

# Trauma and anticoagulants – A potentially dangerous combination

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An 88 year-old gentleman was transferred by EMS to an urban emergency department (ED) from an urgent care centre outside the city. The patient complained of dizziness during venipuncture at the urgent care’s outpatient laboratory and was found to have a heart rate (HR) of 30/minute and a blood pressure (BP) of 112/60 mm Hg. Further history at the urgent care revealed the patient was taking warfarin for sick sinus syndrome and was having his INR level checked. The patient denied syncope, but had sustained a ground-level fall three days prior. A 12-lead ECG revealed sinus bradycardia with first degree AV block. The patient’s heart rate subsequently increased to 60/minute. Cervical spine x-rays at the urgent care revealed a possible C1-C2 abnormality and major anterior soft tissue swelling of the neck. Spinal immobilization was initiated prior to transfer.

## Initial emergency department presentation and management

The patient presented to triage with a hoarse voice. His inability to speak had increased in the past five minutes. He was immediately triaged to a trauma bed with an urgent page to emergency medicine and trauma surgery. Vital signs on arrival were: BP 160/90, HR 60, RR 24 and temperature of 36°C. Significant physical assessment findings included the use of accessory respiratory muscles, muffled speech, pain on swallowing and a large hematoma extending from his anterior neck to his upper chest. Portable cervical spine and chest films were completed and the patient was transferred to radiology for a CT scan of head and neck. No acute spinal or head injury was found on CT. The patient was positioned with the head of bed at a 45° angle, which helped decrease his work of breathing.

| Lab results   |  |
|---|--|
| Significant Urgent Care Lab Results   | Significant ED Lab Results   |
| INR = 7.9<br>(Outpatient lab result the day before presentation to Urgent Care) | Hemoglobin = 127 g/L<br>Hct = 0.39 L/L<br>INR = 1.9<br>Random Digoxin Level =<br>Less than 0.4 mmol/L<br>Creatinine = 140 umol/L |

Bronchoscopy revealed anterior non-obstructive swelling above the epiglottis, with normal vocal cords and trachea down to the level of the carina. Pulmonary and trauma services agreed the patient was at a lower risk of upper airway obstruction unless his bleeding progressed. The priority was to correct the patient’s coagulopathy.

## Correction of coagulopathy

This gentleman had been advised to stop his warfarin and Aspirin after his INR was known to be 7.9 the day prior to presentation at the urgent care centre. Vitamin K 2 mg was given by mouth at the urgent care prior to transfer. Further correction of this patient’s coagulopathy involved the administration of two units of fresh frozen plasma (FFP) in the ED.

## Further history

An extensive cardiac history including infiltrative cardiomyopathy and tachyarrhythmias was found through this patient’s previous medical records. This patient had a recent hospital admission for tachycardia with new medications prescribed and had been experiencing subsequent bradycardia. Current medications included digoxin, amiodarone and Aspirin.

## Outcome

This patient was admitted to the trauma ward under “high observation” for 48 hours and received another two units of FFP for continued management of coagulopathy.

Follow-up on discharge to include very close monitoring of INR level and signs and symptoms of further bleeding episodes. (My injury prevention voice would say that fall prevention education and initiatives would also be a good idea!)

## Teaching points


Warfarin is a common anticoagulant prescribed for a range of medical conditions including arrhythmia, prosthetic heart valves, deep vein thrombosis (DVT) and pulmonary embolus (Medline Plus Drug Information, 2007). Some studies show a 70% risk reduction in large and fatal ischemic strokes in patients with atrial fibrillation who take prophylactic warfarin (Hughes, & Earnest, 2003). However, this medication is not without risk. The warnings included with a prescription of warfarin from the pharmacy are extensive. A group of neurologists in Cincinnati found that in patients

over 80 years of age, the rate of brain hemorrhages associated with warfarin increased more than tenfold (Reinbert, n.d. ). There needs to be a balance between preventing ischemic stroke and the risk of bleeding. Blood pressure must also be managed to decrease the risk of bleeding. Not all patients will significantly benefit from warfarin therapy.

The International Normalized Ratio (INR) or Prothrombin Time (PT) can be used to assess both bleeding and clotting tendencies. Most laboratories report PT results that have been adjusted to the INR (Lab Tests Online). Warfarin affects the INR directly and indirectly, through interactions with other patient medications and herbal preparations such as cranberry products, garlic, Ginkgo biloba, ginseng and St. John's wort (Medline Plus Drug Information). Table One outlines recommended INR ranges and duration of warfarin therapy for a number of medical conditions.

Treatment of bleeding in patients who are on warfarin therapy focuses on withholding the drug and other blood thinners such as Aspirin, and the administration of vitamin K and fresh-frozen plasma. Warfarin inhibits clotting factors II, VII, IX and X, which are all vitamin K-dependent; reduction of the INR level with vitamin K requires at least four to six hours (Altmin, 2003). With significant bleeding that requires immediate reversal of anticoagulation, fresh-frozen plasma is required because it contains all the vitamin K-dependent coagulation factors (Altmin).

The INR of this patient was decreasing from the initial high of 7.9 post-injury to 1.9 on arrival to the ED, through the action of withholding warfarin and the administration of vitamin K.

So, even a minor mechanism of injury such as a ground-level fall can produce potentially life-threatening complications in patients who are anticoagulated. Ask the question about blood thinners on all trauma patients! 

## References

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| <b>Table One. INR ranges and duration of warfarin therapy</b><br>(Vancouver Coastal Health Pharmaceutical Sciences) |                   |  |
|---|-------------------|--|
| <b>Indication</b>   | <b>Target INR</b> | <b>Duration of Therapy</b>   |
| <b>Low intensity therapy</b>  |                   |  |
| Prophylaxis of hip surgery  | 1.6 – 2.3         | Until patient is ambulatory and/or p to 4-6 weeks  |
| <b>Moderate intensity therapy</b>   |                   |  |
| Treatment of DVT or PE  | 2.0 – 3.0         | 3 months   |
| • Due to reversible risk factors  |                   | 6-12 months (may consider indefinite)  |
| • Idiopathic  |                   | Indefinite   |
| • ≥ 2 episodes, cancer  |                   |  |
| Cardioversion for atrial fibrillation   | 2.0 – 3.0         | 3 weeks prior and 4 weeks post cardioversion   |
| Tissue heart valves   | 2.0 – 3.0         | 3 months post surgery  |
| Mechanical aortic valve   | 2.0 – 3.0         | Indefinite   |
| Acute anterior myocardial infarction (MI)   | 2.0 – 3.0         | 3 months post MI (with ASA 81 mg daily)  |
| <b>High Intensity Therapy</b>   |                   |  |
| Mechanical mitral valve<br>(Hughes & Earnest, 2003)<br>(or aortic valve with atrial fibrillation)                   | 2.5 – 3.5         | Indefinite<br>Long term use recommended if meticulous INR monitoring is standard; target INR range 2.5 – 3.5 without concomitant aspirin or 2.0 – 3.0 with aspirin |