Effect of Low-Dose Aspirin on Bleeding Following Exodontia: A Prospective Clinical Study

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Abstract

Purpose This research aims to study the effects of low-dose aspirin on bleeding after exodontia and to compare statistically and analyze perioperative blood loss during exodontia in patients on aspirin therapy and healthy patients and also to discuss the various measures if required necessary for controlling postoperative bleeding in simple and uncomplicated exodontia.

Materials and Methods The study included 100 patients, ranging in age from 30 to 60 years. The patients were divided into two groups, a test group consisting of 50 patients who were on a daily dose of 75–150 mg of aspirin and a control group consisting of 50 patients not on any antiplatelet therapy. All extraction procedures were performed on outpatient basis. Patients were operated under local anesthesia. Post-extraction sockets were checked for bleeding immediately (30 min) and followed up at 24, 48, and 72 h, and 1 week, after the procedure.

Results Amount of intraoperative blood loss was similar in both test and control groups, and there was no excessive postoperative bleeding in any case. Out of 100 patients, only three patients of test group and two patients of control group required level II hemostatic measures and two patients of test group needed level III measures.

Conclusion We could reach a conclusion and recommend that patients on long-term low-dose aspirin (75–150 mg) need not to discontinue their aspirin dose prior to routine exodontia and can be carried out safely with enhanced local hemostatic measures, if required.

Keywords Acetylsalicylic acid · Antiplatelet therapy · Coronary artery disease · Local hemostatic agents

Introduction

Medical care and optimized pharmacological therapy have facilitated prolonged survival in patients with cerebrovascular and cardiovascular diseases (CVD) [1].

An increasing number of patients suffering from heart disease in general and coronary artery disease (CAD), in particular, are routinely treated with aspirin and/or clopidogrel for prevention of major adverse ischemic occlusive events [2]. In recent years, CAD patients have comprised an increasing proportion of dental patients; therefore, it has become compulsory for professionals to acquire a greater understanding of CVDs and the medications that are used by these groups of patients [3]. The aim of oral anticoagulant therapy (OAT) is to reduce blood coagulability to an optimal therapeutic range within which the patient is provided some degree of protection from thromboembolic events. This is achieved at the cost of a minor risk of spontaneous bleeding [4].

Acetylsalicylic acid (ASA) is the most commonly used antiplatelet medication by CVD patients for the primary and secondary prevention of cardiovascular events, including myocardial infarction (MI) and stroke. ASA inhibits irreversibly platelet aggregation within 1 h of ingestion, and this lasts for the life span of platelets

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(7–10 days). When the action of platelets is inhibited, the bleeding time (BT) is prolonged. Therefore, simple dental extraction procedure becomes a challenge if the patient is on antiplatelet therapy [5].

When patients on antiplatelet therapy present for an invasive dental procedure which may cause bleeding, the question arises as to whether the anticoagulant therapy should be continued, modified, or discontinued at some point before dental treatment. In such situations, clinicians must assess the patient's ability to achieve hemostasis following a procedure if anticoagulation is continued, versus the risk of thromboembolism if anticoagulant therapy is decreased or discontinued [6]. Unfortunately, there are no specific, widely accepted recommendations for the management of patients receiving antiplatelet agents during dental procedures, especially following minor surgery [7].

Most of the earlier studies published in English literature have suggested stopping ASA therapy because of the risk of prolonged bleeding after surgery [8–10]. But several authors suggested that ASA therapy can be maintained and subsequent post-extraction hemorrhage can be treated by local measures [5]. This research aims to study the effects of low-dose aspirin on bleeding after exodontia. In this study, we quantitatively evaluated bleeding from extraction socket intraoperatively by swab weighing method and qualitatively by (a) counting the number of gauzes used intraoperatively and (b) postoperatively by observing bleeding episodes (if any) at different time intervals. The study was also aimed to find out whether any additional local measures are required to control the intraoperative or postoperative bleeding.

Materials and Methods

This study was conducted in the Department of Oral and Maxillofacial Surgery, BVPU Dental College and Hospital, Pune, after obtaining ethics and scientific committee approval from the institute and university. Hundred patients of either sex aged between 30 and 60 years, out of whom 50 patients receiving aspirin therapy for various cardiovascular conditions and 50 healthy patients with no cardiovascular conditions referred to our department for dental extractions, were included in this study.

