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POSTOPERATIVE ATRIAL FIBRILLATION AFTER OFF-PUMP VERSUS ON-PUMP CORONARY ARTERY BYPASS GRAFTING IN A LOW-VOLUME CENTER

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ABSTRACT

Background: Postoperative atrial fibrillation (POAF) remains the most common complication following coronary artery bypass grafting (CABG) and is associated with increased morbidity, prolonged hospitalization, and higher healthcare costs. The potential benefit of off-pump CABG (OPCAB) in reducing POAF remains controversial, particularly in low-volume centers.

Objective: To compare the incidence of postoperative atrial fibrillation and early clinical outcomes between off-pump (OPCAB) and on-pump CABG (ONCAB) in a low-volume cardiac surgery center and to evaluate perioperative factors associated with POAF.

Methods: In this retrospective single-center study, 200 consecutive patients undergoing isolated CABG between November 2017 and August 2019 were analyzed (100 OPCAB, 100 ONCAB). Patients with prior atrial fibrillation, concomitant cardiac procedures, or emergency surgery were excluded. POAF was defined as new-onset atrial fibrillation lasting ≥10 minutes or requiring treatment during hospitalization. Clinical, operative, and biochemical variables including serial C-reactive protein (CRP) levels were recorded. Multivariable logistic regression analysis was performed to identify independent predictors of POAF.

Results: POAF occurred in 26% of patients in the ONCAB group and 16% in the OPCAB group ($p=0.300$). AF episodes occurred predominantly on postoperative days 2–3. Duration of AF was significantly shorter in the ONCAB group compared with OPCAB (5.33±1.86 vs 7.55±1.94 hours, $p=0.023$), while ICU stay, ventilation time, and hospital length of stay were comparable between groups. CRP levels increased significantly postoperatively in both cohorts, peaking on day 2, but were consistently lower in the OPCAB group ($p<0.05$). In multivariable analysis, cardiopulmonary bypass use (OR 4.28, 95% CI 1.49–12.26, $p=0.007$) was identified as an independent predictor of POAF, while age showed a borderline association. No AF-related mortality, stroke, or major complications were observed.

Conclusion: In this low-volume center, OPCAB did not significantly reduce the incidence of postoperative atrial fibrillation compared with ONCAB, despite lower inflammatory response as reflected by CRP levels. These

findings suggest that POAF is multifactorial and more strongly influenced by patient-related and perioperative factors than by surgical technique alone.
Keywords: atrial fibrillation; coronary artery bypass; OPCAB; ONCAB; inflammation; cardiopulmonary bypass

DÜŞÜK HACIMLI BIR MERKEZDE POMPASIZ VE POMPALI KORONER ARTER BAYPAS GREFTLEME SONRASI POSTOPERATIF ATRIYAL FIBRILASYONUN KARŞILAŞTIRILMASI

ÖZET

Amaç: Postoperatif atriyal fibrilasyon (POAF), koroner arter baypas greftleme (KABG) sonrasında en sık görülen komplikasyon olup artmış morbidite, uzamış hastanede kalış süresi ve yükselen sağlık maliyetleri ile ilişkilidir. Pompasız KABG'nin (OPCAB) POAF insidansını azaltmadaki potansiyel yararı özellikle düşük hacimli merkezlerde tartışmalıdır. Bu çalışmanın amacı, düşük hacimli bir kalp cerrahisi merkezinde pompasız (OPCAB) ve pompalı KABG (ONCAB) uygulanan hastalarda postoperatif atriyal fibrilasyon insidansını ve erken dönem klinik sonuçları karşılaştırmak ve POAF ile ilişkili perioperatif faktörleri değerlendirmektir.

Yöntem: Bu retrospektif, tek merkezli çalışmada, Kasım 2017 ile Ağustos 2019 tarihleri arasında izole KABG uygulanan ardışık 200 hasta (100 OPCAB, 100 ONCAB) analiz edilmiştir. Önceden atriyal fibrilasyonu olanlar, eş zamanlı kardiyak cerrahi girişim uygulananlar ve acil ameliyat edilen hastalar çalışma dışı bırakılmıştır. POAF, hastanede yatış süresince yeni başlangıçlı ve en az 10 dakika süren veya tedavi gerektiren atriyal fibrilasyon olarak tanımlanmıştır. Klinik, operatif ve biyokimyasal değişkenler ile seri C-reaktif protein (CRP) düzeyleri kaydedilmiştir. POAF için bağımsız prediktörleri belirlemek amacıyla çok değişkenli lojistik regresyon analizi yapılmıştır.

