

## “Postoperative Bleeding in *Coronary Artery Bypass Grafting (CABG)* Patients In Bangabandu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh”

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## Abstract

## Original Research Article

**Background:** Post-operative blood loss remains a major problem after cardiopulmonary bypass. A common complication after Coronary Artery Bypass Grafting (CABG) is postoperative bleeding, which is considered as an important problem. **Objective:** The aim of this study is to study only patients who have never used drugs above so that it can assess postoperative bleeding in CABG with the absence of high-risk medications related to postoperative bleeding. **Methods:** This cross sectional study was carried out at the Department Of Cardiac Surgery in Bangabandu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from January 2019 to December 2019. 50 patients who were candidates for CABG surgery participated in the study. Inclusions criteria included who were candidates for CABG surgery, avoiding the use of blood clotting drugs before surgery, avoiding the use of immunosuppressant, and the absence of an underlying medical condition such as kidney diseases. Patients with inflammatory, platelet diseases, or any coagulation disorder were excluded. All patients initially tested for hemoglobin, platelets and hemoglobin and International Normalized Ratio (INR). In addition to testing for hemoglobin, the amount of bleeding and packed red cell; frozen plasma and platelets were recorded. **Results:** Fifty patients who were candidates for elective surgery, including 33 men (66%) and 17 women (34%) were enrolled in this study. The mean patient age was 8.70+57.9years old. Test showed that mean hemoglobin level of patients before surgery was pre-operative of 1.5+12.4 g/dL, mean platelet was equal to 54.14+250.8 thousand/  $\mu$ L and an average international normalized ratio (INR) was equal to 0.12+1.07. The results after surgery also showed that: The total units of given packed red cell; frozen plasma and platelets were (3.14+1.90; 2.34+2.36 and 0.06 +0.42). Also, postoperative hemoglobin was 1.30+10.30 g/dL, which significantly decreased compared to pre-operative hemoglobin. Bleeding in patients was observed with an average of 537.5+973mL. Of course, the amount of bleeding in any patient was not caused further surgery. **Conclusion:** That the use of some drugs surgery can be a good way to reduce the risk of bleeding after surgery or on-use of some drugs can reduce the risk of bleeding after surgery with a minimum of morbidity and mortality. It is suggested that other researchers after designing clinical trials and using lower doses for effective drugs such as Clopidogrel and compared to control groups, or different doses of the N-acetylcysteine drug be reported more documentation to improve the bleeding after surgery.

**Keywords:** Postoperative Bleeding, CABG, Hemoglobin, Platelet.

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## INTRODUCTION

CVD is a major public health problem throughout the world. It is the number one cause of morbidity and mortality world-wide. Cardiovascular disease (CVD) is one of the major health problems that are prevalent in Bangladesh and will be followed by a lot of deaths [1]. The economic impact of different types of CVD is enormous. Traditionally, Bangladesh is a developing country burdened with communicable

diseases. However, like many other low-income countries in the world, she has been experiencing epidemiological transition; the prevailing disease pattern is changing from communicable diseases to non-communicable diseases (NCD). Atherosclerosis, particularly in coronary heart causes heart failure and there is need to special treatment [2, 3]. Coronary Artery Bypass Grafting (CABG) surgery is one of the effective and standard methods for treatment of coronary heart disease [4, 5]. Although surgery is a

