A STUDY OF OPTIMUM DURATION OF ADMINISTRATION OF FIRST FLUID BOLUS IN PEDIATRIC SEPTIC SHOCK

Ahmed Ahmed El-Nawawy, Azza A. Moustafa , Hadir M. Hassouna, Aliaa T.salem

Department of Pediatric, Faculty of Medicine, Alexandria University

Introduction

Sepsis, a syndrome caused by infection, is a significant public health concern. According to the World Health Organization, infectious diseases account for more than 60% of mortality among children under the age of five worldwide. Sepsis is a potentially catastrophic multiorgan failure caused by the body's dysregulated reaction to an infectious infection. Despite various efforts, severe sepsis and septic shock continue to be the leading cause of death from infection in children. It is projected that infectious illnesses killed more than 4 million children under the age of five in 2013, with severe sepsis and septic shock accounting for the great majority of those deaths. At Alexandria University's Pediatric Intensive Care Unit (PICU), 42% of patients with septic shock died.

Current guidelines advocate aggressive fluid resuscitation of up to 60 mL/kg boluses of 20 mL/kg each over 5–10 minutes to achieve the desired heart rate and blood pressure. Researchers have begun questioning the basics of fluid resuscitation including the need for and duration of administration of boluses. Different studies have reported varying duration of administration of the three boluses ranged from 60 to 90 minutes. there is paucity of evidence on the optimal duration of administration of fluid boluses in the first hour of fluid resuscitation.

Objectives

This study is designed to compare the effect of duration of first bolus administration over 10 minutes versus 20 minutes on the advanced hemodynamic variables in pediatric septic shock patients in the pediatric intensive care unit (PICU) of Alexandria University .

Methods

This Randomized controlled trial (RCT) was conducted on 40 patients with septic shock according to criteria of The International Pediatric Sepsis Consensus Conference , the patients were randomly assigned into two groups (10 mins group and 20 mins group) both groups will receive fluid bolus 20 ml/kg, in 10 mins group fluid bolus will be given over 10 mins by infusion pump , in 20 mins group fluid bolus will be given over 20 mins by infusion pump.

Transthoracic echocardiography before and after fluid bolus, after 1h,6h and after 24 hours of resuscitation to assess cardiac index (CI), stroke index (SI) and systemic vascular resistance index (SVRI).

Results

The 2 studied groups were compared to each other as regards to CI before after fluid bolus, our study yield significant increase in CI in 10 mins group after fluid bolus with p value 0.041.also both groups were compared as regards SI before and after fluid bolus ,we found significant increase in SI after fluid bolus with p value 0.017. We found also significant decrease in Length of PICU stay in 10 mins group with P value 0.024.

Table (1): Comparison between the two studied groups as regards to CI and SI before and after fluid bolus

	10mins group (n=20)	20mins group (n=20)	Test of significance	P value
CI(L/min/m2) At 0 point	3.23 ± 1.0	2.55 ± 1.03	t=2.120	0.041
After fluid bolus	3.73 ± 1.18	2.96 ± 1.14	t=2.114	0.041
SI (ml/m2) At 0 point	19.0 (15.35 –27.45)	15.35 (13.0 –22.40)	U=159.50	0.27
After fluid bolus	25.50 (19.75 –31.30)	16.50 (14.10 – 25.35)	U=112.50	0.017

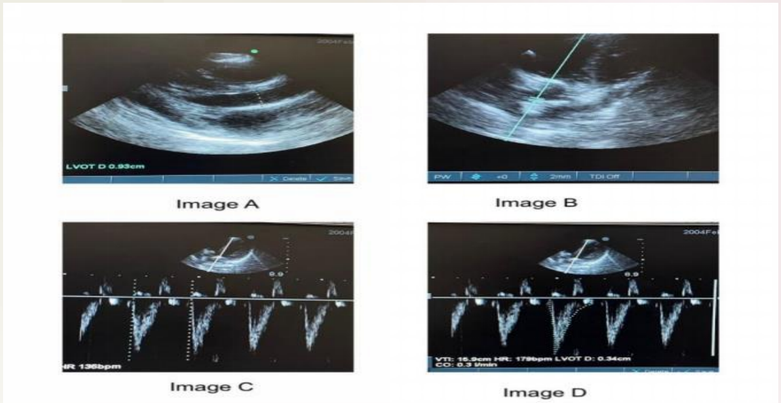

Fig (1): Cardiac output (COP) measurement by Echocardiography (CI=COP/BMI)

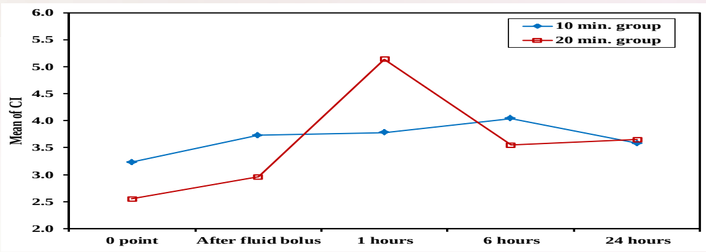

Fig (2): Comparison of cardiac index in the two studied groups in the first 24 hours.

Conclusion

Our results suggests that there is no significant difference regarding mortality and other variables between 10 mins group and 20 mins group. Since there is paucity of literature regrading fluid bolus rate and its effect on mortality and other variables, we recommend to do many trials to address this issue.