Bulgular: POAF, ONCAB grubunda %26, OPCAB grubunda %16 oranında saptanmış olup fark istatistiksel olarak anlamlı bulunmamıştır (p=0,300). Atriyal fibrilasyon atakları çoğunlukla postoperatif 2–3. günlerde ortaya çıkmıştır. AF süresi, ONCAB grubunda OPCAB grubuna kıyasla anlamlı derecede daha kısa bulunmuştur (5,33±1,86 saat vs 7,55±1,94 saat; p=0,023). Yoğun bakımda kalış süresi, mekanik ventilasyon süresi ve toplam hastanede kalış süresi açısından gruplar arasında anlamlı fark saptanmamıştır. CRP düzeyleri her iki grupta da postoperatif dönemde anlamlı şekilde artmış ve 2. günde zirveye ulaşmıştır; ancak OPCAB grubunda değerler istatistiksel olarak anlamlı düzeyde daha düşük seyretmiştir (p<0,05). Çok değişkenli analizde kardiyopulmoner baypas kullanımı (OR 4,28; %95 GA 1,49–12,26; p=0,007) POAF için bağımsız bir prediktör olarak belirlenmiş, yaş ise sınırda anlamlı ilişki göstermiştir. AF ile ilişkili mortalite, inme veya majör komplikasyon gözlenmemiştir.

Sonuç: Bu düşük hacimli merkezde OPCAB, CRP düzeyleri ile yansıyan daha düşük inflamatuvar yanıta rağmen, ONCAB ile karşılaştırıldığında postoperatif atriyal fibrilasyon insidansını anlamlı düzeyde azaltmamıştır. Bulgular, POAF'un multifaktöriyel bir etiyolojiye sahip olduğunu ve cerrahi teknikten ziyade hasta özellikleri ile perioperatif faktörlerden daha güçlü biçimde etkilendiğini düşündürmektedir.

Anahtar Kelimeler: Atriyal fibrilasyon; koroner arter baypas; OPCAB; ONCAB; inflamasyon; kardiyopulmoner baypas

INTRODUCTION

Postoperative atrial fibrillation (POAF) remains the most frequently encountered arrhythmic complication following coronary artery bypass grafting (CABG), with reported incidence ranging between 15% and 35% across contemporary series(1,2). Despite being often transient, POAF is not a benign phenomenon; it has been associated with increased risk of stroke, prolonged intensive care and hospital stay, and higher healthcare costs. Furthermore, growing evidence indicates that the occurrence of POAF may also adversely affect long-term survival(3,4).

In an effort to reduce perioperative complications, off-pump coronary artery bypass (OPCAB) techniques were developed with the rationale of avoiding cardiopulmonary bypass–related systemic inflammatory response and myocardial injury. Several investigators have therefore hypothesized that OPCAB may decrease the incidence of postoperative atrial fibrillation and improve early postoperative outcomes. However, data in the literature remain conflicting, with some studies reporting reduced AF rates after OPCAB, while others demonstrate no significant difference when compared to conventional on-pump CABG(5,6).

The pathophysiology of POAF is multifactorial and involves a complex interaction between patient-related factors (such as age and hypertension), perioperative myocardial injury, systemic inflammation, oxidative stress, and atrial structural remodeling. Identifying modifiable and non-modifiable predictors of POAF remains clinically relevant, as this may guide perioperative preventive strategies and optimize postoperative management(7-9).

Therefore, the present study aims to evaluate the incidence of postoperative atrial fibrillation and to identify its clinical and perioperative predictors in patients undergoing coronary revascularization with or without cardiopulmonary bypass, comparing outcomes between CABG and OPCAB techniques.

METHODS

Study design and patient population

This retrospective observational study included consecutive patients who underwent isolated coronary artery bypass grafting at a single tertiary cardiovascular center over a defined study period. Adult patients with angiographically confirmed stable coronary artery disease who were scheduled for surgical myocardial revascularization were eligible for inclusion.

