fortune Journals

Research Article

FORTUNE JOURNAL OF HEALTH SCIENCES

ISSN: 2644-2906

Incidence of Re-Exploration for Bleeding Following OPCABG Patient Continuing DAPT (Aspirin and Clopidogrel)

Mohammad Samir Azam Sunny*[,1], Ashiqur Rahman[2], Amirul Islam[3], Noor-E-Elahi Mozumder[4], Qazi Tazkia Ara[5]

Abstract

Background: Patients with coronary artery disease (CAD), off-pump coronary artery bypass grafting (OPCABG) is becoming more and more popular to avoid the problems that come with cardiopulmonary bypass. Using dual antiplatelet treatment (DAPT) during surgery, typically involving Aspirin and a P2Y12 inhibitor like Clopidogrel, can be difficult because it may increase bleeding and require additional surgery, which can lead to morbidities and consume resources.

Objective: The goal is to evaluate how often patients who have OPCABG and are taking DAPT (aspirin and clopidogrel) experience bleeding that requires further surgery during the time around their operation.

Methods: At a tertiary-level hospital 289 patients who had OPCABG surgery and continued taking DAPT before and after the procedure from January 2019 to December 2024. We gathered data on operations, clinical conditions, and results.

Results: In 5.88% (17/289) of patients, re-exploration for bleeding took place. The following were significant predictors: BMI ≥30 kg/m² (OR 2.1), chronic renal disease (CKD) (OR 2.8), and intraoperative blood loss >600 mL (OR 3.2). The postoperative hemoglobin levels were lower in patients undergoing re-exploration, and their drain output and transfusion equirements were higher. Despite higher morbidity, there was no obvious difference in death between patients who had undergone re-exploration and those who had not.

Conclusion: In selected patients, continuing DAPT after OPCABG leads to a low rate of needing further surgery, similar to ONCABG without DAPT, showing that it is safe. Comorbid conditions like CKD and obesity raise the risk of bleeding.

Keywords: Coronary artery diseases, Off-pump coronary artery bypass surgery, OPCABG, On-pump coronary artery bypass surgery, ONCABG, double anti-platelet therapy (DAPT)

Introduction

For advanced coronary artery disease (CAD), the revascularization technique becomes the cornerstone of management, and coronary artery bypass surgery remains the mainstay of management for surgical revascularization [1, 2]. In select patients, off-pump coronary artery bypass surgery (OPCABG) has emerged as the preferred technique to prevent complications related to cardiopulmonary bypass. For reducing physiological stress, systemic inflammation, and organ dysfunction, OPCABG is the preferred technique, and the use of dual antiplatelet

Affiliation:

[1]Associate professor, Department of Cardiac surgery, Bangladesh Medical University, Shahbag, Dhaka, Bangladesh

[2]Assistant Registrar, Department of Cardiac Surgery, National Institute of Cardiovascular Diseases and Hospital, Dhaka, Bangladesh

[3]Assistant Professor, Department of Anesthesia, National Institute of Cardiovascular Diseases and Hospital, Dhaka, Bangladesh

[4]Medical Officer, Department of Cardiac Surgery, National Institute of Cardiovascular diseases and Hospital, Dhaka, Bangladesh

[5]Medical Officer, Department of Cardiac Surgery, Directorate General of Health Services (DGHS), Mohakhali, Dhaka, Bangladesh

***Corresponding author:**

Mohammad Samir Azam Sunny, Associate professor, Department of Cardiac surgery, Bangladesh Medical University, Shahbag, Dhaka, Bangladesh.

Citation: Mohammad Samir Azam Sunny, Ashiqur Rahman, Amirul Islam, Noor-E-Elahi Mozumder, Qazi Tazkia Ara. Incidence of Re-Exploration for Bleeding Following OPCABG Patient Continuing DAPT (Aspirin and Clopidogrel). Fortune Journal of Health Sciences 8 (2025): 554-558.

Received: June 03, 2025
Accepted: June 05, 2025
Published: June 17, 2025

Azam Sunny MS, et al., Fortune J Health Sci 2025
DOI:10.26502/fjhs.306

plays a significant role in assuring better results [3]. Many experts recommend the combination of aspirin and P2Y12 inhibitors, particularly clopidogrel, known as dual antiplatelet therapy (DAPT), to prevent graft occlusion and thrombotic events [4]. Keeping dual antiplatelet therapy going during the time around surgery can be difficult because it can lead to more bleeding issues, which are a big reason for complications and death after heart surgery [5, 7].

