

DENTAL MANAGEMENT OF PATIENTS ON WARFARIN THERAPY

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ABSTRACT

The aim of this study was to investigate whether patients who were taking warfarin and had an International Normalized Ratio (INR) within the normal therapeutic range require cessation of their anticoagulation drugs before dental extractions or not.

Patients were divided into three groups: One, consisting of 48 patients had their warfarin treatment stopped for 2-3 days prior dental extractions. Two, consisting of 49 patients who did not have their anticoagulant treatment altered before extractions, and had an average preoperative INR of 2.5. Three, consisting of 45 patients with average preoperative INR of 2.6, their warfarin was stopped and switched to the Low-molecular-weight (LMWHs). The incidence of postoperative bleeding was recorded.

The incidence of bleeding complications in the control group was (5 / 48, 10%), in the group 2 (6 / 49, 12%) and in group 3 it was (4 / 45, 8%). No statistical significance was found between the three tested groups.

This study supports the consensus in the medical literature that dental extractions in patients whose INR is within the therapeutic range can be done without modification of oral anticoagulant treatment.

INTRODUCTION

Anticoagulant therapy is a common therapeutic regimen most frequently utilizing warfarin. This therapy may have important dental implications. An understanding of the mechanisms of action and drug interactions may help avoid problems. Questions commonly arise as to what dental procedures may be safely considered when a patient is on anticoagulant therapy. Generally, controlling bleeding is less of a problem than the management of thrombi and vascular occlusion from decreased coagulation therapy.¹

Haemorrhage is the principle adverse effect of oral anticoagulants. Spontaneous airway threatening bleeding has been reported in the sublingual and retropharyngeal tissue spaces in patients whose anticoagulation levels are poorly controlled and above the expected therapeutic levels.^{2,3} But in general terms it is believed that oral bleeding from anti-

coagulants such as warfarin is often over stated and unnecessary adjustment of warfarin dosage put the patient at risk of a potentially life-threatening thromboembolism with significant morbidity and mortality.⁴

There are several currently recognized indications for the use of warfarin. These include deep venous thrombosis, pulmonary embolism, vascular thrombo-embolism, transient cerebral ischemic attack, stroke and prosthetic valve replacement.^{5,6,7}

The coagulation level is measured in values of the International Normalized Ratio (INR)¹. Warfarin dosages are adjusted to achieve an optimum therapeutic level of anticoagulation, and this is best achieved by monitoring prothrombin time being expressed as INR ratio with the therapeutic levels accepted between 2-4.⁸

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Several protocols for managing such patients who need dental extraction have been suggested. The old fashioned approach of decreasing or discontinuing the warfarin dose preoperatively puts the patients at risk of thromboembolism, unjustifiably, jeopardizing the patients' lives for a minimal risk of easily controllable bleeding, especially risky to the patients' well being in the case of presence of valvular heart disease or prosthetic heart valves.⁹

The medical literature now is strongly supporting the management of patients in a way to continue their anticoagulation treatment unaltered, provided that local measures to control bleeding after dental extraction are well employed. The use of a restorable oxycellulose dressing or fibrin adhesive has been found to be very effective in the prevention of postextraction hemorrhage in patients taking anticoagulants whose INR is within the therapeutic range.¹⁰ Also the use of 4.8% tranexamic acid mouthwash following dental extraction has been found to be equally effective in controlling the postextraction bleeding compared to the use of autologous fibrin glue preparation.¹¹

Also, preoperative reduction of INR is often unpredictable as some patients needed to discontinue their warfarin for a further day before INR was within the required range of (1.5-2.0). In addition there is some evidence of rebound hypercoagulability state on cessation of warfarin, possibly due to increased thrombin activity.⁸ Gage BF and his colleagues advocate that, when the patient develops dental pain, especial care need to be given to the analgesic agents that are safe to take with warfarin and make it clear to the patients that warfarin therapy does not have to be interrupted during a subsequent dental extraction, considering the devastating consequences of doing so, i.e. the high risk of developing strokes in atrial fibrillation patients.¹²