Patients were divided into two groups according to the surgical technique used: conventional on-pump coronary artery bypass grafting (CABG) with cardiopulmonary bypass, and off-pump coronary artery bypass grafting (OPCAB) performed on the beating heart.

Eligible patients were adults aged ≥18 years undergoing elective or urgent isolated coronary artery bypass grafting (CABG) for stable coronary artery disease with documented preoperative sinus rhythm on a standard 12-lead electrocardiogram. Patients were excluded if they had a history of persistent or paroxysmal atrial fibrillation, a preoperative permanent pacemaker, concomitant valvular or other cardiac surgical procedures, emergency surgery for acute coronary syndrome, or incomplete clinical or perioperative data. The preoperative findings for patients in both groups are shown in Table 1.

Surgical techniques and perioperative management

All procedures were performed via median sternotomy by experienced cardiac surgeons. The choice between CABG and OPCAB was left to the discretion of the operating surgeon based on coronary anatomy, hemodynamic status, and technical considerations. In the ONCAB group, cardiopulmonary bypass was established using standard aortic and right atrial cannulation, with myocardial protection achieved using cold blood or crystalloid cardioplegia according to institutional protocol. In the OPCAB group, distal anastomoses were performed on the beating heart using stabilizing devices and intracoronary shunts when necessary.

All patients received standardized perioperative medical therapy. Beta-blockers were routinely administered preoperatively unless contraindicated and were resumed early in the postoperative period. Other cardiovascular medications, including statins and ACE inhibitors, were continued according to current guideline recommendations. Patients were discharged from ICU to the ward as soon as their hemodynamic and respiratory condition was stable. The same medical staff performed all operations and anesthetic management throughout the study period.

Monitoring and definition of postoperative atrial fibrillation

ECGs and hemodynamic variables, including arterial blood pressure, heart rate, and central venous pressure, were monitored continuously throughout the operation and during the period in the ICU. After discharge from the ICU, all patients were monitored with an alarm-triggered telemetry system and double-checked for unnoticed events every morning for at least 5 postoperative days. A 12-lead ECG was obtained before surgery and on the first 5 postoperative days. Serum magnesium concentration was measured before surgery, immediately after surgery, and every morning for 5 days postoperatively and maintained at a level >1.5 mEq/L. Serum potassium and calcium concentrations were also measured perioperatively and adjusted to maintain potassium levels at >4 mmol/L and calcium levels at >8.5 mg/dL.

Postoperative atrial fibrillation (POAF) was defined as any episode of atrial fibrillation lasting ≥10 minutes or requiring pharmacological or electrical treatment due to hemodynamic instability. All patients who had AF were treated according to protocol with intravenous amiodarone (bolus 5 mg/kg followed by an infusion of 15 mg/kg per 24 hours). The observation period for POAF was limited to the early postoperative phase (first 5–7 days after surgery). High-sensitivity C-reactive protein (CRP) levels were measured before surgery and daily thereafter for 5 days postoperatively. CRP was determined by a nephelometric method (Dade Behring Marburg GmbH, Marburg, Germany).

Demographic, clinical, and perioperative data were retrospectively collected from electronic medical records and operative reports. Recorded variables included age, sex, and body mass index; cardiovascular risk factors such as hypertension, diabetes mellitus, smoking status, and peripheral arterial disease; history of previous myocardial infarction; left ventricular ejection fraction; and preoperative risk assessment using EuroSCORE or an equivalent scoring system. Operative variables comprised the number of distal anastomoses, as well as cardiopulmonary bypass and aortic cross-clamp times in the on-pump group. Postoperative data included drainage volume, requirement for inotropic support and intra-aortic balloon pump (IABP), duration of intensive care unit stay, and the occurrence of early postoperative complications and in-hospital mortality.

Study endpoints

The primary endpoint of the study was the incidence of postoperative atrial fibrillation (POAF). Secondary endpoints included the identification of independent predictors of POAF, evaluation of the association between POAF and early postoperative outcomes, and assessment of intensive care unit (ICU) length of stay and in-hospital complications.