Re-exploration for bleeding, a prompt surgical intervention to treat potentially fatal hemorrhage, may raise the risk of infections, extended hospital stays, and death in addition to increasing resource consumption [8-10]. We still don't fully understand how often patients who have had OPCABG and are on DAPT need to have surgery again, and past studies have shown mixed results, even with improvements in surgical techniques and bleeding control. Some studies suggest a concerning link between DAPT and the need for more surgery, while other research shows that continuing DAPT can significantly raise the risk of bleeding because it avoids problems caused by bypass surgery [9, 10]. This doubt highlights the necessity for solid data to support risk-benefit analyses in postoperative care. Due to limitations in the research, current guidelines for DAPT therapy in OPCABG patients have low specificity. To better understand its safety profile and inform perioperative decision-making, this article examines the frequency and correlates of re exploration for bleeding in OPCABG patients undergoing ongoing DAPT. By filling this important knowledge gap, the study aims to weigh the need for thromboprophylaxis against the risks of bleeding, ultimately improving patient outcomes in CABG care. We here represent our center's experience with the incidence of re-exploration for bleeding in OPCABG patients continuing DAPT.

Methodology and Materials

This retrospective cohort study analyzed data from 289 consecutive patients who underwent OPCABG between January 2019 and December 2024 at a tertiary cardiac surgical center. The study aimed to look at how often patients on dual antiplatelet therapy (DAPT—Ecospirin and Clopedigrol) needed to have surgery again due to bleeding after their initial surgery. The institutional review board (IRB) granted ethical approval for the retrospective nature of the analysis. To be included, patients had to have undergone elective OPCABG, continue DAPT (meaning they used it without interruption in the 5 days preceding surgery and restarted it within 24 hours after surgery), and have complete records of their surgery and recovery. The exclusion criteria included ONCABG or conversion of OPCABG to ONCABG, emergency CABG (defined as surgery performed within 24 hours of acute coronary syndrome), and incomplete medical records or loss to follow-up. Databases and transfusion registries provided us with clinical data. Variables included demographics, comorbidities, preoperative DAPT regimen (e.g., Ecospirin + clopidogrel), duration, intraoperative variables (number of grafts, operative time, intraoperative blood loss (ml)), and postoperative outcomes (incidence of re-exploration for bleeding (defined as surgical reintervention for hemodynamic instability or chest tube output >1000 ml/24 hours unresponsive to medical management), total drain collection (first 24 hours and cumulative until removal), number of blood transfusions and fresh frozen plasma transfusions, postoperative hemoglobin levels, hospital lengths of stay, in-hospital morbidity, and mortality).

Statistical analysis

Descriptive statistics summarize continuous variables (mean, SD) and categorical variables (frequency, %). Univariate analyses (chi-square, Fisher's exact, or Mann-Whitney U tests) identified an association between variables and re-exploration. Covariates included demographics, comorbidities, DAPT type duration, intraoperative blood loss, and transfusion requirements. Sensitivity analyses excluded patients with preoperative anticoagulant use. Statistical significance was set at $p < 0.05$. Analyses were performed using SPSS v 28.0 (IBM Corp.).

Results

Out of 289 patients who had OPCABG while continuing dual antiplatelet therapy (DAPT— Aspirin 75 mg daily and Clopidogrel 75 mg daily), the average age was 65.4 years, and 78.5% (n=226) were male. The cohort exhibited high baseline cardiovascular risk: 42.3% (n=122) had diabetes mellitus (DM), 68.77% (n=198) had hypertension (HT), 18.9% (n=54) had chronic kidney disease (CKD), and 31.6% (n=91) had a history of previous myocardial infection (MI). The mean BMI was 28.1 ± 4.5 kg/m². Re-exploration for bleeding occurred in 5.88% (17/289) of patients. Indications included persistent chest tube output >1000 mL/24 hours (n=17) and hemodynamic instability due to tamponade (n=5). Patients who needed another surgery lost much more blood during the operation (850± 240 mL compared to 420± 150 mL, p= 0.003) and had lower hemoglobin levels after the surgery (8.2± 1.1 g/dL compared to 10.1± 1.4 g/dL, $p < 0.001$). Total drain output in the first 24 hours was higher in the re-exploration patients (850± 240 mL vs. 420± 150 mL, $p<0.001$). A statistical analysis found that certain factors predicted the need for re-exploration: losing more than 600 mL of blood during surgery (OR 3.2, 95% CI 1.4-7.1, $p = 0.0005$) and having chronic kidney disease (OR 2.8, 95% CI 1.1-6.9, $p = 0.03$). The independent predictor of re-exploration was CKD (OR 2.8, 95% CI 1.1-6.9, $p = 0.03$), BMI ≥ 30 kg/m² (OR 2.1, 95% CI 1.2-4.5, $p = 0.02$).

