

Priming in Cardiopulmonary Bypass: Effects on Perioperative Hematocrit Profiles in Mannitol vs. Non-Mannitol Groups

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Introduction

The use of Mannitol in adult cardiac surgery with cardiopulmonary bypass (CPB) is **not recommended** to reduce postoperative acute kidney injury¹. Its effect on hematocrit management due to its diuretic effect remains unclear. This study aims to compare the **perioperative longitudinal profile of hematocrit** and evaluate its **impact on transfusions**, according to the use of **Mannitol in priming**.

Materials & Methods

Retrospective, Single-center, Jan 2018 – October 2021
N = 757

Priming with Mannitol
n = 328

Priming without Mannitol
n = 429

Primary outcome: Evaluate the longitudinal profile of hematocrit between the two groups.

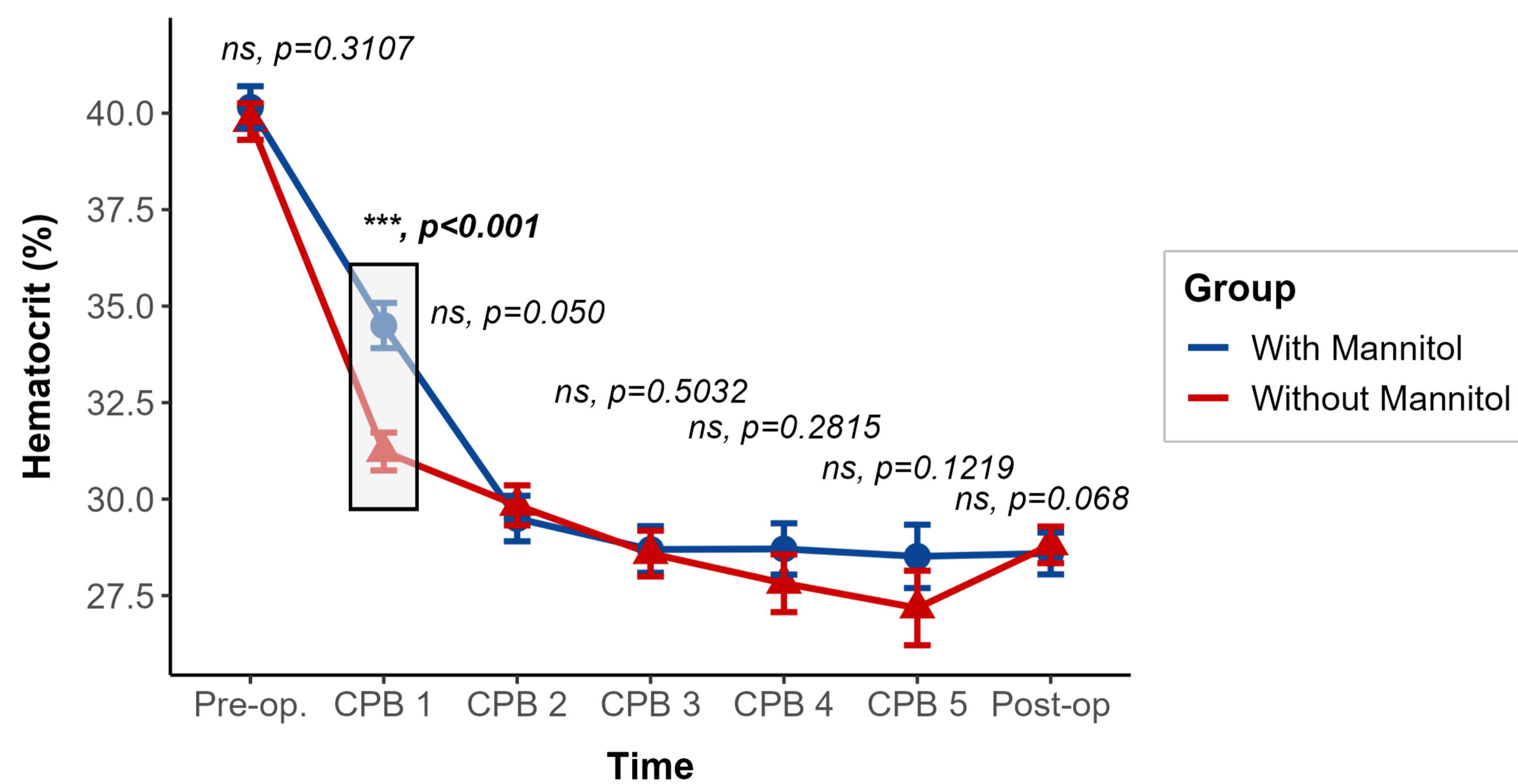
Secondary outcome: Need for red blood cell (RBC) transfusion.

Statistics: Mixed linear regression with fixed and random effects was used for primary outcome, *Fisher* test for secondary outcome, using the RStudio^{®2} software. The study was approved by the ethics committee (Reference N^o 23/18).

Results

- The demographic and laboratory tests, as well as CPB and cross-clamp times, **were similar between the two groups**. Patients in the "Without Mannitol" group do not receive this drug during CPB.

Perioperative Hematocrit Profiles



- Time had a significant negative impact on hematocrit levels**, with a decrease observed during CPB that continued after the operation.
- Marked **differences in hematocrit levels between the two groups only at the first measurement after starting CPB** (2.89 ± 0.35 , $***$, $p < 0.001$ in the "With Mannitol" group).
 - However, this effect **lessened over the rest of the CPB period and was not evident postoperatively** (0.59 ± 0.33 , $p = 0.0681$).
- There were no significant differences in RBC transfusion needs between the two groups**

Conclusions

The hematocrit profile with Mannitol in priming shows significant differences **only at the first measurement after starting CPB, with no prolonged effect during CPB or postoperatively**.

Mannitol use in priming does **not seem to be associated with transfusion requirements**.

References

- Brown JR, Baker RA, Shore-Lesserson L, Fox AA, Mongero LB, Lobdell KW, et al. The Society of Thoracic Surgeons/Society of Cardiovascular Anesthesiologists/American Society of Extracorporeal Technology Clinical Practice Guidelines for the Prevention of Adult Cardiac Surgery-Associated Acute Kidney Injury. *The Annals of Thoracic Surgery*. 2023 Jan;115(1):34-42.
- R Core Team, «R: A Language and Environment for Statistical Computing». R Foundation for Statistical Computing, Vienna, Austria, 2022. Available at: <https://www.r-project.org/>

Variables	Groups		p-value
	With Mannitol	Without Mannitol	
Hematocrit Preop.	40.2 (37 - 42.8)	40.2 (37.7 - 43)	0.8248
Platelets Preop.	207.5 (179 - 250.8)	213 (173.2 - 255)	0.966
Fibrinogen Preop.	333 (278.2 - 394.8)	333 (279 - 377)	0.5887
Prothrombin Time Preop.	12.1 (11.5 - 12.7)	12 (11.5 - 12.6)	0.5013
aPTT Preop.	29 (27.1 - 31.4)	29 (27 - 30.6)	0.3868
ACT Baseline	140.5 (123 - 151)	140 (129 - 150)	0.436
CPB Time	63 (44 - 83.5)	60 (46 - 82.9)	0.1298
X-Clamp Time	49 (34 - 65)	46 (31 - 64)	0.1673

Note:

The presented values represent the median (1st quartile - 3rd quartile).

The p-value is calculated using the Kruskal-Wallis test.

RBC Transfusion by Priming Type

p-value = 0.6263, CI 95% OR: 0.78-1.52