Statistical analysis

Continuous variables were expressed as mean ± standard deviation or median (interquartile range) according to data distribution, while categorical variables were presented as counts and percentages. Between-group comparisons were performed using the Student’s t-test or Mann–Whitney U test for continuous variables and the chi-square test or Fisher’s exact test for categorical variables, as appropriate. Univariate analyses were initially conducted to identify potential predictors of postoperative atrial fibrillation (POAF), and variables with $p < 0.10$ were subsequently entered into a multivariable logistic regression model to determine independent predictors. Results were reported as odds ratios (OR) with 95% confidence intervals (CI), and a two-sided p-value <0.05 was considered statistically significant. All statistical analyses were performed using a validated software package (such as SPSS, Statistica, or R).

Ethical considerations

The study protocol was approved by the local institutional ethics committee. Due to the retrospective nature of the study, the requirement for individual informed consent was waived. All procedures were conducted in accordance with the principles of the Declaration of Helsinki.

RESULTS

Baseline characteristics

Baseline, procedural, and follow-up data were available for all 200 patients included in the study, with 100 patients undergoing ONCAB and 100 undergoing OPCAB. The two groups were generally well balanced in terms of demographic and clinical characteristics. Mean age was 65.0 ± 3.7 years in the ONCAB group and 67.2 ± 4.9 years in the OPCAB group ($p = 0.082$), and sex distribution was similar (male 59.2% vs 52.0%, $p = 0.190$). Left ventricular ejection fraction, prevalence of diabetes, dyslipidemia, peripheral arterial disease, chronic pulmonary disease, renal dysfunction, and EuroSCORE II values were comparable between groups. Hypertension rates were numerically higher in the ONCAB group (45% vs 39%) without statistical significance ($p = 0.09$). The only baseline variable showing a significant difference was smoking status, which was more frequent in the OPCAB group (68% vs 44%, $p = 0.034$). Preoperative data are shown in **Table 1.**

Operative characteristics

The operative characteristics are shown in Table 2. The intended number of distal anastomoses was generally between two and three per patient. The mean number of distal anastomoses was significantly lower in the OPCAB group compared with the ONCAB group (3.3 ± 0.46 vs 3.6 ± 0.49, $p < 0.05$). All patients received a left internal mammary artery graft, and incomplete revascularization was rare, occurring only in four patients in the OPCAB cohort. Operative duration was similar between groups (92.2 vs 90.4 minutes, $p = 0.414$), as were early postoperative parameters, including ICU stay (22.0 vs 21.8 hours, $p = 0.492$), ventilation time

(5.0 ± 0.8 vs 5.0 ± 1.0 hours, p = 0.857), hospital length of stay (6.0 vs 6.2 days, p = 0.384), and first-day postoperative drainage (380.2 ± 109.8 mL vs 380.6 ± 151.6 mL, p = 0.597). The use of postoperative inotropic or catecholamine support was also comparable between the ONCAB and OPCAB groups (18% vs 14%, p = 0.595). Reoperation for bleeding was required in three patients overall (one ONCAB, two OPCAB), and there were no cases of postoperative dialysis, respiratory failure, or early mortality in either group.

Myocardial injury markers

Cardiac troponin I levels measured at 24 hours postoperatively were significantly higher in the OPCAB group compared with ONCAB (2.83 ± 0.58 ng/mL vs 1.04 ± 0.76 ng/mL, p = 0.001). In the absence of electrocardiographic or echocardiographic evidence of perioperative myocardial infarction, these elevations were interpreted as reflecting subclinical myocardial injury rather than overt infarction.

Postoperative AF

During the study period, 26 patients in the ONCAB group (26%) developed postoperative AF, whereas 16 (16%) of the OPCAB patients developed AF (p=0.300). AF occurred a mean of 2.66±0.52 days after surgery in the ONCAB group and 2.55±0.51 days after surgery in the OPCAB group (p=0.650). There was significant difference between groups in the duration of AF (5.33±1.86 versus 7.55±1.94 hours, p=0.023). Electrical cardioversion was not performed on any patient in either group. There were no statistically significant differences in any variable between patients who experienced postoperative AF and those who did not (Table 3). Baseline CRP levels were similar in the ONCAB and OPCAB groups. During the study, the average level of postoperative CRP in both groups increased, with peak concentration on second day (Figure 1). OPCAB group had lower levels of CRP throughout the entire postoperative period than patients in the ONCAB group (p<0.05). Elevated CRP levels decreased and did not return to normal levels by day 5 in either group. When preoperative and operative variables were included in the multivariate analysis, CPB (OR 4.282, 95% CI 1.495 to 12.267, P_0.007) and age (OR 1.049, 95% CI 0.998 to 1.102, P_0.062) were the only independent predictors of postoperative AF

