

toolbox

Managing anticoagulated patients requiring dental extractions: an exercise in evidence-based clinical practice

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Ms. J is a 65-year-old female referred for evaluation and extraction of her remaining dentition (five periodontally involved mandibular teeth) and insertion of an immediate lower denture. She is currently asymptomatic. Her past medical history reveals that she has chronic atrial fibrillation for which she is prescribed an oral anticoagulant, Coumadin® (DuPont, Wilmington, Delaware, USA) to prevent thromboembolic episodes.

Since you do not commonly manage anticoagulated patients, you call three colleagues to solicit their opinions.

- The patient's physician recommends hospital admission and initiating intravenous heparin while tapering her warfarin.
- Her cardiologist recommends discontinuing warfarin 48 hours before the procedure.
- A former classmate (now an oral and maxillofacial surgeon) recommends no change in oral anticoagulant therapy and to control bleeding with local measures.

You are confused with these three conflicting recommendations from knowledgeable experts whose opinions you trust and respect. Your patient needs treatment. You need to make an explicit decision regarding perioperative management of the warfarin. Which management strategy optimizes your patient's outcome?

Evidence-Based Dentistry (2002) 3, 23–26. DOI: 10.1038/sj/ebd/6400094

Introduction

Oral anticoagulants (e.g., warfarin sodium or Coumadin), are commonly used to prevent thromboembolism in patients with: atrial fibrillation; pros-

thetic heart valve replacement; previous deep vein thromboses; or pulmonary embolism.

The level of anticoagulation is monitored using the International Normal-

ized Ratio. Therapeutic levels of anticoagulation, range from 2 to 4.5 for patients with prosthetic heart valves and from 2 to 3 for other conditions such as atrial fibrillation.^{1,2}

Perioperative management recommendations for anticoagulated patients undergoing dental treatment vary. Troulis et al.³ surveyed the practices of oral and maxillofacial surgeons who extract teeth in anticoagulated patients. The most frequently reported practices were:

- hospitalization and use of intravenous heparin;
- discontinuation of warfarin preoperatively; and
- maintenance of warfarin therapy.

Others have recommended the use of mini-dose heparin or short-acting oral warfarin.⁴ Thus, clinicians must weigh the risk of serious postoperative bleeding against the drug's therapeutic benefit in terms of preventing serious embolic episodes such as stroke or pulmonary embolism.

Evidence-based clinical practice

Many clinicians have access to the Internet to facilitate searching and obtaining relevant literature online. The purpose of this paper is to outline a process for using the published litera-

ture to assist clinical decision making⁵⁻⁷. The overall process has four steps:

- asking an answerable question
- searching for the best evidence
- critically appraising the evidence
- applying the evidence

Step 1: Converting information needs into answerable questions

Framing the issue into 4 parts helps focus the question and design the search strategy. The four parts are the:

- Patient or population (P),
- Intervention (I),
- Comparison or control (C),
- Outcome (O).

The acronym PICO may be used to facilitate this process.^{8,9} (and see. <http://cebm.jr2.ox.ac/docs/focusquest/html>).

A generic clinical question can be constructed as follows:

“Patients with ‘X’, treated with Intervention ‘A’

Compared with intervention ‘B’ results in Outcome ‘Y’

In Ms J’s case, there are two questions to answer (Table 1).

Step 2: Efficiently searching the literature and identifying appropriate articles

To address the first question, I searched MEDLINE using the Ovid interface (Ovid Technologies, Inc. New York, NY) (Table 2).

The first step was to identify key words relevant to the topic. I combined the terms “anticoagulants or warfarin” and “tooth extraction”, limited the search to articles published in

Table 2 MEDLINE Search Strategy

Step	Term	Result
1	Anticoagulant	103043
2	Warfarin	6883
3	1 or 2	103043
4	Tooth extraction	10139
5	3 and 4	149
6	Limit 5 to (English and 1990-2002)	33
7	Limit 6 to randomised controlled trials	4

English since 1990 that were randomised controlled trials. The search produced a list of 4 articles.

