



### H110 Anticoagulation and Exsanguination: A Case Series of Fatalities From Superficial Wounds in the Elderly

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**Learning Overview:** The goal of this presentation is to bring awareness to attendees that when under anticoagulation treatment, and even within the therapeutic threshold, an elderly person can quickly exsanguinate on a superficial wound. The subsequent manner and cause of death can be difficult to ascertain because the scenes can require forensic analysis due to the amount of blood present.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by informing attendees that superficial wounds can lead to fatal exsanguination in the elderly and present as a crime scene.

There has been an unprecedented anticoagulant use in the United States, particularly in the elderly, including treatment for heart disease, atrial fibrillation, and deep vein thrombosis prophylaxis.<sup>1</sup> Since the advent of Direct Oral Anticoagulants (DOACs), warfarin use has fallen but still accounts for roughly 1.6 million quarterly doctor visits.<sup>2</sup> Warfarin's mechanism of action relies on blocking the vitamin K pathway in the liver and is drastically affected by dietary sources, requiring close monitoring. In contrast, dabigatran and other DOACs employ an anti-platelet pathway that does not interfere with vitamin K or require specific testing or close monitoring. Regardless of the therapy used, patients are at increased risk of bleeding-related complications, even when they are in the therapeutic window of treatment. Emergent reversal of anticoagulation with warfarin employs Fresh Frozen Plasma (FFP) and vitamin K, but is very limited when antiplatelet agents are used.

The aim of this presentation is to bring awareness to the potential lethal adverse effects of anticoagulants and that vulnerable populations can suffer mortal complications due to relatively superficial and minor wounds. This case series of three geriatric patients highlights a rare complication of massive exsanguination from rather subtle injuries consisting of puncture wounds or abrasions less than a one-quarter of an inch. The three patients ranged in age from 85 to 89 years. The corresponding death scenes were often so bloody they required careful forensic evaluation to determine manner and cause of death, including exclusion of foul play. The first decedent, an 85-year-old male, was found deceased at home in a puddle of blood on his kitchen floor. It had been apparent he had made several trips to the bathroom and back and upon external examination, the only wound present was a one-eighth-inch abrasion on his ankle. Another patient, an 89-year-old female, died under similar circumstances after apparently puncturing her ankle on a screw protruding from her walker. The puncture wound was also about one-eighth inch in circumference and the only lesion found on her body. Finally, an 89-year-old male bled out from a one-quarter inch puncture wound on his ankle as well. All three patients were known to be anticoagulated for atrial fibrillation. These findings may become more common as there is increasing prevalence of anticoagulant usage with the aging population. It is important for clinicians to weigh the cost versus benefit of putting a patient on anticoagulants, or these unfortunate deaths due to minor trauma with fatal outcomes will only increase.

#### Reference(s):

1. Barnes, Jeffery; Eleanor Lucas; G. Caleb Alexander; and Zachary D. Goldberg. 2015. National Trends in Ambulatory Oral Anticoagulant Use. *The American Journal of Medicine* 128, no. 12 (December): 1300–1305. <https://doi.org/10.1016/j.amjmed.2015.05.044>.
2. Kirley, Kate; Dima Qato; Rachel Kornfield; Randall S. Stafford; and G. Caleb Alexander. 2012. National Trends in Oral Anticoagulant Use in the United States, 2007 to 2011. *Circulation: Cardiovascular Quality and Outcomes* (September): 615–621. <https://doi.org/10.1161/CIRCOUTCOMES.112.967299>.

#### Anticoagulation, Exsanguination, Elderly