CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187
http://doi.org/10.5281/zenodo.4437140

Avalable online at: http://www.iajps.com *Research Article*

ANALYSIS OF FLUID RESUSCITATION IN TRAUMA

Dr Rabia Humayun[1], Dr Summiaya Ehsan[2], Dr Ammad Ishtiaq[3]
[1]Central Park Medical College, [2]Rawalpindi Medical College, Rawalpindi, [3]Faisalabad Medical University.

Article Received: November 2020 **Accepted:** December 2020 **Published:** January 2021

Abstract:
In the United States, trauma is the leading cause of death for persons between the ages of 1 and 44 years and the fifth leading cause of death overall. Globally, over 5 million people die of injuries each year, accounting for 9% of the world's deaths. The main objective of the study is to analyse the fluid resuscitation in trauma patients. This review analysis was conducted in Central Park Medical College during June 2019 to December 2019. Critics of aggressive fluid resuscitation cite the abovementioned complications, while those skeptic of hypotensive resuscitation are concerned with the potential harmful effects of decreased oxygen delivery to the various tissues of the body, which could result in inadequate perfusion and subsequent organ failure. Fluids are drugs and should be managed as such. Appropriate early fluid resuscitation in trauma patients is a challenging task. Care should be taken in selecting both the type and volume to promote appropriate perfusion and oxygen delivery, avoiding the adverse effects seen when giving too little or too much.

Corresponding author:
Dr. Rabia Humayun,
Central Park Medical College.

QR code

Please cite this article in press Rabia Humayun et al, ***Analysis Of Fluid Resuscitation In Traum.,*** *Indo Am. J. P. Sci, 2021; 08(1).*

INTRODUCTION:

In the United States, trauma is the leading cause of death for persons between the ages of 1 and 44 years and the fifth leading cause of death overall. Globally, over 5 million people die of injuries each year, accounting for 9% of the world's deaths. Hemorrhagic shock is a principal cause of death among trauma patients accounting for approximately 30–40% of deaths within the first 24 hours after injury. Vascular disruption, blood pressure, volume resuscitation, and the time between injury and hemostasis are all factors that contribute to the magnitude of haemorrhage [1].

Over the past 30 years, there has been a renewed interest in research focusing on the optimal resuscitation strategies for trauma patients, specifically those with uncontrolled hemorrhage, in hopes of decreasing mortality from hemorrhagic shock. This review focuses on hypotensive resuscitation, also called permissive hypotension. Traumatic injuries account for nearly 10% of the global burden of disease [2]. The major cause of potentially preventable death among injured patients is uncontrolled post-traumatic hemorrhage [3]. In trauma patients, fluid resuscitation helps restore lost blood volume, regain tissue perfusion, and reduce mortality.

Fluid resuscitation of trauma patients has been an ongoing challenge, constantly reviewed and debated, resulting in recommendations changing for the use of crystalloids/colloids/packed red blood cells/warm fresh whole blood and clotting factors. Other challenges, such as limited resources, impact the practitioners' choice of fluid the best fluid available does not always equate to the best fluid for the patient, especially where long transfers and no blood availability are concerned [4]. These decisions and management strategies appear relevant for further discussion and research, as this fluid resuscitation attempts to provide adequate organ perfusion and oxygen delivery in a system compromised by the physiological consequences of injury [5].

Objectives:

The main objective of the study is to analyse the fluid resuscitation in trauma patients.

MATERIAL AND METHODS:

This review analysis was conducted in Central Park Medical College during June 2019 to December 2019.

Aggressive versus Hypotensive Fluid Administration:

Critics of aggressive fluid resuscitation cite the abovementioned complications, while those skeptic of hypotensive resuscitation are concerned with the potential harmful effects of decreased oxygen delivery to the various tissues of the body, which could result in inadequate perfusion and subsequent organ failure. Since the early 1990s, a handful of randomized controlled trials have been conducted in trauma patients either in the pre hospital or in-hospital and intraoperative setting [6].

Clear fluid resuscitation:

The ongoing debate as to which group of fluid (synthetic colloid or crystalloid solutions) is best to use in the resuscitation phase of trauma patients remains unanswered with large studies showing little, if any benefit of hydroxyethyl starch 130/0.4 over the traditionally used crystalloids. The CRISTAL trial did identify a potential mortality benefit in a heterogeneous hypovolemic patient cohort resuscitated with a variety of colloid solutions compared to crystalloid solutions. However, several limitations identified by the authors limits applicability: the lack of renal injury and potential 90-day outcome benefit, deserve further research [7]. When reviewing the available literature, in several trials recruitment and consent requirements resulted in the comparison of fluids commencing after the initial resuscitation phase, resulting in interpretation difficulties of outcome benefit in trauma patients [8]. These studies do, however, demonstrate a trend toward less synthetic colloid fluid required to achieve hemodynamic goals compared to crystalloids with a ratio (volume of colloid to crystalloid that results in similar physiological effects) varying between 1:1.1 and 1:1.6.

