

Platelet Recovery and Perioperative Risk After Cardiac Surgery

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Purpose of Study

Approximately 1,000,000 people undergo cardiac surgery with cardiopulmonary bypass in the United States each year and post-operative mortality is ~1%. Postoperative care management of cardiac surgery patients is guided by standard vital signs such as blood pressure and cardiac output, but these metrics do not provide information about tissue oxygen delivery, which happens in the capillaries. Bone marrow capillaries are the primary site of platelet production, which requires blood flow. The primary hypothesis of this project is that platelet count over time after cardiopulmonary bypass will be associated with post-operative mortality.

Methods Used

We completed a retrospective cohort study (n = 6,866) of patients receiving cardiac surgery with cardiopulmonary bypass who had serial platelet count measurements after surgery at the University of Colorado hospital between 2011 and 2021. We compared platelet count over time in survivors vs. non-survivors.

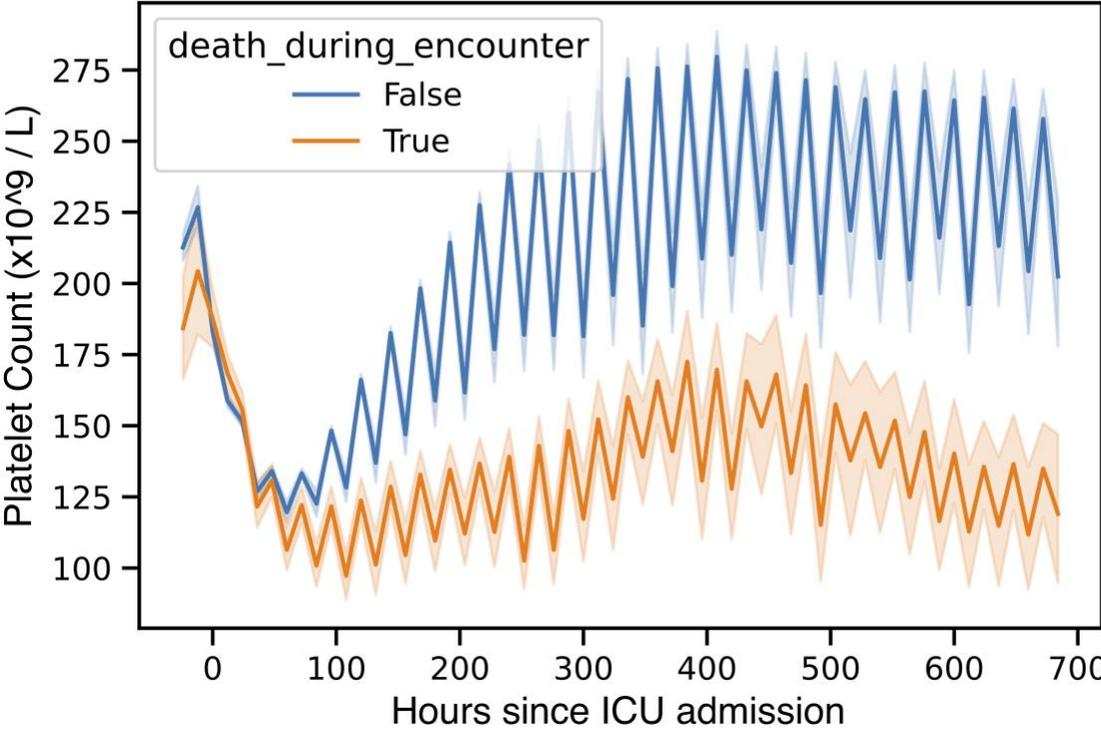
Table 1: Demographics of Survivors and Non-survivors

	All, n = 6,867	Survivors, n = 6215	Non-survivors = 652	P-Value
Age (mean, SD)	60.5 (13.7)	60.3 (13.7)	61.8 (13.5)	0.009
Female sex (N, %)	2,116 (30.8)	1899 (30.6)	217 (33.3)	0.165

Summary of Results

Platelet count was significantly different at a $p < 0.05$ between survivors and non-survivors after cardiac surgery from approximately two days after surgery till death or hospital discharge.

Figure 1: N = 6,687. Platelet count over time in survivors (blue) and non-survivors (orange) after cardiac surgery. The shaded region indicates the 95% confidence interval for each group.



Conclusions

Platelet count recovery differed between survivors and non-survivors after only two days, while mortality occurred at ~2 weeks. Failure of platelet count recovery following cardiac surgery may be an effective early warning sign to allow for targeted clinical interventions to improve survival after cardiac surgery.