Citation: Mohammad Samir Azam Sunny, Ashiqur Rahman, Amirul Islam, Noor-E-Elahi Mozumder, Qazi Tazkia Ara. Incidence of Re-Exploration for Bleeding Following OPCABG Patient Continuing DAPT (Aspirin and Clopidogrel). Fortune Journal of Health Sciences. 8 (2025): 554-558.

Azam Sunny MS, et al., Fortune J Health Sci 2025
DOI:10.26502/fjhs.306

Table 1: Variables with mean/ Frequency

Variables	Mean/ frequency (n%)
Total no of patient	289
Total no of re-exploration for bleeding	17 (5.88%)
Age (Mean± SD)	65.4± 5.8
Sex (male %)	78.50%
BMI (Mean ± SD)	28.1 ± 4.5 kg/m²
Diabetes mellitus (n%)	42.30%
Hypertension (n%)	68.77%
Chronic kidney disease (n%)	18.90%
Previous myocardial infarction (n%)	31.60%
Per operative blood loss (pt required re ex-ploration)	850± 240 mL
Total no of re-exploration (n%)	17 (5.88%)
Cardiac temponade (n%)	5 (1.73%)
Time to re-exploration after surgery (hours, Mean ± SD)	9.5 ± 4.5 hours
Mean drain output (ml, Mean± SD) before reexploration	850± 240 mL
Mean drain output (ml, Mean± SD) after reexploration	480± 200 mL
Ventilation time (hours, Mean± SD)	11.3 ± 4.5 hours
ICU stay (Days, Mean± SD)	5.3± 2.5
Hospital stay (Days, Mean± SD)	9.5± 1.9
Blood products used (Mean± SD)	5.2 ± 3.3
In hospital mortality (n%)	0

Table 2: Variable, characteristic, values and association of variable with re exploration

Variable	Characteristic	Value	Logistic regression	
			OR	P- value
BMI	No re-exploration	28.1 ± 4.5 kg/m²	0.8	p >0.5
	Re-exploration	30.5 ± 5.3 kg/m²	2.1	p = 0.02
Chronic kidney diseases	Re exploration with no CKD	4	0.6	p >0.9
	Re exploration	13	2.8	p = 0.03
	with CKD			
	No re-exploration	420± 150 mL	0.7	p >0.08
Per operative	Re-exploration	600± 240 mL	3.2	p= 0.0005
blood loss				
Post-operative lower hemoglobin	No re-exploration	10.1± 1.4 g/dL		p >0.08
level	Re-exploration	8.2± 1.1 g/dL		p < 0.001

Discussion

This retrospective study of 289 patients undergoing off-pump coronary artery bypass grafting (OPCABG) found a 5.88% rate of reoperation for bleeding while on dual antiplatelet therapy (DAPT) with clopidogrel and aspirin. This rate is comparable to the 5% observed in on-pump CABG (ONCABG) patients not receiving DAPT [11], challenging the assumption that DAPT invariably increases postoperative bleeding risk. The reduced bleeding in OPCABG may stem from avoiding cardiopulmonary bypass (CPB), thereby minimizing coagulopathy and systemic inflammation. Recent findings support the safety of DAPT in OPCABG, consistent

Citation: Mohammad Samir Azam Sunny, Ashiqur Rahman, Amirul Islam, Noor-E-Elahi Mozumder, Qazi Tazkia Ara. Incidence of Re-Exploration for Bleeding Following OPCABG Patient Continuing DAPT (Aspirin and Clopidogrel). Fortune Journal of Health Sciences. 8 (2025): 554-558.

Azam Sunny MS, et al., Fortune J Health Sci 2025
DOI:10.26502/fjhs.306

with our observed re-exploration rate [12]. Enhanced surgical techniques, meticulous hemostasis, and strict transfusion strategies likely contribute. The average transfusion was two units of packed red blood cells (PRBCs), less than the three to four units typically required in ONCABG cases [13]. This reinforces the idea that OPCABG reduces bleeding risk, even with continued antiplatelet use (Song).