reliable method to improve myocardial perfusion, but nevertheless there are multiple complications after the procedure [5, 6]. A common complication after CABG is postoperative bleeding, which is considered as an important problem [7], and the most common complication in these patients leads to reoperation, so that the results of a study showed that postoperative bleeding with incidence of 58.7% is the main cause of reoperation which in 90% of cases has occurred within the first 24 hours after surgery [8]. On the other hand, massive bleeding after CABG is a major cause of postoperative mortality [9]. Surgery is normal, but arteries bleeding are raised as life-threatening condition which is usually caused by rupture or leakage from sutures. On the other hand, venous bleeding is more common than arteries bleeding and can be created due to inadequate surgical hemostasis or coagulation disorders [10]. Cardiopulmonary bypass has many hemostatic effects. Blood in contact with pipes and tanks pump is considered as a severe provocation to initiate inflammatory responses, and leads to activation of the hemostatic system [11]. However, inadequate surgical hemostasis is the most common cause of bleeding after Cardiopulmonary Bypass (CPB), but certainly coagulation disorders occur and can be unacceptable when it associated with micro vascular bleeding. Facing blood with oxygenators and CPB circuit causes platelet activation, degranulation and platelet aggregation. In addition, the relative thrombocytopenia usually occurs after CPB due to thin the blood and aggregation, platelet adhesion and degradation.

The most common cause of extensive bleeding in cardiac surgery patients is fibrinolysis, and platelet inhibition activity of CPB, especially in elderly patients [12]. In addition to the economic burden, administration of blood products in cardiac surgery have important clinical outcomes, that increased hospital mortality, renal dysfunction, per-operative infections, sepsis, and permanent impairment of quality of life and pulmonary dysfunction and prolonged mechanical ventilation are among these side effects [13-16]. The use of some drugs before surgery also adds to the increased risk of bleeding. For example, clopidogrel is an antiplatelet drug that has an important place among cardiovascular drugs. The main application of the drug is in combination with aspirin in the prevention of obstruction in patients, who have been undergoing CABG [17]. The aim of this study is to study only patients who have never used drugs above, so that it can

assess postoperative bleeding in CABG with the absence of high-risk medications related to postoperative bleeding.

## MATERIAL AND METHODS

This cross sectional study was carried out at the Department Of Cardiac Surgery in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from January 2019 to December 2019. After obtaining permission from the university ethics committee, 50 patients who were candidates for CABG surgery knowingly participated in this cross-sectional study with the personal consent in writing. Our hypotheses were that CPB can increase bleeding after CABG. Inclusion criteria included who were candidates for CABG surgery, avoiding the use of blood-clotting drugs before surgery, avoiding the use of immunosuppressant, and the absence of an underlying medical condition such as kidney diseases. Also, in order to remove the confounding factors, the patients with inflammatory, platelet diseases, or any coagulation disorder were excluded. Also, each of the patients was free to leave the study at any time. All patients initially tested for hemoglobin, platelets and hemoglobin and International Normalized Ratio (INR) and after the surgery, in addition to testing for hemoglobin, the amount of bleeding and packed red cell; frozen plasma and platelets were recorded. All the data were analyzed by SPSS software Version 19.0.

## RESULTS

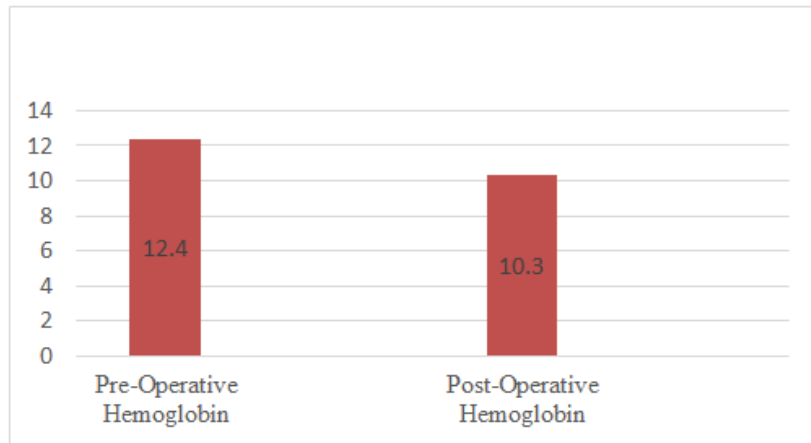
Fifty (50) patients who were candidates for elective surgery, including 33 men (66%) and 17 women (34%) were enrolled. The mean patient age was 8.70+57.9 years old. Tests showed that mean hemoglobin level of patients before surgery was preoperative of 1.5+12.4 g/dL, mean platelet was equal to 54.14+250.8 thousand/ $\mu$ L and an average international normalized ratio (INR) was equal to 0.12+1.07 [Table 1]. The results after surgery also showed that: The total units of given packed red cell; frozen plasma and platelets were (3.14+1.90; 2.34+2.36 and 0.06+0.42 respectively [Table 2]. Also, postoperative hemoglobin was 1.30+10.30 g/dL, which significantly decreased compared to preoperative hemoglobin [Figure 1]. Bleeding in patients was observed with an average of 537.5+973 mL. Of course, the amount of bleeding in any patient was not caused further surgery.

