Dangers of multiple health care systems and potential rivaroxaban overdose

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Story from the Front Lines:

A 58 yo man with prior history of recurrent DVT/PE presented to establish primary care. He reported a history including atrial fibrillation, type 2 diabetes, HTN, chronic kidney disease and heart failure with reduced ejection fraction. Because of his many prescribed medications he often has a hard time understanding why and how he is supposed to be taking each medication. At our first visit together I restarted him on rivaroxaban which he had stopped taking due to a sense of uncertainty around its importance. Several months later he presented to an outside hospital with chest heaviness and mild tachycardia of uncertain cause. A CT pulmonary angiogram (CTPA) was performed which showed a probable old clot. The admitting clinician was unaware of him being on anticoagulation already and restarted him on initiation dose of rivaroxaban at the time of discharge. The patient advised the medical team that he had rivaroxaban at home, and began taking the 20mg dose twice a day at time of discharge. This mistake was only discovered when the patient called over a month early for a refill of his rivaroxaban. Fortunately he denied any evidence of bleeding while on this potentially toxic dose of rivaroxaban. He was grateful for clarifying the proper dosing schedule and felt fortunate that there wasn't a worse outcome.

Teachable Moment:

While there was no major adverse event, this case demonstrates the complexity of disconnected health care and the importance of acquiring an accurate medication history for every patient. Had the outside medical team known he was on therapeutic anticoagulation their method of evaluating his chest pain may have been different since old pulmonary embolism may not have been the cause of his new symptoms. Second, there are numerous potential harms from CTPA, which in this case was unnecessary since he was already on definitive treatment of pulmonary embolus. For this patient the risks of CTPA reaction to contrast dye, radiation, CIN and any incidental findings requiring further work up without much chance of therapeutic benefit. In one series in patients with diabetic nephropathy and heart failure on diuretics the risk of contrast induced nephropathy was reportedly as high as 50 percent (1). Fortunately, the patient did well from this perspective. Third, this case represents medication prescribing error with the potential for a fatal overdose. Rivaroxaban is an oral direct Factor Xa. The intended dose is 15mg twice a day for 21 days followed by 20mg daily. Numerous studies have investigated risks and there is clear evidence that risk of bleeding and all-cause mortality increase with higher doses. Additionally, risks of bleeding in patients with reduced renal function is increased (2). This reiterates the importance of spending time to obtain an accurate medication history and a careful medication reconciliation at the time of discharge. Finally, there is a small but real cost to the patient for needing to refill a medication prior to when it is due. While the patient largely avoided major adverse outcomes, this case demonstrates the difficulties, dangers and inefficiencies of operating in multiple health care systems.

References:

1 P. S. Wells, D. R. Anderson, M. Rodger et al., “Excluding pulmonary embolism at the bedside without diagnostic imaging: management of patients with suspected pulmonary embolism presenting to the emergency department by using a simple clinical model and D-dimer,” Annals of Internal Medicine, vol. 135, no. 2, pp. 98–107, 2001.

2. Trujillo T, Dobesh PP. Clinical Use of Rivaroxaban: Pharmacokinetic and Pharmacodynamic Rationale for Dosing Regimens in Different Indications. *Drugs*. 2014;74(14):1587-1603. doi:10.1007/s40265-014-0278-5.

Meds: atorvastatin, diltiazem, lasiz, insulin detemir, xarelto, metformin,