

Management of Shock in Severe Acute Malnutrition at Stabilization Centre

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ABSTRACT

Objective: Early recognition and management of shock in severe acute malnutrition in children of 6 to 59 months of age.

Study Design: Descriptive / Cross sectional study

Place and Duration of Study: This study was conducted at the NSC CMC Children Hospital Larkana from October 2017 to September 2018.

Materials and Methods: 691 children of age 6 months to 59 months hospitalized with SAM (weight for height <60% of median or bilateral pedal edema or MUAC <11cm) are managed in accordance to WHO guidelines. Data based on clinical features was collected and analyzed to identify risk factors associated, disease pattern and outcome.

Results: In this study 691 admitted via triage/ER. Majority of them were of age between 12 months to 36 months. 280 children (40%) study population formed by marasmus, 102 children(14.5%) by kwashiorkor and 309 children (45.5%) by marasmus kwashiorkor. 37% of children had diarrhea, 39% had bronchopneumonia, 14% had pallor, 10% others. Most observed complications of SAM in our study were severe dehydration(12.44%), hypovolemic shock(11.86) and septic shock (8.3%). Patient with hypovolemic shock were managed with 15ml/kg ringer lactate i/v bolus followed by 10ml/kg Resomal, Patients with septic shock were managed with broad spectrum antibiotics and blood transfusions. Case fatality rate in our study was (3%).

Conclusion: children with SAM complicated by severe dehydration, hypovolemic shock and septic shock had higher risk of death. Early detection and management of complications such as shock reduce the mortality in children with SAM.

Key Words: Fluid resuscitation, Diarrhea, Severe malnutrition, Shock, Sepsis, Wasting

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INTRODUCTION

Severe acute malnutrition is defined by a very low weight for height (below -3 z scores of the median WHO growth standards), by visible severe wasting, or by the presence of nutritional oedema.¹ According to WHO, severe acute malnutrition affecting nearly about 20 million children in whole world.^{2,3} In Pakistan nutritional status of children under five is very poor.² Child Malnutrition rate in Pakistan significantly high. NNS(2011) reveals 15.1% Global Acute Malnutrition. At a national level nearly 31.5% of children <5 is underweight, 43.6% children are suffering from stunting and about 15.1% by wasting.^{2,3}

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Malnutrition is liable directly or indirectly, for 60% of the 10.9 million deaths yearly under five years children. Majority of deaths occurring within 1st year are often associated with inappropriate feeding practices. [3,4] Ten step treatment by the World Health Organization (WHO) has amended case fatality, WHO guidelines of malnutrition strictly prevent use of iv fluids, only permit the use of iv fluid resuscitation in malnutrition with advanced features of Shock^{5,6}. Intravenous Fluid is endorsed only if all of the following sign symptoms are present a weak, fast Pulse, cold peripheries, a capillary refilling time (CRT) of >3 seconds plus signs of leads consciousness (WHO malnutrition shock criteria)^{5,6}. Customarily, these findings creating a very advanced state of shock, when consequences are generally poor as considered by Paediatric life support Providers. Children who accomplishing these criteria, preferential use of low-volume hypotonic fluids (0.45% sodium content) is recommended because of malnourished children are at increased risk of developing Congestive heart failure and sodium, water overload.^{5,6,9} Current WHO guidelines indicate diarrhea is a benign, self-limiting complication⁷ and endorse oral rehydration using low-sodium rehydration solutions (ORS). Meanwhile sepsis, severe diarrhea, and hypovolemia are significant self-

determining factors of outcome in children with severe malnutrition, this may assist for studying the role of more aggressive fluid resuscitation^{7,8}.

Few studies conducted in Kenyan and African hospitals application of the same guideline has attained poorer results with >20% of death in children, poorest result with many reports of unsatisfactorily high case mortality rates^{8,9}. While in contrast to these, few studies were conducted in India which shows substantial reduction of Mortality below 10% and improved survival of malnourished children can be achieved when the WHO guidelines are followed systematically and meticulously.^{10,11} Data regarding application of WHO guidelines in severe acute malnourished children with shock in Pakistan is scarce; therefore this study was conducted from tertiary level teaching children hospital CMC Larkana as an effort to assess the operational aspects, management and outcome of Shock in Severe Acute Malnutrition of patients using WHO guidelines.

