

Comparative Study of Efficacy of ORS with Paedicare (Ready to Use Solution) in Gastroenteritis in Children

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ABSTRACT

Objective: To compare the efficacy of ORS with paedicare (Woodward's England, ready to use solution) as oral rehydration therapy in children up to 10 years of age.

Study Design: Randomized clinical trial.

Place and Duration of Study: This study was conducted in Women Medical College affiliated teaching hospital in Abbottabad from 1 April 2014 to 1 October 2014.

Materials and Methods: A sample of 100 patients suffering from dehydration was subjected to therapy. 50 of them were given ORS and 50 were given Paedicare (a ready to use oral electrolyte solution). The patients were kept under observation and results were noted.

Results: out of the children treated with ORS 42 were successfully rehydrated within two days and 8 children took one week to recover while those treated with Paedicare 48 were rehydrated within two days and 2 children took one week to recover. Those children requiring more than two days recovering had associated illnesses like upper respiratory tract infection, otitis media and measles.

Conclusion: Both ORS and Paedicare were effective in treating rehydration, Paedicare seem to be more hygienic, well constituted and had better results but ORS was less costly than Paedicare and has an edge over Paedicare especially among poor people.

Key Words: ORS, paedicare, oral rehydration therapy, dehydration.

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INTRODUCTION

In third world countries in general and Pakistan in particular acute gastroenteritis leading to dehydration is a common cause of morbidity and mortality especially in the less privileged class¹. Oral rehydration therapy (ORT)^{2,3} is recommended by World Health Organization as first-line therapy for mild to moderate dehydration.^{4,5}

Acute diarrheal illnesses now ranks 2nd to acute respiratory illness, used to be 1st in the past, is responsible for killing around 760 000 children every year⁶. Diarrhoea can last several days, and can leave the body without the water and salts that are necessary for survival. Most people who die from diarrhea actually die from severe dehydration and fluid loss⁷. Children who are malnourished or have impaired immunity or people living with HIV are most at risk of life-threatening diarrhoea.

Diarrhea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual).⁸ Frequent passing of formed stools is not diarrhea, nor is the passing of

loose, "pasty" stools by breastfed babies. Diarrhoea is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral and parasitic organisms. Infection is spread through contaminated food or drinking-water, or from person-to-person as a result of poor hygiene⁹.

Interventions to prevent diarrhoea, including safe drinking-water, use of improved sanitation and hand washing with soap can reduce disease risk. Since most of diarrheal death are caused by dehydration,¹⁰, the importance of oral rehydration has been recognized and many types of oral rehydration solutions have been proposed^{11,12,13}.

There are many inherent benefits of ORT that make it a desirable therapy¹⁴. Patients can be treated successfully with ORT and do not require intravenous access^{15,16}, a painful and difficult procedure in young children. Furthermore, parents who learn to administer ORT correctly acquire a skill that can be used at home for ongoing and future illnesses^{17,18}.

The optimum composition and concentration of ingredients are still debated, two of these preparation ORS and paedicare (Woodward's ready to use oral electrolyte solution) are easily available in market that differ in composition and cost^{19,20}.

The composition of formulation of ORS and Paedicare are shown in the Table 1 and 2.^{21,22}

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Table No.1: Formulation of ORS

Reduced osmolrity ORS	Grams/L	Reduced osmolality ORS	Mmol/L
Sodium Chloride	2.6	Sodium	75
Potassium Chloride	1.5	Potassium	20
Glucose anhydrous	13.5	Chloride	65
Trisodium citrate dehydrate	2.9	Glucose anhydrous	75
		Citrate	10
		Total Osmolarity	245

Table No.2: Composition of Paedicare

Paedicare 500ml contains	
• Sodium chloride -----	1.75gm
• Potassium Chloride -----	0.75gm
• Glucose Anhydrous -----	10gm
• Trisodium Citrate Dihydrate -----	1.45gm

MATERIALS AND METHODS

The study was conducted in Women Medical College affiliated teaching hospital Abbottabad, among patient (children) with gastroenteritis having dehydration during time period from 1st April to 1st October 2014. Acute gastroenteritis cases are at peak in summer. One hundred children with age up to 10 years were selected and subjected to study. Patients were randomized to 1 of 2 treatment groups (ORT or Paedicare) and rehydrated. Data was collected and analyzed.

After recording history, physical examination and initial investigation which included CBC, blood urea and electrolytes, routine urea and stool examination were done. Culture and sensitivity and other investigations were done if indicated.

Blood urea and electrolytes were done periodically till electrolytes were normal. Dehydration up to 5% was classified as mild, 5% to 10% moderate and more than 10% was classified as severe.

Rehydration of 50 children was done with ORS 50ml/kg for mild dehydration 75ml/kg for moderate and 100ml/kg for severe over a period of 4 - 6 hours and continued if needed for 12-18hours. The other 50 children were given paedicare in the same regime.

