

Analysis of profiles of patients on oral anticoagulants undergoing dental extraction - A retrospective study

Natália Batista Daroit¹
Fábio Luis Festugatto²
Luiz Felipe Beltrame²
Júlio César Córdova Maciel²
Pantelis Varvaki Rados^{1*}

Abstract:

Introduction: Many oral surgeons, in clinical practice, face the challenge of management of patients under anticoagulants treatment. The main reason for this concern is the post-operative problems. **Objective:** The objective is to demonstrate the profiles of patients on oral anticoagulants, who underwent exodontia and did not have complications. **Material and Methods:** This review was performed using the records of all cases of Special Care Dental Ambulatory during a period of two years. **Results:** Records of a total of 60 patients, 82 procedures, and 145 extracted teeth were found. The anticoagulant utilized for the sample was warfarin, the mean INR was 2.47 (SD \pm 0.53), the majority of teeth extracted was monoradicular was extracted one/time. **Conclusion:** Can be inferred that is safe to perform dento-alveolar surgeries in anticoagulants patients since additional care measures such as INR monitoring, minimally traumatic technique, and local hemostasis are adopted. This research clarifies some aspects related to routinely surgical procedures in patients under oral anticoagulant therapy.

Keywords: Oral Surgical Procedures; Anticoagulants; Warfarin.

¹ Universidade Federal do Rio Grande do Sul, Department of Oral Pathology - Porto Alegre - Rio Grande do Sul - Brazil.

² Hospital de Clínicas de Porto Alegre, Dental Service - Porto Alegre - Rio Grande do Sul - Brazil.

Correspondence to:
Pantelis Varvaki Rados.
E-mail: pantelis@ufrgs.br

Article received on July 27, 2017.
Article accepted on August 22, 2017.

DOI: 10.5935/2525-5711.20170018



INTRODUCTION

Epidemiological studies show that more than 72% of the American population over the age of 60 years has some type of cardiovascular disease (CVD), and almost 80 million adults have one or more types of CVD. The mortalities resulting from this group of diseases are higher than those resulting from cancer or *chronic respiratory diseases*¹.

Some indications for the use of oral anticoagulants are CVDs such as atrial fibrillation, previous myocardial infarction, congestive heart failure, and valvular heart lesions². The most commonly used category of oral anticoagulants is vitamin K antagonists, since vitamin K participates in the carboxylation of several blood coagulation proteins, mainly prothrombin and factor VII³.

Performing dental procedures in patients on anticoagulant therapy is a point of controversy; performing a dental procedure while continuing the therapy carries the risk of hemorrhage during and after the surgical procedure, in contrast to the suspension of the drug that could lead to a thromboembolic event. A meta-analysis compared the bleeding risk in patients continuing oral anticoagulant therapy with that in patients who had discontinued it. Although the risk ratio was slightly higher in those who continued to use the drug, this was not statistically significant, and therefore, the authors consider that there is no increase in the risk of bleeding⁴.

Thus, the recommended dental practice is based on monitoring of the coagulation levels through serological investigations and performing surgical procedures with preventive measures. The aim of this study was delineate the oral anticoagulate patients' profile in terms of the systemic and technical conditions related to the dental extraction.

METHODS

This research was performed in Porto Alegre Clinical Hospital (HCPA) with the approval of the ethical committee (number 1.571.215 HCPA/UFRGS) in accordance with the Helsinki Declaration. The review was conducted using clinical electronic records of all the patients who underwent dental procedures with special attention to the patients on oral anticoagulant therapy between January 2014 and December 2015.

Inclusion criteria

- Patients taking oral anticoagulants
- Patients undergoing dental extraction
- Patients who returned for consultation in 7 days

Exclusion criteria

- Patients with healing-related disorders, e.g., hepatopathies and hereditary coagulopathies.
- Patients using other anticoagulant substances, e.g., ginkgo biloba and chamomile
- Patients who suspended the use of oral anticoagulants before the dental procedure
- Incomplete clinical records about the systemic disease or local surgery procedure.

Variables

The clinical data recorded about the patients included age, gender, systemic disease, prothrombin time, and INR before the dental intervention; regarding oral anticoagulant medication in use, the type and weekly dose were recorded; regarding the local procedure, the number of teeth extracted in each consultation, use of antibiotic prophylaxis, and presence of trans- and post-operative bleeding complications were recorded.