DISCUSSION

Postoperative atrial fibrillation (POAF) remains one of the most frequent complications following coronary artery bypass grafting (CABG), with reported incidence ranging between 15% and 40% depending on patient characteristics, surgical technique, and perioperative management strategies. In the present study, the overall incidence of POAF was 21%, which falls within the expected range reported in contemporary CABG series and confirms that AF remains a relevant clinical issue even in modern surgical practice(10).

In our cohort, POAF occurred in 26% of patients undergoing ONCAB and 16% of those undergoing OPCAB, without reaching statistical significance. Although there was a numerically lower AF incidence in the OPCAB group, the lack of statistical significance suggests that avoidance of cardiopulmonary bypass alone may not be sufficient to reduce POAF risk, particularly in low-volume settings.

Several mechanisms have been proposed to explain POAF after cardiac surgery, including atrial ischemia, surgical trauma, systemic inflammatory activation, oxidative stress, pericardial irritation, and autonomic nervous system imbalance. Cardiopulmonary bypass has traditionally been implicated as a contributor to systemic inflammatory response and atrial remodeling; therefore, OPCAB has been hypothesized to reduce AF incidence by avoiding extracorporeal circulation. However, our findings are consistent with several randomized trials and meta-analyses demonstrating neutral or inconsistent effects of OPCAB on AF occurrence(11).

Importantly, POAF is a multifactorial phenomenon, and the contribution of CPB-related inflammation may be less dominant than previously thought(11-13). In our study, perioperative care was standardized across both groups, including routine use of beta-blockers, strict electrolyte management, and uniform postoperative monitoring. These factors likely contributed to minimizing differences between the two surgical strategies and highlight the importance of perioperative medical optimization over surgical technique alone(14-16).

Patient-related factors may also play a significant role(17,18). In our cohort, patients who developed POAF tended to be older and had higher prevalence of comorbidities such as hypertension and chronic obstructive pulmonary disease, both of which are known predictors of atrial remodeling and arrhythmogenesis. Although these differences did not reach statistical significance due to sample size limitations, they support the well-established concept that patient substrate rather than surgical method is a primary determinant of AF risk.

Another relevant aspect is institutional volume(19). Several studies have demonstrated that outcomes after OPCAB are highly dependent on surgical experience and institutional case volume. In low-volume centers, variability in exposure techniques, stabilization methods, and hemodynamic control during beating-heart anastomosis may attenuate potential advantages of OPCAB. Our findings support this concept, suggesting that in low-volume environments, OPCAB does not confer a significant reduction in POAF compared with ONCAB.

From a clinical standpoint, POAF in our series did not result in major adverse outcomes such as stroke, need for permanent pacing, or early mortality. However, patients who developed AF tended to have longer ICU and hospital stay, which is consistent with previous reports demonstrating that POAF contributes to increased healthcare utilization and resource burden. Therefore, even in the absence of major complications, POAF remains clinically relevant and justifies preventive strategies(20-23).

Inflammation has been implicated as a key contributor to the pathogenesis of postoperative atrial fibrillation (AF) following CABG, with accumulating clinical evidence supporting this association. Bruins et al. were among the first to highlight this link, demonstrating that the peak incidence of AF occurs on postoperative days 2–3, paralleling the maximal rise in C-reactive protein (CRP) levels(24). Consistent with these findings, our study also demonstrated a marked postoperative increase in CRP concentrations in both groups. Notably, patients in the OPCAB group exhibited significantly lower CRP levels during the postoperative period compared with controls (Figure 1). Although this observation may suggest a potential protective role of reduced inflammatory response against AF development, we did not observe a statistically significant association between CRP levels and AF occurrence within individual groups. Furthermore, our study was not adequately powered to assess the impact of other potential predictors of postoperative AF, and therefore these findings should be interpreted with caution.

