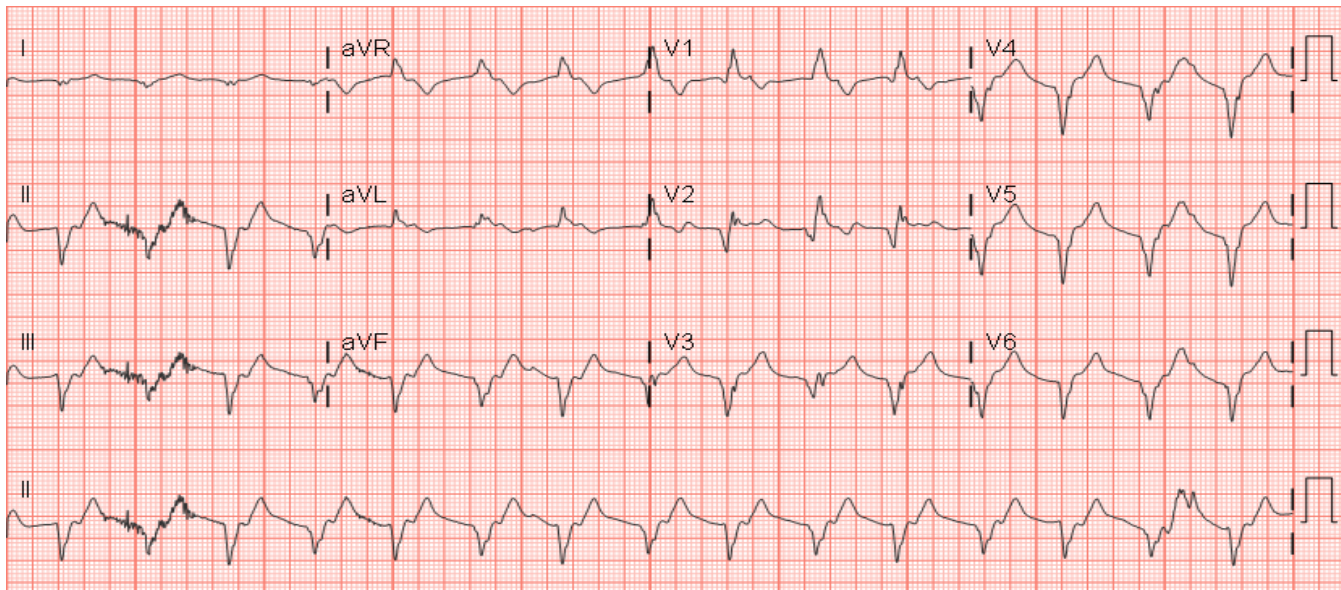


- A. IV amiodarone 300mg bolus
- B. Synchronized DC cardioversion
- C. IV adenosine
- D. Start diltiazem drip

3. A 56 year old Caucasian male is seen in the emergency room for an inferior ST elevation MI. He is status post emergent PCI of right coronary artery. Few hours after transfer to the ICU you are called by the nurse for the following rhythm. HR 90 bpm, BP 110/80 mm Hg. Next step in the management is



- A. Administer IV lidocaine
- B. Synchronized cardioversion
- C. Administer IV magnesium 2 gm
- D. Observation

*(ANSWERS on Page 15)*

## ASK A PATHOLOGIST

### Emily Coberly, MD and Richard Hammer, MD

Department of Pathology and Anatomical Sciences. University of Missouri Health Care.

Question: I heard there is going to be a shortage of FFP from the American Red Cross during the next few months. What should I do when I need to urgently reverse anticoagulation in patients on warfarin?

Answer: The American Red Cross anticipates a shortage in universal donor type AB plasma (FFP or FP24) starting on April 1, 2014 because of new donor standards intended to reduce the incidence of

Transfusion Related Acute Lung Injury (TRALI). Most cases of TRALI are thought to be caused by donor antibodies directed against recipient leukocyte antigens and is associated with plasma-containing products such as FFP. Prevention of TRALI involves donor antibody testing and deferral of high-risk donors. The new donor standards are expected to decrease available universal donor AB plasma by about one-third for the next several months. Other types of plasma (A, B, O) should not be affected by the shortage, since the new standards are already in effect for these blood types.

FFP has been a mainstay for urgent reversal of anticoagulation due to warfarin. One unit of FFP (250cc) is derived from a single donor and contains all clotting factors (pro- and anticoagulant) as well as approximately 400-500mg of fibrinogen.<sup>1</sup> Because it also contains donor ABO antibodies, FFP must be ABO-compatible. The most common adverse reactions include transfusion reactions and Transfusion Associated Volume Overload (TACO).

In 2013, the FDA approved the first 4-factor Prothrombin Complex Concentrate (PCC), Kcentra, for reversal of warfarin anticoagulation in adults with active bleeding.<sup>2</sup> PCCs are pooled concentrates of human donor plasma containing Factors II, IX, and X (3-factor), with some also containing variable amounts of Factor VII (4-factor).<sup>3</sup> PCCs do not require ABO-typing or thawing so they can be administered quickly.<sup>3</sup> Several studies have shown that PCCs result in a more rapid, effective, and sustained reduction in INR compared to FFP with a lower incidence of adverse reactions.<sup>2-5</sup> PCCs should be considered in addition or as an alternative to FFP in actively bleeding patients who require rapid warfarin reversal.

PCCs should be avoided in patients with a thromboembolic event in the past 3 months,<sup>2</sup> known allergy to the product, DIC, or heparin-induced thrombocytopenia.<sup>3</sup> PCCs are expensive; a single dose of Kcentra (70-kg, INR >6) costs about \$4445.<sup>2</sup> This direct cost may be offset by cost savings from more rapid and effective INR reversal and by decreased incidence of adverse reactions compared to FFP, however more cost analysis studies are needed.

### References/Suggested Readings:

1. McCullough, J. Transfusion Medicine 3<sup>rd</sup> Edition. Wiley-Blackwell Publishing. 2012.
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3. Cada DJ, Levien TL, Baker DE. Prothrombin Complex Concentrate. Hosp Pharm. Dec 2013; 48 (11): 951-957.
4. Hickey M, Gatién M, Taljaard M, et al. Outcomes of Urgent Warfarin Reversal With Frozen Plasma Versus Prothrombin Complex Concentrate in the Emergency Department. Circulation. June 2013;128:360-364.
5. Dager WE. Developing a Management Plan For Oral Anticoagulant Reversal. American Journal of Health-System Pharmacy. May 2013;70(10):S21-S31.

Send your questions to [coberlye@health.missouri.edu](mailto:coberlye@health.missouri.edu) to be published in future editions of the Missouri Hospitalist.