

Remove the tooth, but don't stop the warfarin



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BACKGROUND

Dentists rely on general practitioners to manage a patient's warfarin dose before uncomplicated dental extraction.

OBJECTIVE

This article compares common practice of warfarin management with the available clinical evidence.

DISCUSSION

Common practice lags more than 20 years behind clinical evidence to the detriment of patients, and with medicolegal consequences for doctors.

Case history

A woman, 37 years of age, has a mechanical mitral valve and is in atrial fibrillation. She has been on a daily dose of 7 mg of warfarin for 13 months with a stable INR of 3. She smokes 15–20 cigarettes per day and has a body mass index (BMI) of 31. She requires the removal of one molar tooth. Her GP directs her to stop warfarin for 3 days before the extraction. The tooth is removed and the warfarin recommenced 8 hours later. That evening she has a stroke that leaves her with a dense, right sided hemiplegia and expressive aphasia.

- What is common clinical practice for patients on warfarin who require a single dental extraction?
- Is this common clinical practice based on clinical evidence?

The history of warfarin

In the early 1920s Canadian veterinary pathologist, Frank Schofield, reported a new haemorrhagic disease of cattle fed on mouldy, sweet clover hay.⁴ In 1941 the biochemist Karl Link discovered that the harmless coumarin in the sweet clover was oxidised by bacterial action into dicoumarol, and that this was a potent anticoagulant. He and his PhD student, Harold Campbell, then isolated pure crystals of dicoumarol.⁵ They assigned the patent rights to the Wisconsin Alumni Research Foundation (WARF) which had funded their research.

At first warfarin was used as a rodenticide. But the unexpected recovery of a navy recruit who swallowed 567 mg led doctors to experiment with its use in humans.⁶ It received prominence when used on President Eisenhower after his heart attack in 1955. Paradoxically, it may have also been used by Lavrenti Beria, the head of the Soviet Secret Police, to poison Josef Stalin, who died from a cerebral hemorrhage.⁷

Monitoring the level of a patient's anticoagulation was originally calculated by adding thromboplastin to a vial of blood and recording the time it took for a clot to form. Thromboplastin was obtained from the brains of rabbits or humans. These preparations were not bio-equivalent. Consequently tests done by different laboratories on the same blood sample produced different prothrombin times.

Warfarin was approved for human use in 1954. It is the twentieth most frequently prescribed medication in Australia with approximately 80 000 prescriptions dispensed each month.^{1,2} General practitioners are wary of the haemorrhagic potential of 'rat poison' and probably measure their patients' international normalised ratios (INR) too frequently.³ Paradoxically, doctors and dentists are less aware of the greater risk of stroke when they stop a patient's warfarin before uncomplicated dental extraction.

A medicolegal problem

The patient sues the GP. The medical defence lawyer asks the following questions:

- How long has warfarin been in use?

A major advance in the safe use of warfarin was a standardised prothrombin test developed by the World Health Organisation (WHO) in 1983. Since then, all prothrombin times are corrected to an international standard; the 'INR'. A blood sample from a patient on warfarin will now have a clinically similar INR measurement in all accredited laboratories, worldwide.⁸

What is common clinical practice?

My habit and that of my immediate colleagues was to stop warfarin for 3 days, check that the INR was less than 2 on the day before dental extraction, and resume warfarin on the evening of the same day of the extraction. At the October 2004 Royal Australian College of General Practitioners' Annual General Meeting, I asked 20 leading GPs about their management of such cases. Eighteen stopped the warfarin for between 2–4 days. I also asked the next six dentists I met, and all wanted warfarin stopped before a dental extraction.

My 'quick and dirty' epidemiology showed that in 2004, cessation of warfarin before dental extraction was by far the most common clinical practice in Australia. Other studies have also shown variation in doctors' and oral and maxillofacial surgeons' protocols for managing warfarin therapy in patients requiring dental extraction.^{9,10}

Literature review

The first controlled trial of dental extraction in patients on warfarin therapy was conducted in 1983.¹¹ It showed that it was not necessary to cease warfarin prophylaxis for patients whose INR was within the normal range. Other studies in humans and rabbits followed, and all confirmed that it was unnecessary (and dangerous) to stop warfarin for primary care dental extraction.^{12–14}

A Delaware dentist, Michael Wahl, performed a meta-analysis of published papers which included 2400 individual dental procedures in 950 patients. It showed the incidence of embolic complications when stopping warfarin was 1% and that this was three times more likely than bleeding complications.¹⁵

An elaborate trial in which 249 patients were divided into five groups on the basis of their INR reading on the day of dental extraction

was conducted. The INRs ranged from 1.5 to more than 3.49. The incidence of postoperative bleeding was not significantly different among the groups. The authors concluded that dental extractions could be performed without modifying anticoagulant dose.¹⁶

This evidence was used by the North West Medicines Information Centre in Liverpool in devising their 2001 guidelines for the management of patients on long term warfarin who required dental extraction. They recommended that, as long as the INR was less than 4, it was safe to perform simple extractions of no more than three teeth.¹⁷

And yet the 'great warfarin debate'¹⁸ continued under such colourful titles as: 'Let's not wage war on warfarin!'¹⁹ and 'Stop the nonsense, not the anticoagulants'.²⁰ However, even those who had conducted trials confirming the safety and convenience of dental extraction in patients with an INR less than 4 questioned whether performing such dental extractions in general dental practice was feasible and cost effective.^{21,22} And to confuse the issue even further, the haematologists in the north of England did not agree with the Liverpool guidelines and recommended instead that the INR should be reduced to less than 2 before dental surgery.²³ Even the authoritative British National Formulary has only recently included guidelines on dental extraction for patients on warfarin. They closely follow the 2001 Liverpool guidelines with the exception of recommending that the INR should be less than 3 at the time of dental extraction.²⁴

Australia

The Australian contribution to the 'great warfarin debate' has been muted and easily missed. Much of it has been buried or mentioned as an unreferenced aside in guidelines about major surgery.^{25–27} The publication of Australian consensus guidelines on warfarin reversal²⁷ led to a brief flurry or correspondence, including a letter relating my cautionary tale.²⁸ The current *Australian Medicines Handbook* concurs with the recommendations in this article.²⁹ In 2002, the Australian Dental Association advised caution in removing teeth where the INR exceeded 3.³⁰ This approach was criticised as 'historical and failing to reflect current best practice'.³¹ Indeed

the patients most at risk of cerebrovascular thrombosis are those with mechanical heart valves who have a target INR of 3.5 and it is precisely these patients who would be most affected by reducing the INR to less than 3.³² Stopping warfarin in high risk patients before endoscopy has been shown to result in a stroke rate of 3%.³³

Professor Goss from the Adelaide Oral and Maxillofacial Surgery Unit and his colleagues have provided the best evidence based review of dental extractions and warfarin yet available. They confirm that it is not necessary, and indeed unwise, to cease warfarin prophylaxis for patients whose INR is within the normal therapeutic range of 2–4.³⁴

Conclusion

In terms of patient cost, convenience and safety, and as a protection from medicolegal consequences, it is time that the antiquated common practice of ceasing warfarin before uncomplicated tooth extraction is replaced by evidence based practice. A stroke is a catastrophic event, while a bleeding tooth socket is merely messy and usually easily controlled.³⁰

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