Procedure

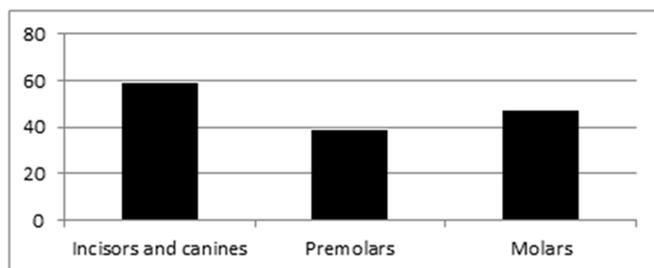
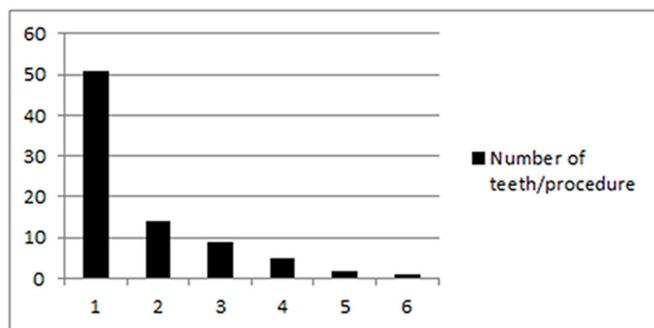
Dental extraction was performed after monitoring PT and INR at least 7 days before the surgery. The procedure was performed under local anesthesia (Citanest 3%®, Prilocaine Hydrochloride 30 mg, Felipressin 0.03 IU, Dentisply, Petrópolis/RJ - Brazil), without the use of additional techniques such as mucoperiosteal flap, osteotomy, or odontosection. Collagen sponges (Hemospon® , Technew, Rio de Janeiro/RJ - Brazil) were placed routinely in the bone defect, and primary closure of the wound was attempted with compressive sutures and dry gauze pressure over the wound for at least 30 minutes post-surgically.

RESULTS

A total of 60 patients with 82 surgical procedures and 145 extracted teeth were reviewed, the sample profile is show in the Table 1. The number of dental extractions according to tooth type is show in the Figure 1. The mean number of teeth extracted per consultation was 1.76 (\pm 1.17 SD) (minimum 1 to maximum 6), (Figure 2). All patients were taking warfarin for anticoagulation. Additionally, the correlation between the study variables is show in Table 2.

Table 1. Characteristics of the sample.

Variable	N (%)
Gender - Male	33 (55%)
Female	27 (45%)
Systemic Disease	
Cardiac Valve Prosthesis	27 (33%)
Congestive Heart Failure	29 (35%)
Cerebral Vascular Accident	27 (33%)
Previous Bacterial Endocarditis	1 (1%)
Deep Venous Thrombosis	5 (6%)
Chronic Obstructive Pulmonary Disease	8 (9%)
Rheumatic Heart Disease	3 (4%)
Atrial Fibrillation	18 (22%)
Previous Antibiotic Prophylaxis before Dental Procedure	30 (37%)
Variable	Mean (Standard Deviation) (minimum-maximum)
Age	59 (±13,2 SD) (34-90) years
Weakly dosage of warfarin	33,5 (±13,4 SD) (12-85) g
Prothrombin Time (PT)	30,2 (±7,2 SD) (13,9 - 53,7) sec
International Normalized Ratio (INR)	2,47 (±0,53 SD) (1,15-4,0)
Post-surgical complications (bleeding or infection)	0

**Figure 1.** Number of dental extractions according to tooth type.**Figure 2.** Frequencies of number of teeth extracted per consultation.

DISCUSSION

The purpose of this study was to analyze the complications such as bleeding or infection after dental extraction in patients on oral anticoagulant therapy;

Table 2. Correlation between the study variables.

	Spearman Correlation
Weekly dosage warfarin x PT	r = 0.07*
Weekly dosage warfarin x INR	r = 0.05*
INR x Number of dental extractions/procedures	r = 0.16*
PT x INR	r = 0.97**

* Poor correlation.

** Strong correlation.

trans- and post-surgical interurrences were not observed in this sample. A profile of this group was delineated to assist the dentists in performing dental procedures safely, as well as to draw the characteristics of the techniques.

