Restrictive strategy of intraoperative fluid maintenance during optimization of oxygen delivery decreases major complications after high-risk surgery

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INTRODUCTION: Optimal fluid management is crucial for patients who undergo major and prolonged surgery. Persistent hypovolemia is associated with complications, but fluid overload is also harmful. We evaluated the effects of a restrictive versus conventional strategy of crystalloid administration during goal-directed therapy in high-risk surgical patients.

METHODS: We conducted a prospective, randomized, controlled study of high-risk patients undergoing major surgery. For fluid maintenance during surgery, the restrictive group received 4 ml/kg/hour and the conventional group received 12 ml/kg/hour of Ringer's lactate solution. A minimally invasive technique (the LiDCO monitoring system) was used to continuously monitor stroke volume and oxygen delivery index (DO_2I) in both groups. Dobutamine was administered as necessary, and fluid challenges were used to test fluid responsiveness to achieve the best possible DO_2I during surgery and for 8 hours postoperatively.

RESULTS: Eighty-eight patients were included. The patients' median age was 69 years. The conventional treatment group received a significantly greater amount of lactated Ringer's solution (mean ± standard deviation (SD): 4, 335 ± 1, 546 ml) than the restrictive group (mean ± SD: 2, 301 ± 1, 064 ml) ($P < 0.001$). Temporal patterns of DO_2I were similar between the two groups. The restrictive

group had a 52% lower rate of major postoperaDCtive complications than the conventional group (20.0% vs 41.9%, relative risk = 0.48, 95% confidence interval = 0.24 to 0.94; P = 0.046).

CONCLUSIONS: A restrictive strategy of fluid maintenance during optimization of oxygen delivery reduces major complications in older patients with coexistent pathologies who undergo major surgery.