



Dental surgery in anticoagulated patients—stop the interruption

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In a literature review, the incidence and morbidity of bleeding complications after dental surgery in anticoagulated patients was compared with embolic complications when anticoagulation was interrupted. Over 99% of anticoagulated patients had no postoperative bleeding that required more than local hemostatic measures. Of more than 5431 patients undergoing more than 11,381 surgical procedures, with many patients at higher than present therapeutic intentional normalized ratio (INR) levels, only 31 (~0.6% of patients) required more than local hemostasis to control the hemorrhage; none died due to hemorrhage. Among at least 2673 patients whose warfarin dose was reduced or withdrawn for at least 2775 visits for dental procedures, there were 22 embolic complications (0.8% of cessations), including 6 fatal events (0.2% of cessations). The embolic morbidity risk in patients whose anticoagulation is interrupted for dental surgery exceeds that of significant bleeding complications in patients whose anticoagulation is continued, even when surgery is extensive. Warfarin anticoagulation, therefore, should not be interrupted for most dental surgery. (*Oral Surg Oral Med Oral Pathol Oral Radiol* 2015;119:136-157)

Vitamin K antagonists such as warfarin are commonly used in patients with atrial fibrillation, artificial heart valves, deep vein thrombosis, myocardial infarction, and pulmonary embolisms. Ever since the first report of excessive bleeding after dental extractions in 1957,¹ dental surgery in anticoagulated patients has been controversial and the subject of avid interest among physicians and dentists, who must weigh the bleeding risks in anticoagulated patients versus the risks of embolic complications in patients whose anticoagulation is reduced or withdrawn.

Dental surgery, including simple and surgical tooth extractions, is unlike surgery performed on most other parts of the body. Major blood vessels are unlikely to be encountered, and the surgical sites are easily accessible to local hemostatic methods, including pressure application (biting on gauze), cellulose, gelatin foams, hemcon dressing, microfibrillar collagen, sutures, hemostatic solutions (styptics), tannic acid, tranexamic acid, and fibrin glue.²

Sequential literature reviews in 1998³ and 2000⁴ demonstrated that bleeding complications requiring more than local hemostatic measures after dental surgery at therapeutic anticoagulation levels are exceedingly rare. On the other hand, sometimes fatal embolic

complications can occur when anticoagulation is withdrawn or reduced for dental procedures. Of over 2400 dental surgical procedures in over 950 patients, only 12 patients (<1.3%) suffered bleeding complications requiring more than local hemostatic measures. Of 575 cessations of warfarin for dental procedures, there were 5 embolic complications (0.95%) and 1 fatal outcome. The conclusion was that continuous anticoagulation at therapeutic INR levels should not be interrupted for dental surgery with local hemostatic measures. The purpose of the present review is to update the previous findings with the inclusion of additional literature.

Since 2000, most authors have concurred that continuous therapeutic levels of anticoagulation (up to INR 3.5, or sometimes 4.0) should not be withdrawn or reduced or replaced with heparin for dental surgery.⁵⁻¹² Beirne concluded, "The risk of uncontrolled life-threatening bleeding is so low that it is not necessary to stop anticoagulation [INR 2.0 to 4.0] even for a short interval and risk thromboembolism in patients on oral anticoagulants."¹³ Although not the subject of this article, the use of newer anticoagulants, including direct thrombin inhibitors (dabigatran) and factor Xa inhibitors (rivaroxaban), has not been studied as extensively as that of warfarin, but it does not appear

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Statement of Clinical Relevance

The risk of postoperative bleeding complications in patients in whom anticoagulation is continued for dental surgery is exceedingly small and is outweighed by the small risk of serious and sometimes fatal embolic events when anticoagulation is interrupted for dental surgery.

necessary to withdraw such medications for dental surgery.¹⁴

The inclusion criteria for article selection were English language peer-reviewed publications that reported on bleeding complications or thromboembolic events in human patients in whom warfarin therapy was continued unchanged, altered, or interrupted for a dental procedure. Literature searches were performed in NLM PubMed and Scopus for citations included in the databases up to October 10, 2013. Other retrieval methods included cited reference searching and manual searching of the literature. Search terms used included “oral surgical procedures,” “oral surgery,” “tooth extraction,” “dental scaling,” “dental procedures,” “warfarin,” “anticoagulant,” “surgical blood loss,” “oral hemorrhage,” “postoperative hemorrhage,” “hemostasis altering,” “thromboembolism,” “stroke,” “adverse event,” “risk assessment,” and “treatment outcome.”