The number of men in our study was slightly higher than that of women; CVD affects as many men as women, as the risk factors are very similar for both groups (i.e., tobacco, physical inactivity, alcohol abuse, hypertension, cholesterol, and diabetes)⁵. In our study, the mean age was 59 years; with aging, vascular alterations like arterial thickening can cause endothelial dysfunction, thereby increasing the systolic pressure which predisposes one to CVD⁶. The most prevalent pathologies found in this research were cardiac valve disease (corrected using prostheses), congestive heart failure, cerebral vascular accident, and atrial fibrillation; the distribution of global CVD burden is principally due to ischemic heart and cerebrovascular diseases⁷.

The use of anticoagulants for prevention of blood clot formation is very common. One of the most commonly used oral anticoagulants is warfarin (Marevan®, Coumadin®, Jantoven®)⁸. The suspension of this drug to perform dental procedures has been controversial; current research shows that the risk of complications such as fatal embolism, fatal massive cerebral thrombosis, transient ischemic attack, fatal myocardial infarction, and cardioembolic strokes by the suspension of anticoagulants is much higher than the possible oral bleeds that can be treated with local hemostatic measures if anticoagulant therapy is continued during dental surgery⁹.

An important method for monitoring the anticoagulation is by the means of INR and PT; these serological investigations are used as guides for the management of surgical oral procedures without interrupting oral anticoagulant therapy; in a multicentric study, data from 2817 dental extraction were analyzed using multivariable analysis to evaluate several conditions. The main risk factor for post extraction bleeding was found to be PT-INR (odds ratio [OR] 7.797)¹⁰.

CONCLUSION

The European Society of Cardiology recommends other methods to evaluate the bleeding risk in patients under oral anticoagulant therapy e.g., the HAS-BLED score. This test analyzes nine risk factors such as age, history of stroke or previous bleeding, systolic blood pressure, renal or liver dysfunction, use of antiplatelet agents or non-steroidal anti-inflammatory drugs¹¹. In a retrospective cohort study, Kataoka et al.¹² evaluated the HAS-BLED score for its use in patients taking warfarin, and concluded that when measured alone, the score could not predict post-extraction bleeding.

In our practice, we utilized the PT-INR investigations before performing dental surgical procedures. The mean INR was 2.47 and the procedures performed in patients with INR less than 4.0 were without interurrences. There is a controversy about the safe INR for performing surgical procedures; some surgeons consider values up to 3.0 safe^{10,13} while others^{14,15} following the British Health Committees guidelines of small surgical procedures like dental extraction (single or multiple) consider performing dental surgical procedures safe in patients with therapeutic INR in the range of 2 to 4, provided local hemostatic agents are used, such as oxidized cellulose (Surgicel®) and 5% tranexamic acid mouthwash four times a day for two days, in addition to avoiding the prescription of nonselective non-steroidal anti-inflammatory drugs, especially COX-2 inhibitors¹⁶.

The correlation between the weekly dose of warfarin and INR or PT was not established; this may be due to other compounds that may have altered the anticoagulation. Drugs, herbal products, and foods can result in pharmacokinetic interactions and may influence the warfarin effect, for example, cimetidine, omeprazole, fish oil, mango, boldo-fenugreek tea potentiate the effect of warfarin, whereas barbiturates, high vitamin K content foods/enteral feeds, avocado, and ginseng have an inhibitory effect on warfarin¹⁷.

Novel oral anticoagulants such as direct thrombin inhibitors (dabigatran) and factor Xa inhibitors (rivaroxaban) pose a new challenge for the dentists because of their increased use by the patients and lack of clinical guidelines for their management¹⁸. Some recommendations are planning with the physician in procedures where excessive bleeding is anticipated and/or in cases with impaired hemostasis. The use should be discontinued at least 24 hours before the elective surgery and local hemostatic conducts are advised¹⁹. Additional studies such as clinical trials are necessary for establishing the safe management of such patients.

Performing minor oral surgeries in patients on oral anticoagulant therapy can be safe. In this observed sample, no trans- and post-surgical interurrences were observed. Based on this research, we suggest performing dental surgical procedures in patients on oral anticoagulant therapy only when INR is less than 4, with good surgical planning including antibiotic cover, extraction of one tooth at a consultation without atraumatic techniques, use of hemostatic agents, and primary closure of the wound. These practices must be followed strictly, so that there are no complications in these procedures in this special group of patients on anticoagulant therapy.