MATERIALS AND METHODS

This was Cross sectional descriptive study conducted at NSC CMC Children Hospital Larkana from October 2017 to September 2018. Total 691 children of age 6 months to 59 months hospitalized with SAM (weight for height <60% of median, ≤ 3 SD, with visible wasting or bilateral pedal edema or MUAC <11cm) were managed in accordance to WHO guidelines. Children with CNS disorder like tuberculous meningitis, static or chronic encephalopathy, Gastro-intestinal, renal, cardiac congenital defects, chronic medical disease - chronic renal failure, chronic hepatitis, a known case of HIV positive with clinical signs and symptoms were excluded. A detailed bio-data with history of the patients including name, age, sex, caste, address, religion, socio economic status was taken by oral questionnaire method. A thorough head to toe examination of the child especially assessing for nutritional status, signs of micronutrients, macronutrients, signs suggestive of respiratory distress, dehydration, electrolyte imbalance, septic shock, congestive cardiac failure, infection, any organomegaly and associated co- morbidities was done.

Management protocol

Upon arrival, the patients were screened for hypoglycemia by blood glucose measurement with a glucometer, hypothermia by temperature measurement with a low reading thermometer, signs of dehydration or shock by history of diarrhea, vomiting and unable to take anything. Recent changes in appearance/sunken eyes, skin turgor, oral mucosa, weak pulses, cold hands and feet, decreased/ no urine flow and Lethargic/unconscious (severe shock). Patients were screened for criteria for septic shock (Incipient septic shock) Limp, Apathetic, Profound anorexic, No thirsty /no restlessness (septic shock) Fast weak pulse with Hot

peripheries, Altered consciousness, Superficial vein dilated, Grunt, Signs of organ failure(late). All morbidities were managed according to WHO guidelines, like hypovolumic (mild to moderate dehydration 2-5%) management with resomal: 5ml/kg every 30min, clinically assessed after every 30 min. start f-75 milk resomal+f-75, all patient with hypovolumic shock (severe dehydration >5%) were managed by ringolact-d 15 ml/kg/hr, repeat 15ml/kg/hr if unconsciousness /pulse rate increases then resomal 10 ml/kg/hr and monitor signs of dehydration and weight gain finally resomal+f-75. [5,6]. While the patients with (incipient septic shock) was managed with broad spectrum i/v antibiotics (ceftazidime+cloxacillin) f-75 milk, developed septic shock managed with ringolact-d 15 ml/kg/hr, blood transfusion (10ml/kg 3hrs) assessed for regain consciousness, pulses good volume and f-75milk.^{6,7}

Then all the patients were started on tube feeding with starter f-75 formula, antibiotics, electrolytes and micronutrients (vitamin A, multivitamins, potassium, zinc, folic acid magnesium) were added to all as per the WHO guidelines. Regular skin and eye care were provided. Iron was started when the patient was entered the catch-up phase and free of infection.

RESULTS

Six hundred ninety-one children of Severe Acute Malnutrition age 6 months to 59 months admitted via TRIAGE, sixty out of six hundred ninety-one (8.86%) patients were suffering from shock, 45/60(75%) with hypovolumic shock secondary to dehydrating diarrhoea, 32 (71%) of these with mild to moderate dehydration were improved treatment with oral resomal and f-75milk and 15/60(25%) were with septic shock. (Table 2). The majority of children in this study were female (75%) and 25% males of total while most of children 76.4% of total from 6-12 months age group of malnutrition.

As in this study majority of patients with SAM have marasmus 95% (PEM Grade III or IV) (Pie chart). Maximum patients stayed for inpatient treatment were between 16-20 day. All the patients were kept in Nutrition Stabilization Centre and they were fed according to guidelines, play therapy was also encouraged during stay. 15.8 days was Mean duration of stay in our study. In study, most of the children were immunized for age accounting for 43.33%.

Table No.I: Showing percentage of malnutrition.