DENTAL SURGERY IN PATIENTS WITH CONTINUOUS WARFARIN ANTICOAGULATION

We reviewed 83 clinical studies of dental surgery in more than 5431 patients who were continuously anticoagulated with vitamin K antagonists and underwent more than 11,381 dental surgical procedures, including more than 10,322 dental extractions (Table I).^{1,15-96} Many of these studies showed similar incidences of postoperative bleeding or blood loss after dental surgery between continuously anticoagulated patients, patients whose anticoagulation was reduced or withdrawn, and nonanticoagulated patients.^{17,18,22,23,37,53,65,95} Out of more than 5431 patients at greater than 5677 visits undergoing more than 11,381 surgical procedures, there were only 375 cases (~6.6% of patient visits) of minor postoperative bleeding that required additional local measures for hemostasis. Only 31 cases (~0.6% of patient visits) required more than local hemostatic measures to control hemorrhage. Thus, more than 99% of all patients had no postoperative bleeding that required more than local hemostatic measures. These studies confirm the earlier findings that for continuously anticoagulated dental patients, there is an exceedingly small risk of a significant postoperative bleeding complication (requiring more than local hemostatic measures).

Analysis of some cases of postoperative hemorrhage requiring more than local hemostatic measures

Cieślak-Bielecka et al.⁴⁵ studied 40 continuously anticoagulated patients undergoing 186 dental surgical

procedures, including 181 extractions with local hemostatic measures. Two patients (undergoing 3 extractions at INR 3.5 and 6 extractions at INR 3.0) who had “minor bleeding” 2 and 3 days postoperatively were treated with new sutures and intravenous cyclonamine. Some patients were on additional medications, including aspirin, but it is unclear which patients or what local measures other than new sutures were attempted before administering cyclonamine.

Morimoto et al. studied three groups of 382 patients undergoing simple and surgical dental extractions on continuous antithrombotic therapy.^{71,72} The first group was on warfarin monotherapy, the second group was on warfarin and antiplatelet combination therapy, and the third was on antiplatelet monotherapy. Hemostasis was achieved in all patients with local measures, but one patient on combined warfarin–antiplatelet therapy undergoing three extractions at INR 1.5 was also administered vitamin K because of an “excessively high” postoperative INR level that was impossible to measure.

Hong et al. studied 122 anticoagulated dental surgical patients,⁶³ some of whom were on additional medications thought to enhance anticoagulation. Only one patient (following liver transplantation, with end-stage renal disease and on hemodialysis) on combined warfarin–aspirin therapy required more than local hemostatic measures after 5 extractions at INR 2.2. His anticoagulation was INR 5.9 after hospital admission. Vitamin K and fresh frozen plasma were administered and local hemostatic measures applied.

All of the above four patients requiring more than local hemostatic measures underwent 3 or more extractions. The authors reported that at least 2 (and possibly all 4) patients had very high postoperative INR levels, possibly because of concomitant medications and/or medical history. These very high INR levels may have contributed to the bleeding complications, and in each study, the authors concluded that therapeutic levels of anticoagulation should not be interrupted for dental surgery.

ANTICOAGULATION WITHDRAWAL OR REDUCTION FOR DENTAL PROCEDURES

We reviewed 64 studies of more than 2673 patients whose anticoagulation was withdrawn or reduced for more than 2775 appointments for dental surgery.^{1,17,18,20,25,31,35-37,40,48,49,51,53,57,58,61,65,71,74,79,82,83,86,87,91,94,96-132}

There were 161 patients (~6% of patients and visits) with at least minor postoperative bleeding, including 4 patients (0.14% of visits) who were administered more than local measures for hemostasis. There were 22 embolic complications (0.8%), including 6 that were fatal (Table II).

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