REDUCTION IN PLATELET COUNT IN POST CABG PATIENTS WITH OR WITHOUT IABP- AN EXPERIENCE AT AFIC/NIHD RAWALPINDI

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ABSTRACT

Objective: To study the reduction in platelet count in patients after coronary artery bypass grafting having IABP placed peri operatively with and without IABP placed.

Study Design: Descriptive Study.

Place and Duration of Study: Armed Forces Institute of Cardiology/National Institute of Heart Diseases (AFIC/NIHD) from Jan 2012 to Dec 2013.

Patients and Methods: All cases with intra-aortic balloon pump (IABP) placed peri operatively (coronary artery bypass grafting, CABG) during this time period were examined in detail. Only those patients who had a platelet count of 150,000 or more pre operatively were included in the study. Patients taking medicines pre operatively that lead to decrease in platelet count were excluded. Platelet counts of each patient were analyzed till the third post-operative day. One hundred and fifty patients were divided into two equal groups, group A without IABP and group B with IABP.

Results: Patients without IABP (group A) pre operatively had mean platelet count of 223.57 ± 83.02, on first post op day the mean platelet count was 171.0 ± 59.0 which was 76.48% of preoperative level, on second post op day the mean platelet count was 168.1 ± 59.4 which was 75.20% of preoperative level and on third post op day the mean platelet count was 167.5 ± 60.0 which was 74.95% of pre-operative level. Patients with IABP (group B), pre operatively had mean platelet count of 205.32 ± 50.257, on first post op day the mean platelet count of 152.71 ± 43.77 which was 74.37% of preoperative level, on second post op day the mean platelet count was 112.11 ± 42.571 which was 54.60% of preoperative level and on third post op day the platelet count was 90.87 ± 41.538 which was 44.25% of preoperative level. There was significant reduction in platelet count from the pre-operative level in both the groups.

Conclusion: Reduction in platelet count in post CABG patients is similar in both the groups i.e. in whom IABP is and those patients who are not treated with IABP.

Keywords: Intra-aortic balloon pump, Thrombocytopenia.

INTRODUCTION

Thrombocytopenia, relative to baseline or absolute is commonly encountered in cardiac surgery patients. The platelet count falls after open heart surgery by approximately 30% by the conclusion of surgery, reaching a nadir of 40 % to 60% on the second or third post operative day[1].

Surgery is the most common cause of thrombocytosis[2]. In contrast to most other operative procedures, however, cardiopulmonary bypass results in an initial fall in the platelet count[3]. In addition to drug induced thrombocytopenia, the mechanical destruction of platelets and hemodilution in the bypass circuit play important roles in the occurrence of postoperative thrombocytopenia. Apart from sepsis and post transfusion purpura, intra-aortic balloon pump (IABP) is the most common cause of thrombocytopenia post operatively. The fall in platelet count is reduced by one third to one half in off-pump bypass surgery when compared to surgery performed using cardiopulmonary bypass[4]. Typically, the nadir platelet count is on the second or third day after surgery, but 10% of patients continue to have a platelet count of 50% of baseline on the fourth postoperative day[5] while platelet count falls steadily until fourth post operative day

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Received: 03 Feb 2014; Accepted: 5 Mar 2014

when IABP is in use and then stabilize. The platelet count falls to 50% of baseline in 26% of patients with an IABP[6]. After open heart surgery, patients may receive a host of medications, such as antibiotics or anti arrhythmic agents, which are known to cause thrombocytopenia. The drug most likely to cause thrombocytopenia in ICU patients, however, is heparin[7]. The diagnosis of HIT, however, may be very difficult. As noted, some patients may have prolonged, significant thrombocytopenia when compared with the preoperative platelet count, making the degree of thrombocytopenia and the timing of thrombocytopenia less useful as diagnostic tools. Laboratory support is limited as well. The enzyme linked immunoassays yields positive result in approximately 50% of patients after cardiopulmonary bypass, while the true incidence of HIT is thought to be around 1%[8].

Our study was conducted to evaluate IABP as cause of falling platelet count in post CABG patients.

PATIENTS AND METHODS

This retrospective interventional study was conducted at post operative ITC for adults in Armed Forces Institute of Cardiology/ National Institute of Heart Diseases Rawalpindi between January 2012 to December 2013. Patients between the ages of 15 to 80 years undergoing CABG surgery with IABP placed perioperatively were included in the study. While, patients with platelet count less than 150,000 perioperatively taking any medication cauding thrombocytopenia except heparin were excluded from the study.

Two groups were included in the study. Group A constituted of post CABG patients without IABP and group B constituted of post CABG patients with IABP. The detailed record of patients fulfilling inclusion criteria was made using a pre designed proforma. All necessary information like patient's age, gender, height, weight, comorbidities, preoperative and postoperative platelet count was added.

Data had been analyzed using SPSS version 19. Descriptive statistics were used to describe the results. Paired sample t-test was applied to compare preoperative platelet counts and post operative platelet count within the group. A p-value < 0.05 was considered as significant.

Table 1: Paired samples test of post CABG patients without IABP.

