Progression of Pre-Existing Renal Dysfunction After Off-Pump Versus On-Pump Technique for Isolated Coronary Artery Bypass Surgery

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Objectives: The aim of this study was to analyze the progression of pre-existing renal dysfunction and short-term outcomes for patients undergoing isolated Off-Pump Coronary Artery Bypass (OPCAB) versus ON-pump technique (ONCAB).

Methods: A retrospective cohort analysis of primary, non-emergent, isolated CAB surgery using the institutional STS Database from January 2013 to December 2018 identified 1,809 cases (1,285 OPCAB vs 524 ONCAB). The patients were stratified into 3 categories according to their pre-operative estimated glomerular filtration rate (eGFR) of >60, 30 to 60, <30 (in mL/min/1.73 m^2) and OPCAB was compared to ONCAB with a 1:1 matched cohort propensity score analysis. Primary endpoints were degree of progression of pre-existing renal dysfunction and de novo renal failure. Secondary outcomes include operative mortality, stroke, length of stay (LOS) and need for transfusions.

Table 1: Change in renal function in patients undergoing isolated CABG.

	ONCAB				OPCAB				
		Post-op eGFR				Post-op eGFR			P-value
Pre-op eGFR (mL/min/1.73)	Total (n)	<30	[30,60]	>60	Total (n)	<30	[30,60]	>60	
<30	12	12 (100%)	0 (0%)	0 (0%)	12	11 (92%)	1 (8%)	0 (0%)	0.99
[30, 60]	108	22 (20%)	78 (72%)	8 (7%)	97	23 (24%)	65 (67%)	9 (9%)	0.71
>60	352	6 (2%)	88 (25%)	258 (73%)	363	10 (3%)	97 (27%)	256 (71%)	0.53
Total	472	40	166	266	472	44	163	265	

eGFR: estimated glomerular filtration rate
ONCAB: on-pump coronary artery bypass grafting
OPCAB: off-pump coronary artery bypass grafting

Results:
There were no differences in pre-operative characteristics. The mean age was 61.8±10.6 vs 62.1±10.5 years and females comprised 27.8 vs 25.8 % for ONCAB versus OPCAB, respectively. The ONCAB group had a higher number of revascularized vessels (3.3±0.9 vs 3.0±0.6, p <.0001) and a higher need for transfusions (33.3% vs 15.8%, p<.0001). **There was a trend, but not statistically significant, in the incidence of post-operative renal failure and de-novo dialysis for the OPCAB group** (1.5% vs 2.5%, p-0.20 and 0.6% vs 1.9%, p-0.08 respectively). eGFR<30 mL/min/1.73 m^2 was an independent predictor factor for post-operative renal failure in both groups (OR-10.7, CI-95%). Regarding the progression of renal dysfunction, there was no significant difference among the matched groups (Table 1). The operative mortality and stroke rate for ONCAB group was no different than for OPCAB (1.1% vs 1.1%, p-0.98 and 0.4% vs 0.4%, p-1.0). Conversely, for the entire cohort, the OPCAB group had a shorter LOS (5.7±5.1 days vs 6.3±3.5, p-0.006).

Conclusion:
There was no significant difference in de novo renal failure and worsening renal dysfunction with the on-pump technique for isolated CABG. Off-pump CABG yielded lower transfusion rate, shorter length of stay and less revascularized vessels.