

Physician - Coronary Artery Diseases and Surgery

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Impact of Phosphorylcholine-Coated Circuits on Inflammatory Response and Renal Function: A Retrospective Study in Coronary Artery Bypass Grafting

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Objective: This study aimed to evaluate the effects of phosphorylcholine-coated circuits compared to traditional standard tubing sets on postoperative inflammatory response, renal function, and intubation duration.

Methods: This retrospective study was conducted with 45 patients who underwent coronary artery bypass grafting. Surgeries were performed by the same team. The patients were divided into two groups: standard tubing sets were used for Group 1 (n=12), and phosphorylcholine-coated sets were used for Group 2 (n=33). Data from the operation were analyzed.

Results: No significant difference was found between standard and phosphorylcholine-coated tubing sets regarding lactate levels after bypass and in intensive care ($p>0.05$). C-reactive protein levels were similar on the first day but lower in the phosphorylcholine group on the second day ($p<0.05$). Preoperative glomerular filtration rates were similar on the first day, but higher glomerular filtration rates were noted on the second day in the phosphorylcholine group ($p<0.05$). Intubation duration was shorter with phosphorylcholine-coated circuits, with no differences in erythrocyte suspension and drainage volumes ($p>0.05$).

Conclusion: Phosphorylcholine-coated circuits reduced postoperative inflammatory response, preserved renal function, and shortened intubation duration. Although coated systems may improve cardiac surgery outcomes, no system completely prevents pathological inflammatory responses. Collaboration between biomedical engineering and cardiac surgery teams is essential for further advancements.

Keywords: Cardiopulmonary bypass, phosphorylcholine-coated circuits.

Table 1. Patient data			
	Group 1 (n=12)	Group 2 (n=33)	
	Mean±SD	Mean±SD	p-value
Lactate at CPB exit (mmol/L)	2.34±1.12	2.5±1.13	0.681*
Initial lactate in ICU (mmol/L)	1.45±0.64	1.89±1.10	0.198
Day 1 CRP (mg/L)	86.60±38.14	86.23±32.20	0.973
Day 2 CRP (mg/L)	222.72±56.32	177.40±48.88	0.010
Intubation duration (hours)	11.84±6.57	7.23±2.65	0.001*
Preoperative GFR (mL/min)	73.76±17.87	84.64±16.23	0.056
Postoperative Day 2 GFR (mL/min)	63.84±27.10	82.99±24.95	0.029
Drainage on Day 1 (mL)	750±574.45	984.72±672.82	0.284*
Drainage on Day 2 (mL)	620.83±443.87	531.94±249.61	0.390*
Erythrocyte suspension given during surgery	1.5±1.24	1.31±1.03	0.595
Erythrocyte suspension given in ICU	2.17±1.89	1.56±1.84	0.328*