As defined by the Advanced Trauma Life Support course, classification of patients into those that respond to initial fluid resuscitation versus those that only transiently respond or do not respond at all is important [9]. The response to intravenous fluid resuscitation is assessed using physiological markers of improvement such as blood pressure, heart rate, decreasing lactate and normalizing base deficit with adequate control of bleeding. Responders are considered those that demonstrate these physiological improvements, whereas transient responders show an initial improvement followed by further physiological deterioration. Non-responders are those that show continued physiological deterioration despite initial fluid resuscitation. The distinction requires vigilance and repeated clinical assessments to identify those patients with re-bleeding, or ongoing bleeding, and initiation of blood product resuscitation together with

surgical intervention. What may be regarded as acceptable physiological parameters will vary depending on many factors including the age, underlying medication and comorbidities of the patient [10].

Maintenance fluid

In providing maintenance fluids, care should be taken to avoid causing tissue edema. This requires limitation of crystalloid administration, which can only really be achieved in the post-resuscitation period. Crystalloid fluid administration is not without hazards. Excessive crystalloid administration is associated with edema of skin, abdominal organs (leading to abdominal compartment syndrome), kidneys (leading to renal compartment syndrome, contributing to acute renal failure) and heart (leading to myocardial dysfunction) [11]. The ideal concept would be to use a strategy where the fluid stays intravascular and expands this compartment for longer. However, the design of the recent large studies involving HES showed that ongoing use of these fluids in critically ill patients, beyond initial resuscitation (even in the trauma subgroup analysis), was without benefit and may increase the need for renal replacement therapy [12].

CONCLUSION:

Fluids are drugs and should be managed as such. Appropriate early fluid resuscitation in trauma patients is a challenging task. Care should be taken in selecting both the type and volume to promote appropriate perfusion and oxygen delivery, avoiding the adverse effects seen when giving too little or too much. Ongoing fluid strategies following resuscitation should incorporate dynamic markers of volume status whenever possible. All aspects of fluid administration should be incorporated into daily fluid plans, including feeding and infusions of medications. A sound knowledge of the differences and physiological consequences of specific trauma groups is essential for all practitioners delivering care for trauma patients.

REFERENCES:

1. Perner A, Nicolai H, Guttormson A, et al. Hydroxyethyl starch 130/0.42 versus Ringer's acetate in severe sepsis. N Engl J Med. 2012;367:124–134.
2. Raiman M, Mitchell C, Biccard B, et al. Comparison of hydroxyethyl starch colloids with crystalloids for surgical patients: a systematic review and meta-analysis. Eur J Anaesthesiol. 2016;33(42–4):8.
3. Annane D, Siami S, Jaber S, et al. Effects of fluid resuscitation with colloids vs crystalloids on mortality in critically ill patients presenting with hypovolaemic shock. The CRISTAL randomized trial. JAMA. 2013;310(1809–181):7.
4. Chappell D, Jacob M. Hydroxyethyl starch—the importance of being earnest. Scand J Trauma Resusc Emerg Med. 2013;21:1–4.
5. Chappell D, Jacob M. Twisting and ignoring facts on hydroxyethyl starch is not very helpful. Scand J Trauma Resusc Emerg Med. 2013;21:1–3. doi: 10.1186/1757-7241-21-1.
6. Coppola S, Froio S, Chiumello D. Fluid resuscitation in trauma patients: what should we know? Curr Opin Crit Care. 2014;20:444–450.
7. Doig G, Heighes P, Simpson F, et al. Early enteral nutrition reduces mortality in trauma patients requiring intensive care: a meta-analysis of randomised controlled trials. Injury. 2011;42(50–5):6.
8. Guidet B, Martinet O, Boulain T, et al. Assessment of hemodynamic efficacy and safety of 6% hydroxyethylstarch 130/0.4 vs 0.9% NaCl fluid replacement in patients with severe sepsis: the CRYSTMAS study. Crit Care. 2012;16(3):R94.
9. Krajewski M, Raghunathan K, Paluszkiewicz S, et al. Meta-analysis of high- versus low-chloride content in perioperative and critical care fluid resuscitation. Br J Surg. 2015;102:24–36.
10. Ince C, Groeneveld A. The case for 0.9% NaCl: is the undefendable, defensible? Kidney Int. 2014;86:1087–1095.
11. Lira A, Pinsky M. Choices in fluid type and volume during resuscitation: impact on patient outcomes. Ann Intensive Care. 2014;4:38.
12. Martini W, Cortez D, Dubick M. Comparisons of normal saline and lactated Ringer's resuscitation on hemodynamics, metabolic responses, and coagulation in pigs after severe hemorrhagic shock. Scand J Trauma Resusc Emerg Med. 2013;21:86.
13. Hafizah M, Liu C, Ooi J (2015) Normal saline versus balanced-salt solution as intravenous fluid therapy during neurosurgery: effects on acid-base balance and electrolytes. J Neurosurg Sci.