Inclusion Criteria

1. Patients belonging to ASA Grade I to III.
2. Patients between 30 and 60 years of age of both sexes.
3. Patients on low-dose aspirin therapy, below or equal to 150 mg/day.
4. Patients within the therapeutic range of international normalized ratio (INR) ≤ 3.5 [11–14].

5. Patients willing to participate in the study.
6. Patients with fitness obtained from physician to undergo exodontia.

Exclusion Criteria

1. Patients on aspirin therapy >150 mg/day.
2. Patients INR > 3.5 .
3. Pregnant or lactating women.
4. Patients with hepatic, renal diseases, or epilepsy or with a clinical history of debilitating respiratory diseases.
5. Patients with known bleeding or clotting disorders.
6. Patients belonging to ASA Grade IV and V.
7. Patients with inflammation of surrounding tissues due to periodontal disease/acute local infection.

Test group comprised of 50 patients on a daily dose of 75–150 mg of aspirin, and equal numbers of healthy patients were taken as control group which were not on any antiplatelet therapy and were compared statistically.

All patients included were evaluated by dental history, clinical examination, and radiographic examination. Preoperative tests include the determination of bleeding time, clotting time, prothrombin time, and activated partial thromboplastin time; INR was carried out in all the patients. The detailed case history of study group patients was taken regarding his/her cardiovascular conditions and dosage of aspirin. The procedure was explained to the patients in their own language, and informed written consent from each patient was obtained prior to dental extraction.

Surgical Procedure

Dental procedure was performed under local anesthetic agent (adrenaline 1:200,000). The extraction was carried out (by the closed technique) with aseptic precautions. Perioperative blood loss was measured for each extraction by swab weighing method. Bleeding was quantitatively evaluated intraoperatively and assessed qualitatively by a number of gauzes (of equal size 4×4 cm) used and time of bleeding (early, immediate, or late) postoperatively. The use of suction was avoided during the surgical procedure to allow a more accurate estimate of actual blood loss. The surgical field was kept clear of blood by blotting with sponges. Surgical sponges were weighed with a sensitive electronic scale both preoperatively and postoperatively (Fig. 1).

Blood loss assessment was done by weighing the swab preoperatively (dry gauze) and postoperatively (used gauze). One gram represents the approximate weight of 1 mL of blood; the difference between the presurgical and

Fig. 1 Swab weighing scale for measuring intraoperative blood loss

postsurgical weight of the sponges was translated directly into a volume measurement [15]. Patients were instructed to bite on a pressure pack for 30 min after dental extractions. All the patients were checked for postoperative bleeding after 30 min.

In a patient in whom bleeding was still present, a piece of gel foam soaked in tranexamic acid was sutured over the extraction socket (these sutures were removed on the seventh day).

All patients were given appropriate postoperative instructions and were advised to immediately report the occurrence of any hemorrhagic problems. The patients were checked after 24, 48, 72 h and 1 week, and bleeding complaints were recorded.

Statistical Analysis

Statistical analysis was performed using Chi-square test for homogeneity of patients with respect to age and sex in both study groups, ANOVA test for increased unit loss of blood with type of tooth extracted, and two-independent-sample *t* test for quantitatively assessing any increased association of intraoperative blood loss in antiplatelet therapy patients. Fisher's exact test for qualitative assessment of any increased perioperative blood loss in test group and level of hemostatic measures required for controlling the same with statistical significance was set at the 0.05 level. The results were considered statistically significant if the *P* value was less than 0.05.

Results

Hundred patients were included in this study, meeting the inclusion and exclusion criteria; 53 were males and 47 were females. The patients ranged in age from 30 to 60 years. Both test and control groups comprised of equal

number of patients, fifty patients in each group, and were compared statistically.

Distribution of Study Subjects According to Medical Conditions

Out of 50 patients included in test group, 42% were the cases of hypertension. The rest of patients were suffering from different cardiovascular and cerebrovascular diseases (Table 1).

