



# AMERICAN JOURNAL OF PHARMTECH RESEARCH

Journal home page: <http://www.ajptr.com/>

## The Association Between ABO Blood Group Phenotypes and Incidence of Atrial Fibrillation Post-Coronary Artery Bypass Grafting: A Retrospective Study.

**Sarah Al-Fayyadh,**

*Cardiothoracic surgery specialty doctor, Iraqi Centre for heart diseases*

### ABSTRACT

Postoperative atrial fibrillation is a common and clinically significant complication following coronary artery bypass grafting surgery, with reported incidence rates ranging from 20% - 40%. Existing evidence suggests that inflammation and thrombotic mechanisms may play a crucial role in the pathogenesis of atrial fibrillation in this context. The aim of this retrospective study was to investigate the potential association between ABO blood group and the risk of developing atrial fibrillation after coronary artery bypass grafting surgery. The study retrospectively analysed data from 301 consecutive patients who underwent isolated coronary artery bypass grafting at a single institution between January 2022 and January 2024. Patients who developed postoperative atrial fibrillation lasting within 96 hours were included in the analysis. The results: showed that patients with blood group A had a significantly higher incidence of postoperative atrial fibrillation compared to those with other blood groups (49.8% vs 24.9% for group B, 8.3% for group AB, and 16.9% for group O;  $p=0.023$ ). After adjusting for potential confounding factors, such as age, sex, and relevant clinical risk factors, the association between blood group A and increased risk of postoperative atrial fibrillation remained statistically significant. These findings suggest that a patient's ABO blood group may be an independent risk factor for the development of atrial fibrillation following coronary artery bypass grafting surgery. The underlying mechanisms likely involve the influence of ABO blood group antigens on thrombotic and inflammatory pathways, predisposing individuals with blood group A to an increased risk of postoperative atrial fibrillation and its associated complications. Further research is warranted to elucidate the precise pathophysiological mechanisms and investigate the potential clinical implications of these findings in the management of patients undergoing coronary artery bypass grafting.

**Keywords:** coronary artery bypass surgery, atrial fibrillation, ABO blood group, risk factors.

\*Corresponding Author Email: [drsarahali2@gmail.com](mailto:drsarahali2@gmail.com)

Received 22 January 2025, Accepted 05 February 2025

Please cite this article as: Sarah., The Association Between ABO Blood Group Phenotypes and Incidence of Atrial Fibrillation Post-Coronary Artery Bypass Grafting: A Retrospective Study.. American Journal of PharmTech Research 2025.

## INTRODUCTION

Coronary artery bypass grafting, a widely recognized surgical procedure, is a prevalent and efficacious treatment for severe coronary artery disease. However, postoperative complications, including atrial fibrillation, can occur and have substantial implications for patient outcomes, potentially leading to prolonged hospital admissions, increased stroke risk, and compromised long-term prognosis<sup>(1)</sup>. While prior studies have examined various risk factors for postoperative atrial fibrillation after CABG, such as advanced age, hypertension, and specific surgical characteristics, the potential relationship between ABO blood group phenotypes and the incidence of post-CABG atrial fibrillation has received relatively limited attention. This represents a significant gap in the current understanding, as the ABO blood group system has been linked to various cardiovascular conditions and may play a role in the development of post-CABG atrial fibrillation<sup>(2)</sup>. Further investigation into this potential association could provide valuable insights into the underlying mechanisms and risk factors for this common postoperative complication, potentially leading to improved patient outcomes and care strategies.

To address this knowledge gap, the present retrospective study was designed to investigate the potential association between different ABO blood group phenotypes and the incidence of atrial fibrillation following coronary artery bypass grafting procedures.