In addition to MEDLINE, there are commercially available collections of evidence-based reviews available on compact disc (CD) or online. To answer the second question, I used UpToDate[®] (www.uptodate.com, UpToDate, Inc., Wellesley, MA), a computer-based program providing direct access to referenced answers, and quickly found the information needed to estimate the risk of thromboembolism when warfarin is discontinued.

Step 3: Appraising the literature

After reviewing the titles and abstracts from the MEDLINE search, two articles were selected to assess their validity and applicability.^{10,11,12}

Ramstrom et al¹¹, examining anticoagulated patients, compared the use of 5 percent tranexamic acid mouthrinse (plus gauze pressure or sutures) to placebo mouthrinse (plus gauze pressure or sutures) in patients requiring tooth extraction. The postoperative bleeding rates in the placebo (n=47) and the treatment (n=46) groups were 21% and 0%, respectively. In a similar study by Borea et al.¹², the postoperative bleeding rates in the placebo (n=15) and treatment (n=15) groups were 13.3% and 6.7%, respectively. Further,

all episodes of postoperative bleeding were minor, resolved with local measures, and were reported as minor bleeding complications.

Based on the papers reviewed here, it appears that maintaining the anti-coagulant regimen and using local measures, such as tranexamic acid mouthrinse, resorbable haemostatic agents, and sutures, results in minimal postoperative bleeding complications. When local measures were used, the reported frequency of bleeding episodes ranged from 0 to 6.7 percent, were easily controlled with additional local measures, and resulted in a total estimated blood loss ranging between 0.6 and 17.3 ml (see Table 3).

Table 3 Incidence of bleeding complications following dental extractions

	+Local Measures	–Local Measures
+Anticoagulant	0% (n=45) ¹²	22% (n=45) ¹²
–Anticoagulant	7% (n=15) ¹³	13% (n=15) ¹⁵

An alternative management strategy is to discontinue warfarin for 48 to 96 hours preoperatively,^{3,18} and ask: “What is the risk of embolic episodes during the time when the warfarin is discontinued?” Using UpToDate[®], I identified evidence-based reviews that provided estimates of stroke risk in patients with atrial fibrillation and prosthetic valves (Table 4)^{1,2}.

Estimates of the acute increased risk of embolic episodes when warfarin is discontinued 48 hours preoperatively ranged from 3.29×10^{-5} to 1.6×10^{-4} . It may be difficult to interpret or internalize numbers of this magnitude.

Table 1 Example of ‘PICO’ questions

Patient or population (P)	Intervention (I)	Comparison or control group (C)	Outcome (O)
1. In patients who take anticoagulants and need dental extractions ...	Does maintaining a patient on warfarin ...	When compared to discontinuing warfarin 48 h preoperatively ...	Result in an increased risk for serious postoperative bleeding?
2. In patients who take anticoagulants and need dental extractions ...	Does having warfarin discontinued 48 h preoperatively ...	When compared to maintaining warfarin	Increase the risk of thromboembolism?

Table 4 Estimates of stroke risk if warfarin is discontinued 48 hours preoperatively

Estimate of annual stroke risk in atrial fibrillation	Discontinue warfarin	Maintain warfarin	Acute ARI*	NNH*
High estimate	7.0%	2.3%	2.6×10^{-4}	3,884
Low estimate	1.0%	0.4%	3.29×10^{-5}	30,414
Average	5.0%	1.4%	1.97×10^{-4}	5,069
Estimate of annual stroke risk in prosthetic valve replacement**				
Average	4.0%	1.0%	1.64×10^{-4}	6,083

*The acute absolute risk increase (ARI) was estimated as follows:

1. Annual absolute difference in risk (7.0%–2.3%)=4.7%
2. 4.7% multiplied by 2/365 (acute 48-hour risk)= $0.047 \times 0.00548=0.000258$

**NNH (number needed to harm) is computed as the reciprocal of the acute ARI (1/0.000258).

A useful technique to estimate the risk for side effects is to compute the number needed to harm (NNH).^{19,20}

The NNH is an estimate of the number of patients exposed to a therapy to produce one adverse outcome. For example, for patients with atrial fibrillation, if one chooses to discontinue warfarin for 48 hours preoperatively, the NNH is 5069 (Table 4). The NNH is interpreted as having one additional embolic episode for every 5,069 patients managed by discontinuing warfarin preoperatively when compared to continuing warfarin perioperatively.