The present study has several strengths, including a homogeneous surgical team, standardized perioperative management, and complete follow-up during hospitalization. However, several limitations must be acknowledged. First, the retrospective and non-randomized design limits causal inference. Second, the sample size may not provide sufficient power to detect small differences in AF incidence between techniques. Third, continuous telemetry monitoring was limited to the hospitalization period, and therefore late or paroxysmal AF episodes after discharge may have been underdetected. Finally, we did not perform multivariable regression analysis to identify independent predictors of POAF, which could further clarify the relative contribution of patient- and procedure-related factors.

Despite these limitations, our study provides real-world evidence from a low-volume cardiac surgery center, a setting that is underrepresented in the literature but highly relevant in many healthcare systems. Our findings suggest that the theoretical advantages of OPCAB in reducing POAF may not translate into clinically meaningful benefit in such environments.

In conclusion, postoperative atrial fibrillation after CABG is a multifactorial complication influenced more by patient characteristics and perioperative management than by the use of cardiopulmonary bypass itself. In low-volume centers, efforts should focus on standardized perioperative AF prevention strategies rather than expecting a significant reduction in AF incidence solely from the use of off-pump techniques.

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Table 1. Preoperative characteristics of the patients

NYHA = New York Heart Association; LVEF = Left ventricular ejection fraction; LMCA = Left main coronary artery; DM = Diabetes mellitus; CCS = Canadian Cardiovascular Society; COPD = Chronic obstructive pulmonary disease; ACEI = Angiotensin-converting enzyme inhibitor

	Control group (n=100)	OPCAB group (n=100)	P
Age (year)	65.0±3.7	67.2±4.9	0.082
Sex(M/F)	42/58	44/56	0.190
Obesity	5	5	-
NYHA(I/II)	96/4	97/3	0.715
LVEF(%)	60.8%	62.4	0.083
LMCA (<50%)	8	8	-
Number of diseased vessels	2.59±0.54	2.56±0.66	0.135
Diabetes(%)	16(16.3%)	16(16.3)	0.965
Dyslipidemia	23	19	0.420
Preoperative drugs, n			
ACE inhibitor	96	92	0.199
Beta-blocker	68	58	0.303
Nitrate	9	8	0.793
Cerebrovascular disease	4(4.1%)	2(2%)	0.303
Peripheral arterial disease	11	9	0.82
COPD	9	13	0.337
Renal disease	4	3	0.956
EuroSCORE II	4.06±0.38	3.74±0.35	0.543
Hypertension	45	39	0.09
Angina(CCS)	24	23	0.923
Smokers	44	68	0.034

Table 2. Operative and early postoperative characteristics of the patients

LIMA = Left internal mammary artery; OPCAB = Off-pump coronary artery bypass; IABP = Intra-aortic balloon pump; AF = Atrial fibrillation; ICU = Intensive care unit

Variable	Control (n=100)	OPCAB (n=100)	P value
No. of distal anastomoses (mean ± SD)	3.6 ± 0.49	3.3 ± 0.46	<0.05
LIMA use, n (%)	100 (100%)	100 (100%)	–
Incomplete revascularization	0	4	0.240
Postop. inotrope use, n (%)	18 (18%)	14 (14%)	0.595
IABP, n (%)	1 (2%)	0	–
Procedure duration (min)	92.2	90.4	0.414
Postop. AF, n (%)	26 (26%)	16 (16%)	0.300
ICU stay (h)	22.0	21.8	0.492
Ventilation, hours	5.0±0.8	5.0±1.0	0.857
Hospital stay (d)	6.0	6.2	0.384
Revision for bleeding, n (%)	2 (2%)	4 (4%)	0.999
Drainage 1st day (ml)	380.2±109.8 mL	380.6±151.6 mL	0.597
New renal failure requiring dialysis	0	0	–
Catecholamine use, n (%)	18 (18%)	14 (14%)	0.595
Respiratory failure	0	0	–
Sternal infection, n (%)	4 (4%)	0	0.242
Mortality	0	0	–

