Rapid Intravenous Rehydration to Correct Dehydration and Resolve Vomiting in Children with Acute Gastroenteritis

Akut Gastroenteritli Çocuklarda Dehidratasyonu Düzeltmek ve Kusmayı Geçirmek için Hızlı intravenöz Rehidrasyon

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SUMMARY

Objectives

The objective of this study is to evaluate the effect of rapid intravenous rehydration to resolve vomiting in children with acute gastroenteritis.

Methods

This randomized control trial was conducted in the pediatric emergency department in a tertiary care center in Tabriz, North-West of Iran. The study participants' were 150 children with acute gastroenteritis and vomiting who were moderately dehydrated, had not responded to oral rehydration therapy and without any electrolyte abnormalities. 20-30 cc/kg of a crystalloid solution was given intravenously over 2 hours and the control group was admitted in the emergency department (ED) for a standard 24 hour hydration. Effectiveness of rapid intravenous rehydration in the resolution of vomiting in children with acute gastroenteritis was evaluated.

Results

In 63 children of the intervention group (out of 75) vomiting was resolved after rapid IV rehydration and they were discharged. Among them, 12 that did not tolerate oral fluids were admitted. In the control group, 62 patients' vomiting was resolved in the first 4 hours after admission, and there was no significant difference between the two groups regarding resolution of vomiting.

Conclusions

Rapid intravenous rehydration in children with moderate dehydration and vomiting due to gastroenteritis is effective in reducing admission rates in the ED.

Key words: Emergency department; gastroenteritis; rehydration; vomiting.

ÖZET

Amaç

Bu çalışmanın amacı, akut gastroenteritli çocuklarda, hızlı intravenöz rehidratasyon tedavisinin kusma üzerine etkisini değerlendirmektir.

Gereç ve Yöntem

Bu randomize kontrollü çalışma İran'ın Kuzeybatısındaki Tebriz ilinde üçüncü basamak çocuk acil servisinde gerçekleştirildi. Çalışmaya orta derecede dehidrate, elektrolit anormalliği olmayan ve oral rehidrasyon tedavisine yanıt vermemiş akut gastroenteritli 150 çocuk katıldı. İki saat içinde intravenöz yolla 20-30 cc/kg kristaloid çözelti verildi ve kontrol grubu standart 24 saatlik hidrasyon için acil servise alındı. Akut gastroenteritli çocuklarda, hızlı intravenöz rehidratasyon tedavisinin kusma üzerine etkisi değerlendirildi.

Bulgular

Müdahale grubundaki 75 çocuğun 63'ünde hızlı IV rehidrasyondan sonra kusma geçti ve hastalar taburcu edildi. Bu çocukların 12'si oral sıvıları tolere edemedikleri için hastaneye kabul edildi. Kontrol grubunda 62 hastanın kusması hastaneye kabulden sonraki ilk 4 saat içinde geçmiş olup, iki grup arasında kusmanın geçmiş olması açısından herhangi bir anlamlı farklılık yoktu.

Sonuç

Gastroenterite bağlı orta derecede dehidratasyon ve kusması olan çocuklarda hızlı intravenöz rehidrasyon acil servisten yatış oranlarını azaltmada etkilidir.

Anahtar sözcükler: *Acil servis; gastroenterit; rehidrasyon; kusma.*

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Introduction

Acute gastroenteritis is the most common cause of dehydration in children and represents one of the most common conditions in pediatric emergency departments.[1,2] Oral rehydration is appropriate for most children, but intravenous rehydration is the treatment of choice for severe dehydration and in cases of failure of oral rehydration therapy.[3] Given the high incidence of acute gastroenteritis in children, this can lead to overcrowding in emergency departments.[4] The most appropriate method of intravenous rehydration is still under investigation. The volume and rate of administration of intravenous fluids are the focal point of many discussions. Slow restoration regimens and rapid rehydration regimens have both been used by clinicians treating dehydrated children.[5,6] Rapid rehydration regimens might have the potential benefits of achieving earlier rehydration and reduction in length of hospital stay and costs.[7]

Considering the large incidence of acute gastroenteritis in our country, we carried out this study to evaluate the effectiveness of the rapid intravenous rehydration on the resolution of vomiting and correction of dehydration in moderately dehydrated children with acute gastroenteritis in whom oral rehydration therapy had failed and were therefore candidates for intravenous rehydration therapy.

Materials and Methods

Settings

A randomized control trial was conducted in the emergency department of Tabriz children's hospital, North-West of Iran.

Participants

The study population consisted of 150 children with moderate dehydration or vomiting due to gastroenteritis who had not responded to oral rehydration therapy. 565 children were referred to the hospital with the diagnosis of acute gastroenteritis during the study period. We excluded children with severe dehydration, shock and hypotension, electrolyte abnormalities, those who were not dehydrated or were mildly dehydrated. Parents signed informed consent before entry into the study and the study was approved by the medical ethics committee of the Tabriz University of Medical Sciences prior to entrance into the study.

Enrollment and Intervention

Eligible patients were children with moderate dehydration or vomiting due to gastroenteritis who had not responded to an oral rehydration therapy. They were randomly assigned to each of the study groups: rapid intravenous rehydration or standard 24 hour intravenous therapy. They were allocated in a 1:1 ratio for each group. Nine patients in the intervention group were excluded from the study due to electrolyte abnormalities. In the intervention group, 54 patients received metoclopramide prior to admission and 49 patients in the control group received metoclopramide as well; this was not significantly different between two groups (p=0.7).

The intervention group received 20-30 cc/kg of a crystalloid solution over 2 hours. Four hours after the initiation of IV therapy, the patients were visited by the attending physician at which time they were discharged or admitted.

Table 1. Patients' characteristics in intervention and control groups

	Intervention group	Control group	p
Population	75	75	–
Age (year)	2.73±2.53	2.1±1.74	0.07
Sex (female)	27 F	31 F	0.33
Weight (kg)	12.27±5.6	11.48±4.22	0.11

Table 2. Patients' outcomes in intervention and control groups

Outcomes	Intervention group		Control group		p
	n	%	n	%	
Stop vomiting after 4 hours	63	84	62	82	>0.05
Persistent vomiting	2	3			>0.05