Therefore, the current trend is to maintain patients on their anticoagulation regimens without altering their warfarin dosages, provided that their INR values are within the therapeutic range of 4 or less, and proper local measures are well applied, so that teeth can be extracted safely and the development of thromboembolic in high-risk patients can be prevented. However, with procedures having a high risk of bleeding, such as complicated dental extraction or extraction of impacted teeth, warfarin dosage may need to be modified but still in a way that will not put the patient life at risk of a thromboembolic crisis.¹³⁻¹⁷

In cases where there is fear of considerable postoperative bleeding, and levels of anticoagulation need to

be reduced, one approach is to replace warfarin with heparin and resume it after extraction. These include replacing heparin for warfarin and the heparin is discontinued for a minimum of 6 hours preoperatively and resumed 12-24 hours after surgery along with regular preoperative dosage of warfarin until INR is back to the optimum therapeutic level. This requires hospitalization and careful monitoring; yet this puts the patient at risk of postoperative thromboembolism as warfarin may require several days to reach the therapeutic levels required.¹⁸

Recently, after the emergency of the low-molecular-weight heparins, or (LMWHs) as an alternative in the management of patients whose anticoagulant status should not be modified for lengthy periods. This provided an easier approach substituting warfarin with LMWH for a few days before surgery, and withheld from the patient for only a few hours the day of the surgery. LMWHs are administered on an outpatient basis and do not require hospitalization, as does unfractionated heparin. As a result, they are more cost-effective and offer greater convenience than heparin therapy. They have longer duration of action than unfractionated heparin, as once daily subcutaneous dosage is very convenient to patients. Also, the standard prophylactic regimen does not require monitoring. Patients' physicians may prescribe LMWH injections to more safely manage the patients' care during oral surgery.^{19,20}

Science clearly indicates that in the case of routine dental work, including uncomplicated extractions the risk of a patient on warfarin having a life-threatening thromboembolic event if the anticoagulant therapy is stopped is three- to five-times greater than the risk of the patient having postoperative bleeding that cannot be controlled with local measures.^{21,22}

As this issue is still controversial, it is the aim of this paper to review the clinical evidence, to highlight the areas of major concern, and to suggest management regimens for patients on warfarin who need dental extraction.

METHODOLOGY

This study is a prospective randomized cohort study to investigate whether patients who are taking warfarin and have an International Normalized Ratio (INR) within the normal therapeutic range require cessation of their anticoagulation drugs before dental extractions or not, also its testing the usage of Low-molecular-weight (LMWHs) as a substitute to warfarin in cases when postoperative bleeding is anticipated.

The study was conducted in accordance with Good Clinical Practice as approved by the ethical committee of the Royal Medical Services in Jordan. A written, dated informed consent was obtained from all patients prior to study entry. The study was carried out in the period between January 2007 to January 2008.

A total of 142 warfarinized patients were included in the study. Of these, 69 were males and 73 were females, ranging in age from 31 to 87 years (mean 51 years) Table 1 showing demographic, objective and subjective measurement data.

All procedures were performed on an ambulatory basis under local anesthesia by the same surgeon (the author). Procedures included extraction of normal teeth, remaining roots and uncomplicated impacted wisdom teeth. Patients with an International Normalized Ratio outside the therapeutic range of 2-4, or with history of liver disease or on drugs affecting liver function were excluded from the study.

All patients had their INR checked on the morning they were due for surgery. Patients admitted to our trial, were those only having their INR within the expected therapeutic values, less than 4.1, all patients above that value were returned to their physicians to adjust their dosages.