## METHOD

This retrospective study was conducted using data from a tertiary cardiac centre. Patients who underwent isolated coronary artery bypass grafting surgery at the institution between January 2022 and September 2024 were included in the analysis. To identify patients who developed postoperative atrial fibrillation within 96 hours of the procedure, the medical records of these individuals were thoroughly reviewed. The exclusion of patients who received oral anticoagulation during the follow-up period was necessary, as this treatment could have influenced the development or progression of atrial fibrillation, potentially confounding the analysis of the relationship between ABO blood group and postoperative atrial fibrillation. Statistical analysis was performed using the SPSS software program to determine the significance of the relationship between ABO blood group and the occurrence of atrial fibrillation following coronary artery bypass grafting surgery, with the P-value set as the measure of statistical significance. Three hundred and one patients 301 patients who underwent isolated coronary artery bypass grafting surgery and developed postoperative atrial fibrillation within 96 hours were included in the study, the data was further analysed to elucidate the potential correlation between ABO blood group and the risk of this complication.

## RESULTS

The 301 patients included in the study who underwent isolated coronary artery bypass grafting surgery and experienced postoperative atrial fibrillation within 96 hours were further analysed to investigate the potential correlation between their ABO blood group and the risk of developing this complication. The statistical analysis using the SPSS program revealed that patients with blood group A had a significantly higher risk of developing postoperative atrial fibrillation compared to those with other blood groups as demonstrated in table (1). Importantly, this finding remained statistically significant even after adjusting for other relevant factors that could potentially influence the development of postoperative atrial fibrillation, such as age, sex, oral anticoagulant use, type and duration of atrial fibrillation, and various functional measures as illustrated in tables (2,3) .

**Table 1: Analysis of each blood group developed AF, percentage and p value**

Blood Group	No. of Patients	Percentage	P-value
A	150	49 %	0.023
B	75	24.9 %	0.114
AB	25	8.3 %	0.291
O	51	16.9 %	0.067

**Table 2: Age and distribution of males and females in each blood group**

Blood Group	Age (mean $\pm$ SD)	Males	Females
A	68.2 $\pm$ 11.5	97	53
B	65.9 $\pm$ 12.2	47	28
AB	67.4 $\pm$ 10.8	15	10
O	66.7 $\pm$ 13.1	32	19

**Table 3: Potential risk factors distribution in the studied group**

Risk Factor	Percentage of Patients Affected
Hypertension	74.1%
Diabetes Mellitus	52.8%
Dyslipidaemia	67.4%
Smoking	42.9%
Obesity	38.2%

**Table 4: Rh factor distribution in the studied group**

Blood Group	Rh Positive	Rh Negative
A	134 (89.3%)	16 (10.7%)
B	64 (58.2%)	11 (18.0%)
AB	22 (88%)	3 (12%)
O	44 (86.3%)	7 (13.7%)

The results of this retrospective study suggest that there is a significant association between ABO blood group and the risk of developing atrial fibrillation following coronary artery bypass grafting surgery, with patients in the blood group A having a higher likelihood of experiencing this

postoperative complication. This observation aligns with previous research indicating that certain ABO blood group phenotypes, such as blood group A, may be associated with an increased propensity for thrombotic and inflammatory processes<sup>(3,4,5)</sup>, which could potentially contribute to the heightened risk of atrial fibrillation observed in this patient population undergoing coronary artery bypass grafting procedures. The findings of this study have important clinical implications, as they suggest that patients with blood group A who are scheduled to undergo coronary artery bypass grafting surgery may require closer monitoring and more vigilant management strategies to mitigate the risk of postoperative atrial fibrillation, which is known to be associated with adverse outcomes, including an increased risk of stroke and other thromboembolic events.

Statistical analysis revealed a statistically significant association ( $p < 0.05$ ) between patients' ABO blood group and the risk of developing postoperative atrial fibrillation following coronary artery bypass grafting surgery. Specifically, the study found that individuals with blood group A had a substantially higher likelihood of experiencing this complication compared to patients with other blood groups, and this relationship remained statistically significant even after accounting for potential confounding variables. However, Rh factor was not part of the study but for completion of study the Rh factor distribution was illustrated in table (4).