After initial rehydration children were allowed to have breast feed or diluted formula foods or soft diet based on previous diet. Maintenance fluid was calculated according to age and weight and supplementary ORS/paedicare given 10ml/kg after each loose motion. Antidiarrheal was not used routinely and antibiotic were given in indicated cases. Children with prolonged diarrhea were given lactose free (ALII), protein free (ISOMilk) diet. Children were discharged as soon as

they recovered but malnourished children were kept for feeding for gaining weight.

RESULTS

Out of 50 patients who were given ORS, 42 were successfully rehydrated with ORS alone, 8 were given I.V. Dextrose saline for less than 12 hours since vomiting prevented from having ORS and (probably rushed to I.V fluids).42 of these patients recovered in two days while 8 of them took one week.

Out of the other 50 patients who were given paedicare, 2 needed I.V fluids because of the same reason. Out of which 48 patients recovered in 2 days and 2 needed one week.

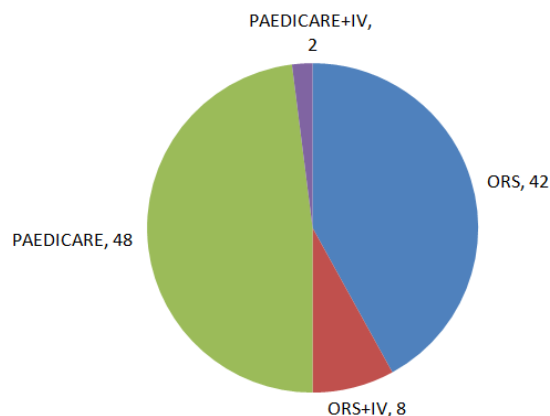
Overall 15% required special milk. Those who needed one week to recover were associated with upper respiratory tract infection, otitis media and measles. The results are shown in table 3 and 4 and pie chart.

Table No. 3: Electrolyte and Urea levels in patients rehydrated with ORS

	Initial	6 hours	24 hours
Na	132.42meq/L	137.15meq/L	137.66meq/L
K	3.36meq/L	4.18meq/L	4.27meq/L
Bicarbonate	17.43mmol/L	18.20mmol/L	19.12mmol/L
Cl	96.36meq/L	100.10meq/L	100.94meq/L
Urea	18.12mg/dl	16.55mg/dl	9.24mg/dl

Table No.4: Electrolyte and Urea levels in patients rehydrated with PAEDICARE

	Initial	6 hours	24 hours
Na	134.02meq/L	135.99meq/L	136.21meq/L
K	3.4meq/L	4.8mq/L	5.1meq/L
Bicarbonate	16.21mmol/L	17.89mmol/	19.57mmol/L
Cl	97.41meq/L	99.12meq/L	101.76meq/L
Urea	22.4mg/dl	19.21mg/dl	13.62mg/dl

**Pie Chart No.1: Regime of Rehydration**

DISCUSSION

The study revealed that both ORS and paedicare were effective as rehydration solution, serum sodium level were within normal range after rehydration with either solution, although ORS contains more sodium than paedicare.^{23,24} Potassium was also within normal range after rehydration; both solutions contain same concentration of potassium. The results also showed that urea level which was raised came to normal within twenty four hours. The patients that were breastfed recovered earlier than bottle fed patients. Children on solid food also had a good recovery. Older children responded well to the rehydration therapy than younger children. Those dehydrated patients who had associated diseases showed a delayed recovery²⁵. Underweight children needed a longer time to recover than children with normal weight. The socioeconomic status of the parents also had a favorable effect on recovery. The coordination in rehydration therapy between health care persons and educated mothers was more fruitful than non educated. It took longer time to educate these mothers regarding the formulation and making solution of ORS. Personal hygiene like hand washing, the use of boiled water remains the key to success. As paedicare was a ready to use solution so it was far more easier for the mothers to administer. Initially 18 children out of 100 vomited but later on vomiting subsided on continuation of the fluids. Flavor of rehydration solution may be a contributing factor in vomiting. The follow up was uneventful and satisfactory for most of the children but it took longer time for patients with associated illnesses. Vitamin supplements were advised to the patients which were kept on antibiotic. Additional zinc supplements are having a favorable effects on the course of the disease²⁶. Some patients had acidosis which was efficiently corrected by both ORS and Paedicare. During treatment the costs of both solutions were also kept under consideration and it was noted that although both rehydration solutions were effective in treating dehydration and acidosis, but paedicare was more hygienic with a success rate of 96 percent while that of ORS is 84 percent and its composition was more better than ORS, but the cost of paedicare was higher than standard ORS solution which made ORS the preferred choice of rehydration therapy by poor people.^{27,28}

CONCLUSION

Gastroenteritis, the most common illness in children is preventable and curable. The cause of death is dehydration and salt imbalance. The introduction of ORS has revolutionized the treatment. In this study rehydration therapy by ORS and paedicare were compared. According to the results of this study, paedicare (ready to use solution) a well constituted and

more hygienic, but treatment with ORS was more affordable by poor people.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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