Patients were divided into three groups: group 1 consisting of 48 patients had their warfarin treatment stopped for 2-3 days prior of having dental extractions, resulting in a reduction in the average preoperative international normalized ratio (INR) from 2.6 to 1.6, group 2 consisting of 49 patients did not have their anticoagulant treatment altered before extractions, and had an average preoperative INR of 2.5, group 3 consisting of 45 with average preoperative INR of 2.6, their warfarin stopped, and were switched to the Low-molecular-weight (LMWHs), given subcutaneous dalteparin 200 units/kg 5 days before their appointments, and asked not to take their dosage of the

LMWHs on the morning they expect to have their dental extraction to be performed. They were advised to have their next dosage of the LMWHs in the next morning and to resume their warfarin the same day, in the same dosage they used to take before switching to LMWHs. All patients had their INR checked on the morning they were due for surgery and were treated under local analgesia on an outpatient basis. Patients at risk of infective endocarditis received prophylactic antibiotic therapy. Local measures-consisting of absorbable oxidized cellulose pack (Surgical® Ethicon, Johnson & Johnson), and sutures were used to control bleeding from extraction sockets.

All patients were kept for an average of half an hour following the dental extraction so as to make sure that no primary bleeding was occurring. Patients were given the usual post-operative instructions and advised to avoid aspirin and non-steroidal anti-inflammatory analgesics (NSAID). They were advised to return to the hospital in case of bleeding or untoward incident. In addition, they were asked to make a note of the timing, duration and severity of any bleeding that occurred postoperatively. All patients had been reviewed on the third postoperative day to record any incidence of post-operative bleeding. Patients who were unable to attend their outpatient appointments were contacted by phone.

Statistical analysis was performed by using 1-way analysis of variance, Student's *t* test, and chi-square test. A value of $P < 0.05$ was considered statistically significant.

RESULTS

Patients enrolled in this study were found to be treated with oral anticoagulants for a variety of disorders i.e. deep vein thrombosis 31 patients, pulmonary embolism 21 patients, stroke 19 patients, ischemic heart disease 26 patients, valvular disease and prosthetic valve replacement 23 patients, and atrial fibrillation 22 patients.

TABLE 1: DEMOGRAPHIC, OBJECTIVE AND SUBJECTIVE MEASUREMENT DATA.

	G (1) patients stopped warfarin	G (2) patients kept warfarin	G (3) patients switched to LMWH
Number of patients	48(33.4%)	49(32.7%)	45(33.8%)
Age (mean)	52	49	51
Gender	22 M 26 F	24 M 25 F	23 M 22 F
Mean duration surgery (mint)	15.4	14.7	15.9

Out of 142 patients enrolled in this study, a total of 315 teeth were extracted, 48 patients in Group (1) had 110 extractions, in G (2) 49 patients had 104 extractions and 101 extractions were performed on 45 patients in G (3). There were no significant differences between the groups in the mean age, gender, and number of extractions performed.

131 patients attended their review appointments and the reminders were contacted over the phone. None of the patients had any immediate postoperative bleeding before being discharged home. Intermittent oozing was reported by 5 patients (10%) in group (1), 6 patients (12%) in group (2), and 4 patients (8%) in group (3) during the first day following extraction. Only one patient from the control group and another one from G (2) required hospital review for bleeding, which was easily controlled by application of absorbable oxidized cellulose pack and pressure with a gauze on the extraction site. None of these patients required hospital admission and can be considered as cases who failed to follow the post extraction instructions properly. All other episodes of bleeding were controlled by patients at home, as all patients had been given very clear verbal and written instructions for the prevention and management in case of post extraction bleeding.

No statistically significant difference was found between the three tested groups ($P < 0.05$).

DISCUSSION

There is a widespread belief among dental practitioners and physicians that oral anticoagulation therapy in which patients receive drugs such as warfarin sodium must be discontinued before dental surgery to prevent serious hemorrhagic complications.

Unfortunately many practitioners seem to be underestimating that such traditional management which entails the interruption of anticoagulant therapy put the patient at risk of a potentially life-threatening thromboembolic crisis.²³

The risk of a patient on Coumadin having a life-threatening thromboembolic event if the anticoagulant therapy is stopped is three to five times greater than the risk of the patient having postoperative bleeding that cannot be controlled with local measures.