Table 3. Comparison of All Patients With and Without Atrial Fibrillation

Variable	With AF (n=42)	Without AF (n=158)	P value
Male sex, %	42.7	60.8	0.100
Age, y	65.08 ± 12.98	60.53 ± 10.05	0.062
Preoperative drugs, %			
β-Blockers	62.5	63.2	1.000
Calcium antagonists	20.8	27.6	0.601
Preoperative LVEF, %	60.41 ± 7.24	60.00 ± 8.61	0.831
Preoperative MI, %	87.3	73.7	0.419
Diabetes mellitus, %	47.8	42.1	0.815
Hypertension, %	68.7	63.2	0.812
Angina, %	72.8	60.5	0.469
Renal disease, %	25.0	15.8	0.363
Peripheral vascular disease, %	41.7	26.3	0.202
Smoker, %	42.7	43.1	0.168
No. of distal anastomoses	2.54 ± 0.88	2.53 ± 0.85	0.991
LIMA used, %	100	100	—
Intraoperative defibrillation, %	45.8	28.9	0.141
Operation time, min	160.41 ± 22.39	165.47 ± 29.98	0.449
Inotrope used, %	4.2	14.5	0.284

Abbreviations: AF, atrial fibrillation; LVEF, left ventricular ejection fraction; MI, myocardial infarction; LIMA, left internal mammary artery.

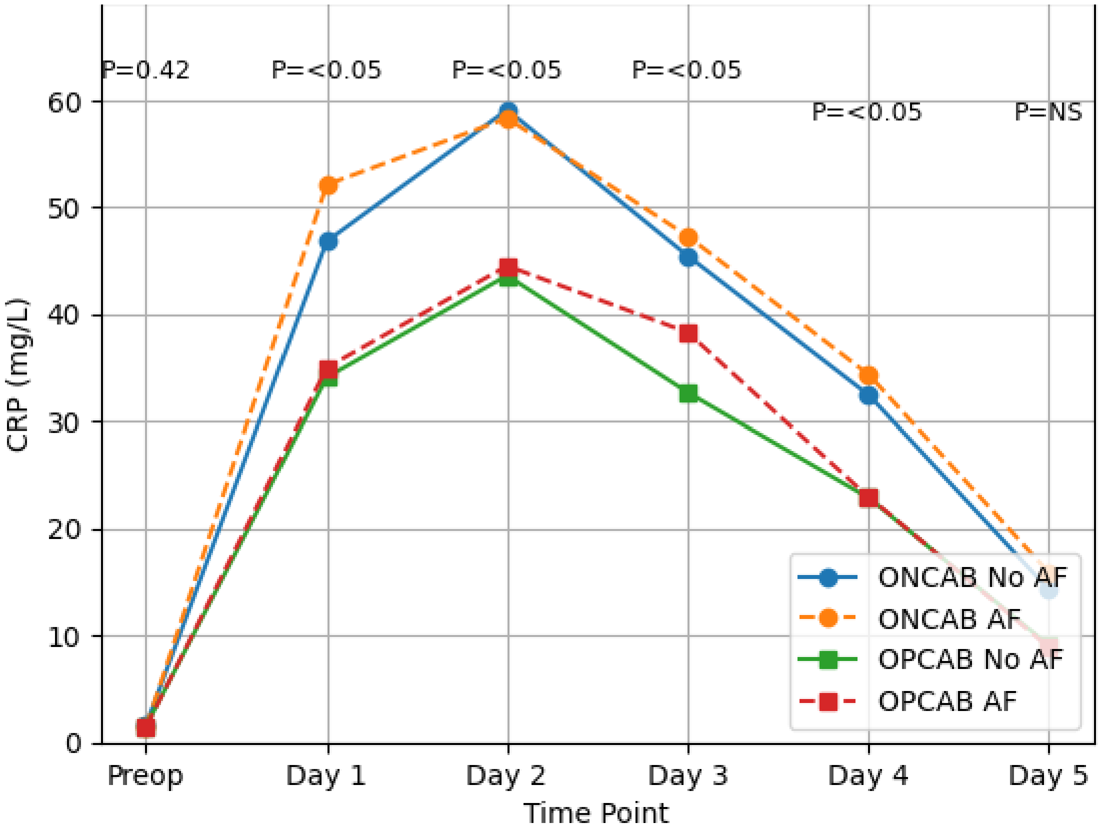

Figure 1. Course of CRP Levels in ONCAB vs OPCAB Groups