Distribution of Study Subjects According to Type of Tooth Extracted

Maximum cases (51%) were of molar extractions. 32% cases were of bicuspid extractions; remaining extractions (17%) were of cuspid and incisors. By performing Fisher's exact test (*P* value > 0.05), there is no significant difference with respect to type of tooth extracted with test and control groups (Table 2).

Qualitative Assessment of Intraoperative Blood Loss of Study Subjects According to the Number of Gauzes Required

In all patients of test and control groups, intraoperative blood loss was assessed qualitatively by using gauze count method. Comparing both groups by Fisher's exact test, insignificant result (*P* value = 0.317) was observed. Hence, the number of gauzes required for controlling blood loss was similar in both groups (Table 3).

Quantitative Assessment of Amount of Intraoperative Blood Loss in Study Subjects

Intraoperative blood loss was measured for all the patients of test group and control group. Blood loss assessment was done by using swab weighing method preoperatively and postoperatively. Statistical analysis was performed using two-independent-sample *t* test, *P* value > 0.05; therefore, there is no significant difference between mean amount of blood loss in test and control groups. Mean blood loss obtained was almost similar in both groups without much deviation (Table 4). Hence, single antiplatelet therapy is not associated with increased intraoperative blood loss for routine extraction in comparison with healthy patients not on antiplatelet therapy.

Distribution of Study Subjects According to Level of Hemostatic Agents Required

The use of local hemostatic measures for controlling postoperative bleeding in both test group and control

Table 1 Distribution of patients according to medical conditions

Medical conditions	Number of patients	Percentage (%)
Atrial fibrillation	1	2.00
CABG	5	10.00
Hypertension	21	42.00
Ischemic cerebrovascular disease	3	6.00
Myocardial infarction	14	28.00
Peripheral venous disease	6	12.00
Total	50	100.00

Table 2 Distribution of study subjects according to type of tooth extracted

Tooth extracted	Group		Total	Fisher's exact test <i>P</i> value
	Test	Control		
Molar	25	26	51	0.124
Premolar	13	19	32	
Canine	7	1	8	
Incisor	5	4	9	
Total	50	50	100	

Table 3 Qualitative assessment of blood loss of study subjects according to the number of gauzes required

Number of gauzes	Group		Total	Fisher's exact test <i>P</i> value
	Test	Control		
1	19	28	50	0.317
2	22	17	39	
3	7	4	8	
4	2	1	3	
Total	50	50	100	

groups was analyzed at different time intervals (30 min, 24, 48 h and 1 week). Comparing both groups, we found that only 7 patients required local hemostatic measures out of whom 3 patients of test group and 2 patients of control group required level II hemostatic measures and 2 patients of test group needed level III measures. The results of Fisher's exact test to assess association between antiplatelet therapy and level of hemostatic measures showed a

statistically nonsignificant association when compared to control group (P value = 0.517). Therefore, local hemostatic agents are sufficient to control bleeding associated with routine extraction of tooth in antiplatelet therapy (Table 5).

Comparison of Amount of Blood Loss with Respect to Type of Tooth Extracted in Test Group and Control Group

In comparison with intraoperative blood loss for type of tooth extracted by using ANOVA test (P value > 0.05), no statistical significant difference was found in both groups irrespective of type of tooth extracted. Mean blood loss for multi-rooted teeth and single-rooted tooth showed no significance standard deviation in amount of bleeding. Hence, blood loss is irrespective of type of tooth whether it is multi-rooted or single-rooted in both groups (Tables 6, 7).

Discussion

Antiplatelet activity of aspirin has been seen even at a dose as low as 40 mg/day. The antiplatelet properties are effective up to 320 mg daily dose [4, 16]. Various evidence-based studies recommended aspirin in the range of 75–100 mg/day for the prophylaxis against serious vascular events in high-risk patients [17].

Most frequently recommended doses of aspirin for prevention of myocardial infarction and stroke are 81, 160, and 325 mg/day in the USA, whereas in Europe and other countries, these doses are 75, 150, and 300 mg/day [18].