Obesity and chronic kidney disease (CKD) emerged as independent predictors of reoperation, underscoring the need for personalized risk stratification. CKD impairs platelet function, vascular integrity, and coagulation, increasing bleeding risk. Luan et al., reviewed 3,256 OPCABG cases and found that elevated preoperative creatinine and need for continuous renal replacement therapy (CRRT) were strongly linked to postoperative mortality, highlighting the importance of vigilant perioperative management in CKD patients, particularly when continuing DAPT [14]. The link between obesity and bleeding risk is complex. While obesity is traditionally associated with surgical complications, studies suggest a "bleeding paradox," where obese patients may have a lower risk due to a hypercoagulable state with elevated fibrinogen and prothrombotic factors. In a similar study reported that overweight patients (BMI 25–35 kg/m²) had significantly fewer re-explorations than those with BMI ≤24 kg/m² [15]. A multicenter study also found that higher BMI correlated with reduced postoperative bleeding, possibly due to coagulation changes [16]. Although not statistically significant, data from the Journal of Perioperative and Critical Intensive Care Nursing noted a decrease in re-exploration from 2.5% in patients with BMI 19–30 kg/m² to 1.5% in those with BMI >30 kg/m².

Re-exploration rates after OPCABG typically range from 1% to 3%. In contrast to other studies showing a 3–5-fold mortality increase with reoperation, our study found no mortality difference between re-explored and non-re-explored patients. Advances in critical care and timely intervention may explain this. However, re-exploration was linked to longer hospital stays and higher infection rates, emphasizing the importance of preventive measures such as topical hemostatics and antifibrinolytics for high-risk patients [17]. Prior to OPCABG particularly with ongoing DAPT—patients with CKD and obesity should undergo thorough bleeding risk assessment. The timing of discontinuing P2Y12 inhibitors like clopidogrel should be carefully weighed to balance bleeding risk against thrombotic protection [18]. Enhanced intraoperative and postoperative monitoring, with prompt intervention protocols, is essential to mitigate complications. Patients undergoing OPCABG while on aspirin and clopidogrel—especially those with CKD—are at higher bleeding risk. While obesity may not heighten this risk and might even offer a protective effect, individualized risk stratification remains crucial. Ongoing advancements in surgical techniques, hemostatic strategies, and interdisciplinary planning are critical for improving outcomes in this patient population.

Strength and Limitation

This large, granular dataset strengthens validity, but the retrospective design limits causal inference. Although aspirin and clopidogrel were used consistently, the differences in how long DAPT was given before surgery were not looked at; also, since the study was done at just one center, the results may not apply to other settings.

Conclusion

This study shows that keeping patients on dual antiplatelet therapy (DAPT) during off-pump coronary artery bypass grafting (OPCABG) leads to a low rate of needing to re-exploration surgery for bleeding (5.8%), which is similar to the rates seen in on-pump CABG without DAPT. These findings challenge traditional concerns about perioperative DAPT use, suggesting that with careful patient selection and meticulous surgical technique, bleeding risks can be effectively controlled. Key predictors of re-exploration included intraoperative blood loss, chronic kidney disease, and obesity, underscoring the importance of individualized perioperative risk assessment. Although re-exploration increased transfusion needs and length of stay, it was not linked to higher in-hospital mortality, highlighting the value of early detection and management. These results support a tailored approach to DAPT management in OPCABG, particularly in patients at high thrombotic risk. We need further prospective, multicenter studies to validate these findings and inform clinical guidelines.

Conflicts of interest: None

Source of funding for the work: Nil

References

1. World Health Organization. The top 10 causes of death [Internet]. World Health Organization (2024).
2. Virani SS, Newby LK, Arnold SV, et al. AHA/ACC/ACCP/ASPC/NLA/PCNA Guideline for the Management of Patients with Chronic Coronary disease: A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. Circulation 148 (2023): e9–119.
3. Fudulu D, Benedetto U, Gustavo Guida Pecchinenda, et al. Current outcomes of off-pump versus on-pump coronary artery bypass grafting: evidence from randomized controlled trials. Journal of thoracic disease 8 (2016): S758–71.