**Table-1: Pre-Operative Details of 50 elective patients' candidate for CABG**

Pre-Operative Details (n=50)	
Age	57.9+8.70
gender (%male)	66
preoperative hemoglobin	12.4+1.5
preoperative platelet $\times 10^3$	250.8+54.14
Preoperative INR	1.07+0.12

**Table-2: Perioperative complications (transfusion requirements; amount of bleeding (N=50))**

Number of patients who need packed red cell, fresh frozen plasma, and platelete transfusion; Total amount of bleeding (N=50)	
Packed Red cell (%)	46 (92%)
Total unis	3.14+1.9
Fresh Frozen plasma (%)	27 (54%)
Total unis	2.34+2.36
Platelet (%)	1 (2%)
Total unis	0.06+0.42
Bleeding of the patients (%)	50 (100%)
Total amount (mL)	973+537.5

**Fig-1: Comparison of Pre and Post-Operative Hemoglobin.**

## DISCUSSION

According to the results, patients' hemoglobin level after surgery in patients undergoing CABG significantly reduced, and bleeding of these patients lead to need for blood products, including packed red cell; has been frozen plasma and platelets. The importance of these findings show the postoperative complications in the ICU, because lack of attention to this issue can be associated with irreparable damage on the patients, and in addition to other problems in the ICU[18], it increases even the risk of kidney and safety diseases [19]. Obviously, one of the essential ways to compensate for bleeding is the use of blood products, but increased use of these products leads to increased risk of transfusion-transmitted diseases, as well as kidney, liver disorders and immune responses.[20] Risk of immune responses is more important in this respect that these patients following bypass pump have faced with acute inflammatory and safety changes and many factors, including interleukins and complement in these patients has changed, all of which helps the deteriorating conditions in kidney and liver of the patients [21]. The risk of blood products in addition to the risk of bypass pump can increase the patients' morbidity and mortality. It should be noted that if patients have underlying comorbidities, this risk will be greater. For example, in cancer patients [22], and Chronic Obstructive Pulmonary Disease (COPD) patients with immune disorders, inflammatory

responses will be more [23-25]. According to what was said finding a way to reduce this complication and minimize morbidity and mortality is prevention of increased bleeding after surgery of these patients with other methods. In fact, we can help to reduce the postoperative bleeding using a preoperative drug or the lack of the use of a drug (also with less dose and time). The studies show that among existing drugs, Clopidogrel is one of the drugs with the most effect on the risk of bleeding [26]. Also using a combination of drugs, efforts are made to reduce the risk of bleeding. It has been observed that N-acetyl cysteine drug is associated with reduced bleeding after CABG surgery [27]. However, this information needs for further studies.

## CONCLUSION

According to the results of this study and other studies, we conclude that the use of some drugs surgery can be a good way to reduce the risk of bleeding after surgery or non-use of some drugs can reduce the risk of bleeding after surgery with a minimum of morbidity and mortality. It is suggested that other researchers after designing clinical trials and using lower doses for effective drugs such as Clopidogrel and compared to control groups, or different doses of the N-acetyl cysteine drug be reported more documentation to improve the bleeding after surgery.

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