establishment, in many tertiary health institutions, of Children Emergency Rooms (CHER),^{1 2} units in which quasi-inpatient care is provided for acutely ill children pend-

University College Hospital, Ibadan

Department of Paediatrics

*Senior Registrar

† **Professor

Correspondence: Professor F Jaiyesimi

bronchopneumonia: hence the incidence of heart failure in such children was 6%.

Of the 32 patients with intrinsic cardiac disease accounting for cardiac failure, 17 (18.7%) were due to congenital cardiac malformations. These defects occurred mainly in infants, the age range being from 1 week to

3.8 years (mean, 9 months). Six of them had ventricular septal defect, another 6 had transposition of the great arteries while the remaining 5 had patent ductus arteriosus. Six of the 15 cases of myopericarditis were attributable to rheumatic disease, 5 to septicaemia, 3, to tuberculosis and the remain-

TABLE I
Causes of Heart Failure at different Ages

Causes	Age (years)			Total	% of Total
	< 1	1-5	> 5		
Intrinsic cardiac diseases					
Cardiac malformations	15	1	1	17	18.7
Myopericarditis	1	7	7	15	16.5
Lower respiratory tract infections					
Bronchopneumonia	14	11	0	25	27.5
Lobar pneumonia	0	1	3	4	4.4
Bronchiolitis	2	0	0	2	2.2
Pertussis	0	1	0	1	1.1
Anaemia	1	17	6	24	26.3
Acute glomerulonephritis	0	2	1	3	3.3
Total	33	40	18	91	100.0

TABLE II
Causes of Anaemia in 24 Patients

Causes	No of Patients	% of Total
Malaria	11	46
Malaria + Sickle cell anaemia	5	21
Septicaemia	5	21
Acute leukemia	3	12
Total	24	100

TABLE III
Incidence of Heart Failure in different Disease Entities

Disease Entity	No of patients	No with heart failure	Prevalence (%)
Lower respiratory tract infections	480	32	7
Anaemia	389	24	6
Congenital heart disease	46	17	37
Others	1851	18	1
Total	2766	91	3

TABLE IV
Overall and Group Mortality Rates

Category	No of patients	No of deaths	Mortality rate (%)	p*
All Admissions	2,766	221	8	—
Anaemia	24	6	25	< 0.001
Bronchopneumonia	25	9	36	< 0.001
Cardiac diseases	32	15	47	< 0.001

*p values are in respect of the difference between the overall mortality and each group mortality.

ing one to presumed viral myocarditis. The mean age of the patients with acquired heart diseases was 6 (range 1 – 15) years.

Anaemia was the third commonest cause of heart failure. The mean age of the patients with this condition was 4.6 years, and their haematocrit ranged from 4 to 21% (mean 12%). Table II shows the causes of anaemia in the affected 24 children.

The prevalence of heart failure amongst children with the different disease entities is shown in Table III.

Outcome

At the time of discharge, 50 (55%) of the 91 patients had recovered fully while 11 (12%), comprising mainly children with structural heart disease, still required "antifailure" treatment on outpatient basis.

Thirty (33%) of the patients died. The group mortality pattern is shown in Table IV. The mean haematocrit in the fatal cases of anaemia was 9% (range, 4–12%) while the value for the non-fatal cases was 12% (range, 6 – 25%); this difference was not statistically ($p>0.5$). All the deaths in patients with heart failure and bronchopneumonia occurred in infants; so also did the deaths in patients with heart failure and cardiac malformations. There were no

deaths amongst the children who presented with lobar pneumonia, bronchiolitis, pertussis or acute glomerulonephritis. It should be noted, however, that there were only 10 children with these conditions (Table I).

In all, 221 of the 2766 children admitted into CHER during the one-year study died, thus giving an overall mortality rate of 8%.

Discussion

There are a few differences, but several similarities, between our findings and those reported in 1977, by Jaiyesimi.³ In both reports, the prevalence of heart failure amongst children admitted into CHER was 3 per cent and anaemia and bronchopneumonia were among the commonest causes. In the previous report, 57% of the patients with heart failure were aged 2 years or below; this figure is similar to the 50% obtained in this study. However, while intrinsic heart disease accounted for about a third of the 91 patients in the present series, in only 6 (4%) of the 138 patients in the previous study was heart failure attributable solely to intrinsic cardiac disease. The difference probably reflects the growing recognition of such disorders and, consequently, increased referral to UCH. Furthermore, heart failure attributable solely to bronchopneu-

monia was much less frequent in the present series (6% than in the previous study (15%). The results of both studies indicate, however, that heart failure tends to complicate bronchopneumonia mainly in infants.