Acetylsalicylic acid (ASA) is widely used for its antiplatelet effects. Low-dose aspirin (75–150 mg) is generally indicated in cases of angina, ischemic heart disease, post-

Table 4 Comparison of intraoperative blood loss in test and control groups

Group	Number of patients	Amount of blood loss		Independent sample <i>t</i> test <i>P</i> value
		Mean	SD	
Test	50	1.24	1.71	0.888
Control	50	1.28	1.03	

Table 5 Distribution of study subjects according to level of hemostatic agents required

Level of hemostatic agents required	Group		Total	Fisher's exact test <i>P</i> value
	Test	Control		
I	45	48	93	0.517
II	3	2	5	
III	2	0	2	
Total	50	50	100	

Level I pressure pack, *level II* suturing, *level III* local hemostatic agent, *level IV* surgical diathermy, *level V* platelet transfusion

Table 6 Comparison of amount of blood loss with respect to type of tooth extracted in test group

Tooth extracted (test)	Number of cases	Amount of blood loss		ANOVA test <i>P</i> value
		Mean	SD	
Molar	25	1.60	1.94	0.415
Premolar	13	1.15	1.86	
Canine	7	0.57	0.53	
Incisor	5	0.60	0.55	
Total	50	1.24	1.71	

Table 7 Comparison of amount of blood loss with respect to type of tooth extracted in control group

Tooth extracted (control)	Number of cases	Amount of blood loss		ANOVA test <i>P</i> value
		Mean	SD	
Molar	26	1.38	1.20	0.737
Premolar	19	1.16	0.90	
Canine	1	2.00		
Incisor	4	1.00	0.00	
Total	50	1.28	1.03	

myocardial infarction, post-bypass surgery, post-angiography/angioplasty, stroke, and transient ischemic attacks.

In the present study, we did not find any significant difference in blood loss perioperatively and postoperatively assessed by the number of gauzes used and quantitatively assessed by swab weighing method in both groups. No study was found in English literature regarding the number of gauzes required for control of bleeding in patients on aspirin therapy. The only study found that the use of warfarin showed no significance difference in warfarin and non-warfarin groups [19].

Mean intraoperative blood loss was insignificant in both test and control groups. Partridge et al. [20], Hemelik et al. [21], and Morimoto et al. [22] performed similar study and concluded that mean blood loss during routine extractions was found to be insignificant statistically in comparison with experimental and control groups.

In our study, we found that local hemostatic measures like gauze pack, suturing of socket alone or with gel foam soaked in tranexamic acid were sufficient to control post-extraction bleeding. None of the patients required transfusion of blood or blood substitute.

Balasubramanian et al. and various other authors also concluded that the hemorrhagic risk in patients on aspirin therapy can be managed by local hemostasis protocol [6, 15, 22–25]. Girotra et al. [26] in his study concluded that the greatest risk of prolonged bleeding was found in patients on dual therapy; this required higher levels of hemostatic measures.

Amount of blood loss assessed intraoperatively was irrespective of type of tooth in both test and control groups and yielded similar result with no relation to size of tooth or multi-rooted or single-rooted tooth on the amount of blood loss during extraction. Similar study was performed by Partridge et al. [20], and they concluded same results that there is no difference in relation to amount of blood loss per unit surgical area in both groups.

We believe that the blood loss measurements in this study were reasonably accurate, especially in light of the small volumes of blood lost from these surgical procedures. Although saliva may be measured by this technique and may distort the actual measurement of blood loss, it is unlikely that volume would differ, significantly between the control and test group.

Conclusion

Our results demonstrate that there is no need for ASA therapy suspension before routine extractions. In cases in which there was delayed postoperative bleeding, local hemostatic measures were sufficient to control bleeding. Hence, from this study we are able to conclude that most minor oral surgical procedures can be carried out safely without stopping the low-dose aspirin therapy.

Additional studies will be necessary to fully address the bleeding impact of all platelet-altering medicines on office minor oral surgical procedures. However, based on our findings, the oral environment, and the procedures that constitute oral surgery, we feel that this study supports the view that most patients who are on aspirin can undergo routine minor oral surgical procedures without modification of their drug regimens.

Compliance with Ethical Standards

Conflict of interest None.

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