Malnutrition Type	PCM grade	Number	Percentage
Mild	I	5	8.3%
moderate malnutrition	II	31	51.6%
Marasmus	III	21	35%
Kwashiorkor	IV	3	5%
Total		60	100

Table No.2: Showing hypovolumic dehydration with shock

Type of Shock	No/ frequency	Type of treatment	Out come	
			improved	expired
Severe dehydration (shock)	13 (29%)	I/v ringolact-d fluids (15ml/kg/hr) and resomal + f-75.	Improved	
Severe dehydration (shock)	5 (11%)	I/v ringolact-d fluids(15ml/kg/hr) and resomal + f-	Expired.	
Incipient shock	0	0	0	
Septic shock	15 (25%)	Ringolact-d 15 ml/kg/hr Blood transfusion (10ml/kg 3hrs).	8(>50%)	

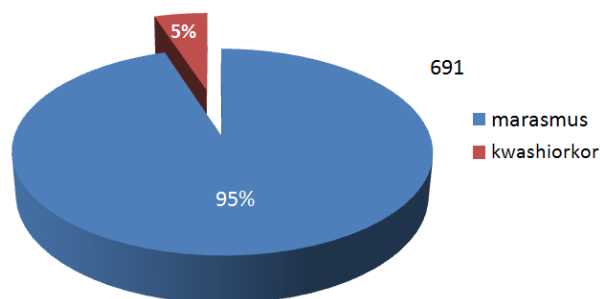


Figure No.1: Type of malnutrition

DISCUSSION

Severe acute malnutrition is preventable and treatable major cause of childhood morbidity and mortality under the 5 years of age. For the treatment of severe malnutrition with shock, systematic guidelines required, thus this study follows WHO guidelines, it has become easier to manage SAM with shock in hospital settings, with least possible stay at hospital. According to WHO guidelines^{5,6}. Careful fluid management using low dose isotonic solution (RL) was shown to be safe, with moderately better improvement of some, but not all, of the haemodynamic parameters of shock, with significant survival advantages. In this study sixty patients were enrolled malnutrition with shock, 45/60 (75%) with hypovolumic shock secondary to dehydrating diarrhoea, 32 (71%) of these with mild to moderate dehydration were improved treatment with oral resomal and f-75 milk and 15/60(25%) were with septic shock, it is comparable with study by Akech et al, he enrolled 61 cases of SAM with shock.⁹ Forty had hypovolaemic shock secondary to dehydration and 21 had septic shock. Another study by Manary MJ et al,

shows, sepsis with shock in 15-60% of children with complicated severe acute malnutrition.¹³

study by Shah RH et al. shows female 45(75%) and males 15(25%) while 76.4% of total belong 6-12 months age group and majority of patients with SAM have marasmus (PEM Grade III or IV). Maximum patients stayed for inpatient treatment were between 16-20 days. All the patients were kept in nutrition stabilization Centre and they were fed according to guidelines, play therapy was also encouraged during stay.¹¹ In our study Mean duration of stay was 15.8 days. this study shows Hypovolumic shock in 13 (29%) cases, death in Severe dehydration (shock) 5 (11%) cases and Septic shock in 15(25%) cases with death in 8 cases with severe acute malnutrition in contrast to that study by Shah RH et al. shows Hypovolumic shock in 8 (13.33%) patient with death in 1 and Septic shock in 7 (11.66 %) with death in 3¹¹, in comparison to this study, Akech et al. shows median age of children was 15 months (interquartile range; 12, 23); 48 (64%) had marasmus and 13 (21%) had oedematous malnutrition(kwashiorkor).^[9] Overall, 31/61(51%) children died because of shock, 22/41(%) by shock of dehydration (diarrhoea) and septic shock was led to death in 9/20(%), remaining were improved with meticulous management.

According to the WHO, a case fatality rate of less than 5% is considered to be (Good) acceptable in the management of severe malnutrition and less than 1% is excellent. Accounting for sphere standards, management of severe malnutrition is successful when the mortality rate is less than 10%.^{7,9,14} While in our study, the case fatality rate is 29% because of late arrival with irreversible shock and other cases shows effectiveness of WHO protocol. Following WHO guidelines is efficacious and cost effective in resource limited settings. So early discharge is possible for patients with limited complication and mortality.

CONCLUSION

As in this study we concluded children with SAM complicated by severe dehydration, hypovolumic shock and septic shock had higher risk of death because of late arrival and associated with other complication. So, their early arrival, early detection and management of complication such as shock reduces mortality and morbidity in children with severe acute malnutrition and who have given good way of management for severely malnourished children with shock particularly in early stage. it is actually a base line study; in future it requires comparative study with standard management of normal children.

Author's Contribution:

Concept & Design of Study: Shankar Lal
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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