Ethical approval

The regional Ethical Review Board of Scientific Committee of the Porto Alegre Clinical Hospital (HCPA) approved the work, the patients was informed and consent of this publication.

Disclosures

The authors declare that there is no conflict of interests regarding the publication of this paper.

REFERENCES

1. Lloyd-Jones D, Adams R, Carnethon M, De Simone G, Ferguson TB, Flegal K, et al.; American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics-2009 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*. 2009;119:480-6.
2. Labuz-Roszak B, Pierzchala K, Skrzypek M, Swiech M, Machowska-Majchrzak A. Oral anticoagulant and antiplatelet drugs used in prevention of cardiovascular events in elderly people in Poland. *BMC Cardiovasc Disord*. 2012;12:98.
3. Kelly JG, O'Malley K. Clinical pharmacokinetics of oral anticoagulants. *Clin Pharmacokinet*. 1979;4:1-15.
4. Yang S, Shi Q, Liu J, Li J, Xu J. Should oral anticoagulant therapy be continued during dental extraction? A meta-analysis. *BMC Oral Health*. 2016;16:81.
5. WHO; World Heart Federation; World Stroke Organization, eds. *Global Atlas on Cardiovascular Disease Prevention and Control*. Geneva: World Health Organization; 2011.
6. Lakatta EG, Levy D. Arterial and cardiac aging: major shareholders in cardiovascular disease enterprises: Part II: the aging heart in health: links to heart disease. *Circulation*. 2003;107:346-54.
7. World Health Organization. *The global burden of disease: 2004 update*. Geneva: World Health Organization; 2008.
8. Ouirke W, Cahill M, Perera K, Sargent J, Conway J. Warfarin prevalence, indications for use and haemorrhagic events. *Irish Med J*. 2007;100:402-4.

-
9. Wahl MJ, Pinto A, Kilham J, Lalla RV. Dental surgery in anticoagulated patients - stop the interruption. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2015;119:136-57.
 10. Iwabuchi H, Imai Y, Asanami S, Shirakawa M, Yamane GY, Ogiuchi H, et al. Evaluation of postextraction bleeding incidence to compare patients receiving and not receiving warfarin therapy: a cross-sectional, multicentre, observational study. *BMJ Open.* 2014;4:e005777.
 11. European Heart Rhythm Association; European Association for Cardio-Thoracic Surgery, Camm AJ, Kirchhof P, Lip GY, Schotten U, Savelieva I, Ernst S, et al. Guidelines for the management of atrial fibrillation: the Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC). *Eur Heart J.* 2010;31:2369-429.
 12. Kataoka T, Hoshi K, Ando T. Is the HAS-BLED score useful in predicting post-extraction bleeding in patients taking warfarin? A retrospective cohort study. *BMJ Open.* 2016;6:e010471.
 13. Dudek D, Marchionni S, Gabriele M, Iurlaro A, Helewski K, Toti P, et al. Bleeding Rate after Tooth Extraction in Patients under Oral Anticoagulant Therapy. *J Craniofac Surg.* 2016;27:1228-33.
 14. Bacci C, Maglione M, Favero L, Perini A, Di Lenarda R, Berengo M, et al. Management of dental extraction in patients undergoing anticoagulant treatment. Results from a large, multicenter, prospective, case-control study. *Thromb Haemost.* 2010;104:972-5.
 15. Febbo A, Cheng A, Stein B, Goss A, Sambrook P. Postoperative Bleeding Following Dental Extractions in Patients Anticoagulated With Warfarin. *J Oral Maxillofac Surg.* 2016;74:1518-23.
 16. Perry DJ, Noakes TJ, Helliwell PS; British Dental Society. Guidelines for the management of patients on oral anticoagulants requiring dental surgery. *Br Dent J.* 2007;203:389-93.
 17. Holbrook AM, Pereira JA, Labiris R, McDonald H, Douketis JD, Crowther M, et al. Systematic overview of warfarin and its drug and food interactions. *Arch Intern Med.* 2005;165:1095-106.
 18. Curto A, Albaladejo A, Alvarado A. Dental management of patients taking novel oral anticoagulants (NOAs): Dabigatran. *J Clin Exp Dent.* 2017;9:e289-e293.
 19. Firriolo FJ, Hupp WS. Beyond warfarin: the new generation of oral anticoagulants and their implications for the management of dental patients. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2012;113:431-41.