
Warfarin & Vitamin K – A Case in Point

We had a very interesting experience with warfarin recently. It was chock full of learning opportunities and I thought I would highlight some of them.

MM, a 94-year old female, returned from hospital with an order of warfarin 5 mg daily. The warfarin was started one week earlier following a new diagnosis of atrial fibrillation. Since MM has very poor renal function (her creatinine is 159), she did not qualify for one of the newer NOAC (novel oral anticoagulants) drugs. Warfarin was the right choice. MM is not frail (weight of 64Kg) so at first glance the dose seemed OK.

If we dig a little deeper and add a few more patient characteristics, we see that the dose was far from ideal. MM was jaundiced on admission, signaling hepatic trouble, and also suffered from heart failure (HF). Warfarin is metabolized by the liver, so both hepatic impairment and HF (reduced blood flow to liver) reduce requirements. Age also plays

a role in warfarin dosing. Young and middle aged adults usually have warfarin doses in the 5 to 10 mg daily range, but elderly patients typically take 2 to 4 mg daily. If we take all this into account, a dose of 2 mg daily – perhaps with a slightly higher loading dose for the first two days – would have been more appropriate.

The 5 mg dose was started on a Monday and the resident was back in her home a few days later. Blood was drawn for an INR measurement on Friday morning and the result did not come to the facility until just after the Monday PM dose was given. Not surprisingly, the INR was 6.3, and the resident had already received four more doses of the drug since the Friday AM blood draw!

The warfarin was put on hold and the INR was repeated on Tuesday. The new result was 7.7, and this was reported to the physician on Wednesday. GeriatRx became involved at that point, because the doctor ordered what seemed to be a very high vitamin K (K) dose (10 mg orally stat). If INR is 6-10 with no bleeding, the recommended K dose is 1 to 2.5 mg p.o. stat. Higher doses can cause *warfarin resistance*, rendering warfarin relatively ineffective for a time, due to the continued presence of K.

A call to the physician helped to clarify things. The atrial

fibrillation was triggered by fluid overload, resulting from an exacerbation of MM's heart failure. Lasix and digoxin were used in hospital to clear the fluid, resolving the atrial fib for the time being. Ironically, the patient's husband had been hospitalized recently with a warfarin related bleed so the doctor did not want to take any chances. In light of this, plus the reduced atrial fib risk, a vitamin K dose of 10 mg made perfect sense.

It is worth adding that vitamin K takes 8 – 24 hours to substantially reduce INR. Also, INR drops by roughly 25% each day after warfarin is stopped. Careful consideration of resident characteristics and conditions could have prevented this situation. Quicker INR reporting or the use of a CoaguChek® monitor certainly would have made it less urgent. We must always take great care when dealing with high risk medications such as warfarin.

Moderation is the Key

Two recent studies have confirmed what our mothers used to tell us...everything in moderation. Exercise and sodium are the subjects. Too much of each is bad and too little is not good either. Each extreme is linked to increased mortality. Let's all take mom's advice and find the healthy middle ground.