Azam Sunny MS, et al., Fortune J Health Sci 2025
DOI:10.26502/fjhs.306

4. Levine GN, Bates ER, Bittl JA, et al. ACC/AHA Guideline Focused Update on Duration of Dual Antiplatelet Therapy in Patients With Coronary Artery Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines: An Update of the 2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention, 2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery, 2012 ACC/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease, 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction, 2014 AHA/ACC Guideline for the Management of Patients With Non–ST-Elevation Acute Coronary Syndromes, and 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. Circulation (2016): 134.

5. Kinlay S, Quach L, Cormack J, et al. Premature Discontinuation of Dual Antiplatelet Therapy After Coronary Stenting in Veterans: Characteristics and Long-Term Outcomes. Journal of the American Heart Association 10 (2021).

6. Katrien François, Sofie Gevaert. Discontinuation of platelet inhibitors before elective cardiac surgery: a well-considered choice. Interactive Cardiovascular and Thoracic Surgery 33 (2021): 710–1.

7. UNSWORTH-WHITE J. Cardiac surgery for the elderly: a surgeon's perspective. Heart 82 (1999): 125–5.

8. Stroo JF, Steenbergen van, HM A, et al. Long-term Outcome of Reexploration for Bleeding After Coronary Artery Bypass Grafting. Journal of cardiothoracic and vascular anesthesia 37 (2023): 1624–30.

9. Karthik S, Grayson AD, McCarron EE, et al. Reexploration for bleeding after coronary artery bypass surgery: risk factors, outcomes, and the effect of time delay. The Annals of Thoracic Surgery 78 (2004): 527–34.

10. Patel K, Adalti S, Runwal S, et al. Re-exploration after off-pump coronary artery bypass grafting: Incidence, risk factors, and impact of timing. Journal of Cardiac Surgery 35 (2020): 3062–9.

11. Song Y, Song JW, Shim JK, et al. Optimal Anticoagulation during Off Pump Coronary Artery Bypass in Patients Recently Exposed to Clopidogrel. Yonsei Medical Journal 54 (2013): 1119–9.

12. Pullan M, Kirmani BH, Conley T, et al. Should obese patients undergo on- or off- pump coronary artery bypass grafting? European journal of cardio-thoracic surgery: official journal of the European Association for Cardio-thoracic Surgery 47 (2014).

13. Levine G, Patrick C, O'gara T, et al. ACC/AHA FOCUSED UPDATE 2016 ACC/AHA Guideline Focused Update on Duration of Dual Antiplatelet Therapy in Patients With Coronary Artery Disease PCNA/SCAI/STS Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease, 2013 ACCF/AHA Guideline for the Management of ST-Elevation Myocardial Infarction, 2014 AHA/ACC Guideline for the Management of Patients With Non-ST-Elevation Acute Coronary Syndromes, and 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. Journal of the American College of Cardiology 68 (2016).

14. Luan T, Zhuang Y, Nie W, et al. The death risk factors of patients undergoing re-exploration for bleeding or tamponade after isolated off-pump coronary artery bypass grafting: a case–control study. BMC Cardiovascular Disorders 21 (2021).

15. Yusuf S, Hawken S, Ôunpuu S, et al. Effect of Potentially Modifiable Risk Factors Associated with Myocardial Infarction in 52 Countries (the INTERHEART study): case-control Study. The Lancet 364 (2004): 937–52.

16. Nardi P, Pisano C, Turturici M, et al. The impact of dual antiplatelet therapy administration on the risk of bleeding complications during coronary artery bypass surgery. Polish Journal of Cardio-Thoracic Surgery 18 (2021): 145–51.

17. To continue or discontinue aspirin in the perioperative period: a randomized, controlled clinical trial. British Journal of Anaesthesia 104 (2010): 305–12.

18. Saeed Z, Sirolli V, Bonomini M, Gallina S, Renda G. Hallmarks for Thrombotic and Hemorrhagic Risks in Chronic Kidney Disease Patients. International Journal of Molecular Sciences 25 (2024): 8705.

Citation: Mohammad Samir Azam Sunny, Ashiqur Rahman, Amirul Islam, Noor-E-Elahi Mozumder, Qazi Tazkia Ara. Incidence of Re-Exploration for Bleeding Following OPCABG Patient Continuing DAPT (Aspirin and Clopidogrel). Fortune Journal of Health Sciences. 8 (2025): 554-558.