In general terms it can be stated that the scientific literature does not support routine discontinuation of

oral anticoagulation therapy for dental patients. The coagulation status based on the International Normalized Ratio of patients who are taking these medications must be evaluated before invasive dental procedures are performed. Any changes in anticoagulant therapy must be undertaken in collaboration with the patient's prescribing physician.²⁴

The management of oral surgery procedures on patients treated with anticoagulants should be influenced by several factors: extent and urgency of surgery, laboratory values, treating physician's recommendation, available facilities, dentist expertise, and patient's oral, medical, and general condition.¹⁹

So it is obvious that there is an evident need to make a protocol for oral surgery procedures in patients on oral anticoagulant therapy. This need is aggravated by the increased demand as the percentage of such patient referred to hospital from outpatient facilities is on the rise. For the safe management of patients on oral anticoagulant undergoing oral surgery, the present study proposes the following protocol: All patients should have a preoperative INR measured and this should be in the range of 2-4. Patients should not have other risk factors or taking medications affecting the liver function and preoperative bleeding. The use of good surgical technique and local measure consisting of absorbable oxidized cellulose pack (Surgical@Ethicon, Johnson & Johnson) and careful suturing should be used in all patients. In addition facilities for review should be available for all patients. This will allow patients to have oral surgical treatment on an outpatient basis without modification of their oral anticoagulant therapy. The elimination of the need for hospitalization will result in a substantial cost saving for the patient and society and provides great psychological benefit for the patient.^{25,26}

Modifications in the warfarin dosage might be considered in procedures with higher risk of postoperative bleeding, such as surgical extractions that may require extensive flaps and substantial bone removal. But this kind of change should be done in liaison with the patient's treating physician, which undoubtedly should not be simple discontinuation of the patient anticoagulation therapy, as there are few alternatives such as switching to heparin or low-molecular-weight heparins.

This study supports the consensus that dental extractions can be performed without alteration of oral

anticoagulant treatment. Local hemostasis with an absorbable oxidized cellulose mesh, tranexamic acid, autologous fibrin glue and sutures found to achieve the aim of minimizing postextraction bleeding in patients on warfarin without jeopardizing their lives through exposing them to a life threatening thromboembolic crisis. Modification of the warfarin dosages may be considered in procedures that entail a high risk of bleeding, as unnecessary adjustment of warfarin dosage puts patients at risk for significant morbidity and mortality.

CONCLUSION

This study supports the consensus in the medical literature stating that dental extractions in patients whose INR is within the therapeutic range (2-4) can be performed without modification of oral anticoagulant treatment, and the usage of Low-molecular-weight (LMWHs) instead of warfarin is an excellent alternative when postoperative bleeding is anticipated.