During the present study, 389 anaemic children attended the CHER: only 24 (6%) of them developed heart failure. This contrasts sharply with the previous study in which 23% of 351 anaemic children had cardiac decompensation. The mean haematocrits in the present and previous studies were 9% and 14% respectively. Thus, the difference in the prevalence of heart failure cannot be attributed to differences in the severity of anaemia. Rather, it may be due to the dissimilar study methodologies. In the present series, strict criteria for the diagnosis of heart failure were adopted and only patients confirmed to be in heart failure by at least two observers were recruited into the study. The previous study, on the other hand, was based on a retrospective analysis, the criteria for the diagnosis of heart failure were non-standardized and for this and other reasons which we have stated elsewhere,⁷ heart failure might have been over-diagnosed.

That acute bronchopneumonia constitutes one of the top three killer diseases in infants and young children is well-recognized.^{8, 9} What has not been sufficiently stressed is the aggravating role played by heart failure which, being invariably biventricular in such children irrespective of the cause, further decreases the pulmonary compliance that is already compromised, by inflammatory reaction. This leads to increased hypoxaemia which, together with the resultant increased pulmonary vascular resistance, further accentuates the heart failure, thus setting up a life-threatening vicious cy-

cle. In the present study, 7 per cent of the children with acute lower respiratory tract infections developed heart failure. A figure of 15 per cent was recorded in the 1977 study,³ while Johnson⁹ recorded an even higher percentage (44%) during his study of acute respiratory tract infections in childhood. But even the relatively low figure recorded in the present study assumes a very disconcerting proportion when it is related to the wide prevalence of acute lower respiratory infections and the high case fatality (36 per cent in this study) in children with bronchopneumonia and heart failure.

About 40% of Nigeria children with ventricular septal defect or patent ductus arteriosus, and practically and those with transposed great arteries, have cardiac failure by the time they present in hospital.¹⁰ However, the degree of failure is usually moderate, most of the patients are managed on an outpatient basis, and only the acutely ill ones get seen in the CHER. It is therefore, hardly surprising that almost half of the 17 patients with congenital heart disease and heart failure who qualified for this study, died. The mortality rates for the other disease groups were also high (25 - 47%; very much higher, in fact, than the 8% overall mortality rate for all children admitted into the unit during the present study and the 10% case fatality reported by Diakparomre and Obi in a similar study.¹¹ These figures confirm that children admitted into the CHER or similar units are usually very ill. If they are to be salvaged, both their primary diseases and the complications must be recognized and treated promptly.

References

1. Leary PM. Concept of a paediatric emergency ward for cities of a developing country. *Br. Med J* 1972; **2**: 719-22.

2. Ransome-Kuti O. The problems of paediatric emergencies in Nigeria *Nig Med J* 1972; **2**: 62-70.
3. Jaiyesimi F. Congestive cardiac failure in emergency paediatric practice. *Trop Cardiol* 1977; **3**: 9-14.
4. Baristow D and Metcalfe J. Physical sign in congestive heart failure. *Prog. Cardiovasc Dis* 1967; **10**: 236-45.
5. Goldring D, Hernandez A and Hartma AF. The critically ill child Care of the infant in cardiac failure. *Pediatrics* 1971; **47**: 1056-63.
6. Wolfe RR. Congestive heart failure. In: Kemp CH, Silver; HK and O'Brien D, eds. *Current Pediatric Diagnosis and Treatment*. Kis Atlos: Lange Medical Publications, 1982: 324-5.
7. Jaiyesimi F. Cardiac failure in children with anaemia or bronchopneumonia: problems in its clinical diagnosis and management. *Trop Cardiol* 1978; **4**: 193-18.
8. Adeyokunnu AA., Taiwo O and Antia AU. Childhood mortality among 22,255 consecutive admissions in the University College Hospital, Ibadan. *Nig. J Paediatr* 1980; **7**: 7-15.
9. Johnson WBR. Studies on acute respiratory infections in urban Nigerian children. *FWACP Dissertation* 1986.
10. Jaiyesimi F and Antina AU, Congenial heart disease in Nigerian children: a ten-year experience at UCH, Ibadan *Ann Trop Paediatr* 1981; **1**: 77-85.
11. Diakparomre MA and Obi JO. The pattern of paediatric emergencies in University of Benin Teaching Hospital. *Nig. J Paediatr* 1980; **7**: 43-5.

Accepted 19 September, 1988