Bloodless Norwood is Possible: Encouraging Results of Blood Conservation in Neonatal Open-Heart Surgery

Objective: To evaluate early outcomes of blood conservation in neonatal open-heart surgery.

Methods: Eighty-seven consecutive patients undergoing neonatal open-heart surgery between May 2021 and September 2022 were reviewed. Patients in which traditional blood management was used are referred to as group I (n=44), whereas patients in which blood conservation was attempted made up group II (n=43). Choice of management pathway was left to the discretion of the operating room team, but blood conservation was generally not considered in patients with body weight < 2.5kg, baseline hematocrit (Hct) < 35% and hemodynamic lability. CPB was initiated with blood prime in group I and with clear prime in Group II. The CPB circuit had the same configuration in all patients and targeted Hct was ? 24% during CPB.

Results: Patients in group II were younger at the time of surgery (median 4 days vs. 6 days, p=0.02) and had higher preoperative Hct (median 43% vs. 40.5%, p=0.04). There was no difference between both groups in terms of body weight (median 3.2 kg vs. 3.3 kg, p=0.85), postoperative mechanical ventilation time (median 64 hrs. vs. 92 hrs., p=0.13) and postoperative ICU length of stay (median 6.5 days, vs. 10 days, p=0.06). Median STAT category was 4 in both groups. Sixteen neonates (37.2%) in group II, including 2 Norwood patients, left the operating room without any transfusion of blood products. Ten patients (23.3%) in group II, including 1 Norwood patient, were discharged without any transfusion. When patients within group II, who had transfusion-free hospitalization, were compared to those in whom bloodless approach was attempted but was unsuccessful, they were found to have higher preoperative Hct (median 51% vs. 42%, p=0.006), shorter postoperative mechanical ventilation time (median 14.5 hrs. vs. 75 hrs., p=0.005) and shorter postoperative ICU stay (median 4.5 days vs. 9days, p=0.01) but similar age (median 3.5 days vs. 4 days, p=0.18) and body weight (median 3.3 kg vs. 3.2 kg, p=0.17). Median discharge Hct was 28% in patients which didn't receive any transfusion. Hospital and 30-day survival were 100% in group II.

Conclusions: Bloodless surgery is possible in a significant proportion of neonates undergoing open-heart surgery, including the Norwood operation, even in the early stages of experience. Early clinical results are favorable but long-term follow-up and continued efforts are warranted to prove safety and reproducibility.

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