REFERENCES

- Aldous JA, Olson CJ. Managing patients on warfarin therapy: a case report. *Spec Care Dentist*. 2001 May-Jun; 21(3): 109-12.
- Owens D E, Cacatterra TC, Arstad RA. Retropharyngeal haematoma: a complication of therapy with anticoagulant. *Arch Otolaryngol*; 101: 565; 1975.
- Cohen AF, Warman SP. Upper airway obstruction secondary to warfarin-induced sublingual haematoma. *Arch Otolaryngol Head Neck Surg*; 115: 718-720; 1989.
- Lockhart PB, Gibson J, Pond SH, Leitch J. Dental management considerations for the patient with an acquired coagulopathy. Part 2: Coagulopathies from drugs. *Br Dent J*. 2003; 195(9): 495-504.
- Hirsh J, Dalen JE, Deykin D, Pollar L. Oral anticoagulants: mechanisms of action, clinical effectiveness, and optimal therapeutic range, *Chest*; 102: Suppl: 312 S-326S, 1992.
- Davios J A, Tuddenham EGD. Haemostasis and thrombosis. *Oxford Textbook of Medicine*, 2nd edition: Oxford medical publications, 19: 228-229, 1998.
- Weinmann E E, Salzman E W. Medical progress: deep venous thrombosis. *N Engl J Med*; 331: 1630-1641: 1994.
- P. Devani, K. Lavery, C. Howell. Dental extractions in patients on warfarin. *British J Oral and Maxillofacial Surg* 1998; 36, 107-111.
- Robbin RC, Bowman FO, malm JR. Cardiac valve replacement in children: a twenty-year series. *Ann Thorac Surg* 1998; 45: 56-61.
- Penny W, Fraser JS, Adlam DM. Comparison of 2 hemostatic agents for the prevention of postextraction hemorrhage in patients on anticoagulants. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2001 Sep; 92(3): 257-69.
- Carter G, Goss A, Lloyd J, Tocchetti R. Tranexamic acid mouthwash versus autologous fibrin glue in patients taking warfarin undergoing dental extractions: a randomized prospective clinical study. *J Oral Maxillofac Surg*. 2003; 61(12): 1432-35.
- Gage BF, Fihn SD, White RH. Warfarin therapy for an octogenarian who has atrial fibrillation. *Ann Intern Med*. 2001; 20; 134(6): 465-74.
- Beirne OR, Koehler JR. Surgical management of patients on warfarin sodium. *J Oral Maxillofac Surg*. 1996 Sep; 54(9): 1115-18.
- Brewer AK. Continuing warfarin therapy does not increased risk of bleeding for patients undergoing minor dental procedures. *J Can Dent Assoc*. 2009 Feb; 75(1): 41.
- Nematullah A, Alabousi A, Blanas N, Douketis JD, Sutherland SE. Dental surgery for patients on anticoagulant therapy with warfarin: a systematic review and meta-analysis. *J Can Dent Assoc*. 2009 Feb; 75(1): 41.
- Jimenez Y, Poveda R, Gavalda C, Margaix M, Sarrion G. An update on the management of anticoagulated patients programmed for dental extractions and surgery. *Med Oral Patol Oral Cir Bucal*. 2008 Mar 1; 13(3): 176-79.
- Evans IL, Sayers MS, Gibbons AJ, Price G, Snooks H, Sugar AW. Can warfarin be continued during dental extraction? Results of a randomized controlled trial *Br J Oral Maxillofac Surg*. 2003 Apr; 41(2): 132.
- Donoff RB. *Massachusetts General Hospital Manual of oral and maxillofacial surgery*. St Louis; CV Mosby, 54: 100-102, 452; 1987.
- Johnson-Leong C, Rada RE. The use of low-molecular-weight heparins in outpatient oral surgery for patients receiving anticoagulation therapy. *J am Dent Assoc*. 2002 Aug; 133(8): 1083-87.
- Bajkin BV, Popovic SL, Selakovic SD. Randomized, prospective trial comparing bridging therapy using low-molecular-weight heparin with maintenance or oral anticoagulation during extraction of teeth. *J Oral Maxillofac Surg*. 2009 May; 67(5): 990-95.
- Alexander R, Ferretti AC, Sorensen JR. Stop the nonsense not the anticoagulants: a matter of life and death. *N Y State Dent J*. 2002 Nov; 68(9): 24-26.
- Wahl MJ. Myths of dental surgery in patients receiving anticoagulant therapy. *J Am Dent Assoc*. 2002 Jan; 131(1): 77-81.
- Scully C, Wolff A. Oral surgery in patients on anticoagulant therapy. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2002 Jul; 94(1): 57-64.
- Jeske AH, Suchko GD. Lack of a scientific basis for routine discontinuation of oral anticoagulation therapy before dental treatment. *J Am Dent Assoc*. 2003 Nov; 134(11): 1492-97.
- Jimenez Y, Poveda R, Gavalda C, Margaix M, Sarrion G. An update on the management of anticoagulated patients programme for dental extractions and surgery. *Med Oral Patol Oral Cir Bucal*. 2008 Mar 1; 13(3): 176-79.
- Morimoto Y, Niwa H, Minematsu K. Hemostatic management of tooth extractions in patients on oral antithrombotic therapy. *J Oral Maxillofac Surg*. 2008; 66(1): 51-57.