	Group A		Group B	
Time	Mean difference	*p*-value	Mean difference	*p*-value
Day 1	171.000	< 0.001	52.63	< 0.001
Day 2	168.133	< 0.001	93.213	< 0.001
Day 3	165.187	< 0.001	114.440	< 0.001

RESULTS

Total 150 patients were included in the study, 75 in each group. In group A i.e mean age of patients was 56.79 ± 8.8 years, minimum age was 17 years and maximum age was 77 years. Six (8%) patients were females and 69 (92%) patients were male. The mean BMI was 26.08 ± 3.7 with minimum BMI of 18.86 and maximum BMI of 38.45. Among them 29.3% were diabetic, 52% were hypertensive, 32%were smokers and 2.6% had other endocrinal abnormalities. In group B, the mean age of patients 55.85 ± 9.63 years. Minimum age was 33 years and maximum age was 75 years. Eleven (14.7%) patients were females and 64 (85.3%) patients were male. The mean BMI was 26.34 ± 3.75 with minimum BMI of 15.94 and maximum BMI of 37.46. Among them 31% were diabetic, 42% were hypertensive, 24% were smokers and 2.6% had other endocrinal abnormalities. Both the groups are comparable with respect to demographic and baseline characterstics.

In group A, the mean platelet count preoperatively was 223.57 ± 83.02. The mean platelet count on first postoperative day was 171.0 ± 59.0 i.e 76.48% of preoperative count. The mean platelet count on second postoperative day was 168.13 ± 59.4 i.e 75.20% of preoperative count. The mean platelet count on third postoperative day was 167.59 ± 60.054 i.e 74.95% of preoperative count. (Figure-1)

The mean platelet count preoperatively was 205.32 ± 50.2. The mean platelet count on first postoperative day was 152.71 ± 43.77 i.e, 74.37% of preoperative count. The mean platelet count on second postoperative day was 112.11 ± 42.571 i.e, 54.60% of preoperative count. The mean platelet count on third postoperative day was 90.87 ± 41.538 i.e, 44.25% of preoperative count. (Figure-2)

Reduction in platelet count from preoperative to postoperative day 1, day 2 and day 3 was significant in both the groups. (Table-1)

DISCUSSION

Moulopoulos in 1962[9] first described the principle of Intra Aortic Balloon Pump (IABP). This mechanical assist device works on the principle of diastolic counter pulsation, augmenting coronary perfusion and reducing afterload. This improves myocardial oxygen supply, reduces oxygen demand and enhances cardiac output. Kantrowitz in 1968 published the first report on the clinical performance of IABP[10]. Since that time, IABP has gradually become an essential part of the cardiac surgeon's armamentarium.

The main finding of our study was the reduction in platelet count in subsequent postoperative days in post CABG patients treated with IABP. The reduction in platelet count after IABP implantation has been investigated in previous studies,[11-15]with conflicting results. McCabe[12] reported that falling platelet count though detectable in all patients, was not related to development of complications. Vonderheide[13] observed, in a prospective study of 58 patients treated with IABP, that the use of this device led to steady and predictable decrease in platelet count, which recovered rapidly when the IABP was removed

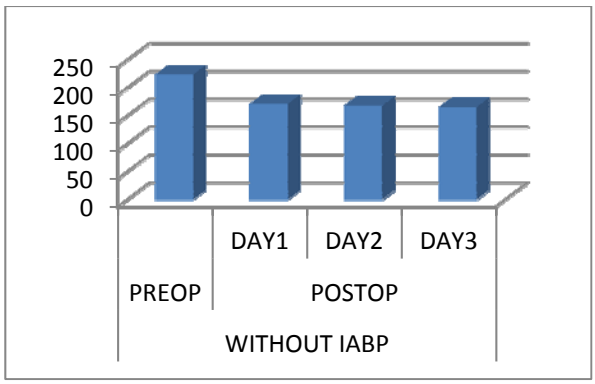

Figure-1: Reduction of platelet count in group A.

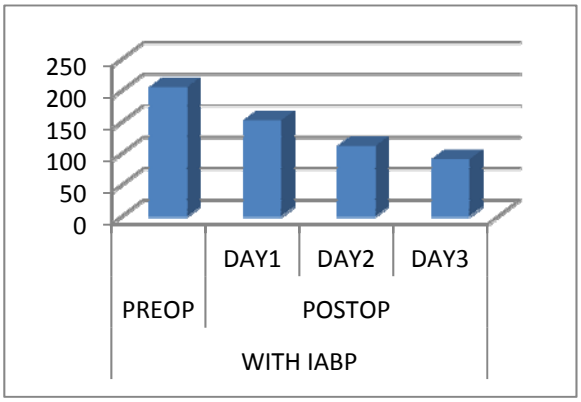

Figure-1: Reduction of platelet count in group A.

or slowly if the device remained in place. Bream-Rouwenhorst[14],in a retrospective cohort study involving 107 patients undergoing IABP, reported that the reduction in platelet count occurred in 58% of patients and was not related to the use of antiplatelet therapy. Recently, Roy assessed the incidence and predictors of falling platelet count in 252 consecutive patients treated with IABP and documented that in-hospital death and major bleedings were higher in patients with falling platelet count[16]. However, at multivariable analysis falling platelet count

was not an independent predictor either of in-hospital death or major bleeding. The IABP-associated falling platelet count should not necessarily prompt discontinuation of IABP support or important adjunctive medications. Similarly in small observational study[15], falling platelet count, though a common finding, was not associated with serious adverse consequences. Since the development of IABP in 1962[17] the incidence rate and the type of complications have deeply changed over time.

Falling platelet count can be related to mechanical factors because it is inversely correlated to the duration of IABP support.

CONCLUSION

It is concluded that reduction in platelet count in post CABG patients is similar in both the groups i.e. in whom IABP is and those patients who are not treated with IABP.

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