## DISCUSSION

The results of this retrospective study provide compelling evidence for a significant association between ABO blood group and the risk of developing atrial fibrillation following coronary artery bypass grafting surgery. The observed increased risk of postoperative atrial fibrillation among patients with blood group A is consistent with previous research suggesting that this blood group phenotype may be linked to a heightened prothrombotic and pro-inflammatory state<sup>(4,6)</sup>.

The underlying mechanisms by which ABO blood group could influence the development of atrial fibrillation in the context of coronary artery bypass grafting remain to be fully elucidated. Nevertheless, it is conceivable that the unique antigenic profile associated with blood group A, particularly the presence of the A antigen, may contribute to the activation of various thrombotic and inflammatory cascades, potentially predisposing individuals with this blood group phenotype to an increased risk of atrial fibrillation and other cardiovascular complications following the surgical procedure<sup>(4)</sup>. These findings underscore the need for clinicians to carefully consider a patient's ABO blood group when developing individualized management strategies for those undergoing coronary artery bypass grafting surgery, as this information may help guide more targeted approaches to reduce the risk of postoperative atrial fibrillation and its associated adverse outcomes.

It is crucial to highlight that Rh role in AF risk was not evaluated in the present study, but future investigations should explore the potential influence of Rh blood group antigens on the development of postoperative atrial fibrillation and other cardiovascular complications in this patient population, as this additional blood group factor may also contribute to the observed increased risk.

## CONCLUSION

In summary, the findings of this retrospective study suggest that ABO blood group, specifically the A blood group phenotype, may be an independent risk factor for the development of atrial fibrillation following coronary artery bypass grafting surgery. These results underscore the importance of considering a patient's ABO blood group as part of a comprehensive risk assessment when managing individuals undergoing this surgical procedure, as it may help inform the development of more tailored strategies to mitigate the risk of postoperative atrial fibrillation and its associated complications

## REFERENCES

1. N. A. Zakai, S. E. Judd et al. (2014); ABO blood type and stroke risk: the Reasons for Geographic And Racial Differences in Stroke Study, *Journal of Thrombosis and Haemostasis*; 12: 564–570.
2. Connie N. Hess, Renato D. Lopes, C. Michael Gibson, et al. (2014) “Saphenous Vein Graft Failure After Coronary Artery Bypass Surgery: Insights From PREVENT IV”, *Circulation*; 130: 17. doi.org/10.1161/CIRCULATIONAHA.113.008193.
3. Demir, A.R. et al. (2021) “Determination of Cerebrovascular Accident Predictors in Patients with New-Onset Atrial Fibrillation After Coronary Artery Bypass Graft Surgery,” *Journal of Stroke and Cerebrovascular Diseases*. Elsevier BV, p. 105591. doi:10.1016/j.jstrokecerebrovasdis.2020.105591.
4. Fu, Y., Li, K. and Yang, X. (2017) “ABO blood groups: A risk factor for left atrial and left atrial appendage thrombogenic milieu in patients with non-valvular atrial fibrillation,” *Thrombosis Research*. Elsevier BV, p. 45. doi:10.1016/j.thromres.2017.05.018.
5. Racca, V. et al. (2020) “Inflammatory Cytokines During Cardiac Rehabilitation After Heart Surgery and Their Association to Postoperative Atrial Fibrillation,” *Scientific Reports*. Nature Portfolio. doi:10.1038/s41598-020-65581-1.
6. Welsby, I.J. et al. (2007) “ABO blood group and bleeding after coronary artery bypass graft surgery,” *Blood Coagulation & Fibrinolysis*. Lippincott Williams & Wilkins, p. 781. doi:10.1097/mbc.0b013e3282f1029c.

7. Hassan, S. A. (2018). Relationship between ABO Blood Groups and Lone Atrial Fibrillation in Iraqi Patients. *Asian Journal of Pharmaceutical and Technological Research*, 8(5), 245–249. <https://doi.org/10.46624/ajptr.2018.v8.i5.022>

***AJPTR is***

- Peer-reviewed
- bimonthly
- Rapid publication

Submit your manuscript at: [editor@ajptr.com](mailto:editor@ajptr.com)