Step 4: Applying the evidence

Returning to Ms. J, the first clinical question was:

Among patients who are anticoagulated and need dental extractions, does maintaining a patient on warfarin when compared to discontinuing warfarin 48 hours preoperatively result in an increased risk for serious postoperative bleeding?

Based on the review, anticoagulated patients may bleed more and may require more interventions, but virtually all of the cases responded to local measures and the total blood loss was minor (i.e.: serious bleeding was not evident).

The second related question was:

Does discontinuation of warfarin preoperatively increase the risk of thromboembolism?

The answer is yes. While the estimated risk is small (see Table 4), the

morbidity can be significant and includes fatalities.

Clinical Judgement

Using this evidence, I would do the following for Ms. J:

1. Review her case with the patient's physician or medical specialist. There may be some circumstances when the International normalized ratio (INR) needs to be above a level that is documented to be "safe" for dental procedures (i.e. >4.0). As such, the patient may need to be admitted for anti-coagulant management and observation perioperatively.
2. Obtain a blood sample preoperatively and document the INR. Some authors report that it is adequate to obtain the INR anytime during the week before the procedure.²² I choose to obtain the INR on the day of the procedure.^{11,13–15} Levels of anticoagulation can be variable. I want to know the baseline INR immediately before starting a procedure. If the INR is <4.0, dental procedures associated with minimal bleeding should be able to be accomplished with minimal risk of significant bleeding. This might, for example, include single extractions, scaling and root planing, supragingival dental prophylaxis, and complex restorative dentistry. For more complex procedures, i.e. multiple extractions or extraction of a single bony impacted wisdom tooth, an INR <3.5 (most cases)

has minimal risk of significant postoperative bleeding. If the INR is <3.0 (most cases), full mouth extraction, extraction of impacted teeth, implant placement(s), periodontal flap surgery and other procedures associated with significant bleeding may be accomplished.²³ An INR >4.0 may represent a supratherapeutic INR and no procedure should be started. The patient should be referred to his or her physician for intervention to adjust the INR.

In Ms. J's specific case, if the INR was <3.5, I would proceed with the extractions.

3. For patients scheduled for multiple extractions (as in Ms. J's case), removal of multiple impacted teeth, multiple quadrants of periodontal surgery, I recommend staging the procedure. For example, limit the procedure to one quadrant and assess the amount and quality of bleeding. If bleeding is minimal and the state of coagulation grossly normal, proceed to the next quadrant. If you are unsatisfied with the amount of bleeding or state of coagulation, the procedure can be aborted.
4. Regardless of the INR, use local measures to control bleeding. Local measures consist of using resorbable haemostatic agents, suturing the wound, and applying gauze pressure. The reviewed studies reported on the value of using 5% tranexamic acid mouthrinse or biting on gauze soaked in tranexamic acid. Until now, using tranexamic acid was not part of my protocol. I now plan to incorporate it into the perioperative management of protocol for my patients.
5. Before discharging anticoagulated patients, I recommend they remain in the waiting room or recovery area for one or two hours postoperatively so the clinician can monitor the early postoperative bleeding status. This last recom-

mentation was not evidence-based, but based on clinical experience. It is generally easier to monitor and intervene when the patient is in your office rather than over the telephone or in the emergency room late at night.

Summary

Central to evidence-based clinical practice is the explicit enumeration and balancing of risks and benefits. We need to integrate our clinical values and preferences with the patient's values and preferences to render compassionate, informed treatment decisions.

Hypothetically, given the above strategy, we are trading Ms. J's increased risk of bleeding for a decrease in the risk of an embolic event. We believe she would feel similarly, but this preference needs to be validated by the patient.

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