OPEN ACCESS Freely available online

ADVANCES IN PEDIATRIC RESEARCH

Future evolution of intraoperative goal directed fluid and hemodynamic therapy in children

Claudine Kumba *

https://orcid.org/0000-0002-9748-5141

Department of Pediatric Anesthesia and Critical Care, Necker Enfants Malades University Hospital, Paris Descartes University, Paris, France

Abstract

Background: Recently a systematic review and meta-analysis was conducted to determine the impact of intraoperative goal directed fluid and hemodynamic therapy (GDFHT) in children and postoperative outcome. This study is part of a vast and extended Thesis Project concerning the impact of Goal Directed therapies on postoperative outcome in the pediatric population. This systematic review and meta-analysis of 23 randomized and non randomized controlled trials in 3389 children, of which more than 90% of the studies (21 among the 23 studies) concerned pediatric cardiac surgical patients, revealed that trials where GDFHT aiming to determine the impact on postoperative outcome in children were not developed compared to what has been realized in adults. However this trial showed that a lot of studies concerning hemodynamic monitoring in children were prospective, retrospective, observational and non interventional. These studies demonstrated the existence of parameters or biomarkers of adverse postoperative outcome in pediatric cardiac surgical patients. Namely cerebral, renal, splanchnic regional oxygen saturation, serum lactate levels, mixed central venous oxygen saturation and arterial to venous carbon dioxide difference. Systematic reviews and meta-analysis with high level evidence studies can help to elaborate recommendations for improvement implementation programs for clinical practice.

Objective of this Editorial: To analyze the results, conclusions and future perspective of this recent systematic review and meta-analysis of the impact of intraoperative GDFHT on postoperative outcome in children.

Methods: Editorial concerning the recent systemetic review and meta-analysis of the impact of intraoperative GDFHT on postoperative outcome in children.

Results and Conclusion: This systematic review and meta-analysis of 23 non randomized and randomized controlled trials (RCT) evidenced that randomized controlled trials concerning the impact on perioperative GDFHT on postoperative outcome in children are lacking. Secondly, unoptimal intraoperative parameters mentioned above were predictors of adverse postoperative outcome in pediatric cardiac surgical patients. Finally RCT using these parameters in GDFHT protocols should be developed to clarify the influence of this therapy on postoperative outcome in children in cardiac and non cardiac surgical pediatric populations. In the present time there are no answers concerning the effect of intraoperative GDFHT on postoperative outcome in children. Thus research in this field is highly recommended.

Citation: Kumba C (2019) Future evolution of intraoperative goal directed fluid and hemodynamic therapy in Children. Adv Pediatr Res 6:29. doi: 10.35248/2385-4529.19.6.29

Received: September 17, 2019; **Accepted:** September 21, 2019; **Published:** September 27, 2019

Competing interests: The authors do not have any competing interests.

Sources of funding: There is no funding for this article.

*E-mail: claudine.kumba@gmail.com

ADVANCES IN PEDIATRIC RESEARCH

Editorial

The purpose of systematic reviews and meta-analyses is to find an anwser to a particular question which can help to improve clinical practices [1]. The ideal systematic review and meta-analyses include well conducted randomized controlled trials. Evidence based on these studies can guide strong recommendations which can be used to treat patients. In pediatrics and neonatology randomized controlled studies are not always easy to realize for several reasons like the number of patients required. A lot of trials in this population are prospective, observational and retrospective. The recent systematic review and meta-analysis on GDFHT in children [2] is part of a vast and extended Thesis Project concerning the impact of Goal Directed therapies on postoperative outcome in the pediatric population [3-9].

This systematic review and meta-analysis which concerned 23 non randomized and randomized trials in 3389 children mostly in pediatric cardiac surgery did not determine whether or not intraoperative GDFHT impacted on postoperative outcome in children because RCT analyzing the impact of this therapy on outcomes are lacking.

However, this study revealed important evidence concerning the existence of parameters or biomarkers of adverse postoperative outcome in pediatric cardiac patients. Suboptimal intraoperative values of regional cerebral, renal, splanchnic oxygenation saturation, mixed venous oxygen saturation, serum lactate levels, arterial to venous carbon dioxide difference were predictors of adverse postoperative outcome namely mortality, organ dysfunction and length of hospital stay (LOS). Although the evidence of this study was low because of the studies design included, nevertheless the information extracted from this review is of high importance because it will guide the direction of future studies to clarify this issue. Even if in adults evidence has been shown concerning the importance of GDFHT, the impact of this therapy in children is not obvious or intuitive because children differ from adults in terms of physiology and physiopathology especially at the extreme ages of life.

That is why it is of paramount interest to develop this field of research. RCT concerning the impact of intraoperative GDFHT on postoperative outcome in children are to be developed to clarify this issue in children.

References

1. Rudnicka AR, Owen CG. An introduction to systematic reviews and meta-analysis in health care. Ophtalmic Physiol Opt. 2012;32:174-183.
2. Kumba C, Willems A, Querciagrossa S, Harte C, Blanc T, De Cock A, et al. A systematic review and meta-analysis of intraoperative goal directed fluid and haemodynamic therapy in children and postoperative outcome [CRD42018103119]. J Emerg Med Critical Care. 2019;5(1):9.
3. Kumba C, Mélot C. The era of goal directed therapies in paediatric anaesthesia and critical care". EC Emergency Medicine and Critical Care. 2019;3(5):306-309.
4. Kumba C. 'Do goal directed therapies improve postoperative outcome in children? (Perioperative goal directed fluid and hemodynamic therapy; Transfusion goal directed therapy using viscoelastic methods and enhanced recovery after surgery and postoperative outcome): A study research protocol'. Acta Scientific Paediatrics. 2019;2(7):17-19.
5. Kumba C, Cresci F, Picard C, Thiry C, Albinni S, Orliaguet G. Transfusion and morbi-mortality factors: An observational descriptive retrospective pediatric cohort study. J Anesth Crit Care Open Access. 2017;8(4):00315.
6. Kumba C, Querciagrossa S, Blanc T, Tréluyer JM. Transfusion and postoperative outcome in pediatric abdominal surgery. J Clin Res Anesthesiol. 2018;1(1):1-8.
7. Kumba C, Lenoire A, Cairet P, Dogaru-Dedieu E, Belloni I, Orliaguet G. Is transfusion an independent risk factor of postoperative outcome in pediatric orthopedic surgical patients ? A retrospective study. J Emerg Med Critical Care. 2018;4(2):7.
8. Kumba C, Taright H, Terzi E, Télion C, Beccaria K, Paternoster G, et al. Blood product transfusion and postoperative outcome in pediatric neurosurgical patients.EC Anaesthesia. 2018;4(8):288-298.
9. Kumba C. A retrospective descriptive cohort study of preoperative, intraoperative and postoperative management of children in scoliosis surgery. EC Anaesthesia. 2019;5(2):20-29.