



# e-Network Forum

## CALIFORNIA BLOOD BANK SOCIETY

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### ***Routine use of cryoprecipitate to reverse prolonged protime and INR prior to heart surgery***

**A colleague in Wisconsin** reports that one of the attending surgeons in his hospital recently ordered 10 units of Cryoprecipitated Antihemophilic Factor (CRYO) to "reverse" a prolonged Protime and INR, prior to surgery. The surgeon's reasoning for using CRYO for this patient, and not FFP, is that a **dose of FFP would be too large a volume** for the patient. The inquiring colleague is concerned that the transfusion of CRYO is not medically justified in this case, given that CRYO is the portion of plasma that is rich in only certain of the clotting factors, including Factor VIII, fibrinogen, von Willebrand factor, and Factor XIII. However, the surgeon is adamant that he has in his practice seen reversal of the INR following infusion of CRYO, and insisted on using CRYO instead of FFP to reverse the INR for his patient. To prove his point, after the patient received the CRYO, the surgeon acknowledged that the patient's INR went from 3.6 to 2.9. The surgeon then reportedly implied that the aforementioned **use of CRYO is standard with his heart case patients, where volume overload is a concern and that he wants to use 10 units of CRYO and 2 units of FFP as part of his normal routine.** The Wisconsin colleague is hopeful for input from the field.

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The following comments have been received.

**ADDENDA** July 19, 2005

1. **A transfusion medicine physician in Spain** is of the opinion that common reasons for an increased INR are 1) coumadin treatment or 2) chronic liver disease. Since the colleague in Wisconsin did not provide the reason for the increased INR in the patient at his facility, nor did he mention the patient's plasma fibrinogen level, in the absence of that information it would **not be surprising if the patient was deficient in the following four clotting factors: II, VII, IX and X.** If the assumption is true, none of those four clotting factors is present in enough quantity in CRYO to be clinically efficacious, since CRYO contains mainly factor VIII, von Willebrand factor, fibrinogen and factor XIII. Only a residual amount of the other factors are found. For this reason, **CRYO was probably NOT indicated** for the correction of the patient's increased INR.

**ADDENDA** July 21, 2005

2. **A Blood Bank/Transfusion Service Medical Director in New York** acknowledges that he is **not aware of any published guidelines indicating that CRYO is used for reversal of a prolonged PT/INR**, probably because CRYO does not contain the vitamin K-dependent factors necessary to reverse prolonged PT/INR. Therefore, he does not recommend the use of CRYO under such circumstances. His advice to the Wisconsin colleague, is to ask the surgeon to back up his/her claim that CRYO will reverse prolonged PT/INR with facts from the literature. The New York physician seriously doubts that the surgeon will find any. Finally, it may also be helpful to **seek out the opinion of other surgeons/hematologists within the institution.**

**ADDENDA** August 10, 2005

3. **A transfusion medicine physician in the Eastern US** reports that a resident physician working in their Emergency Department ordered Cryoprecipitate to rapidly reverse Coumadin effect in a patient. When the blood product order was challenged the resident commented that "You'll find the use of cryoprecipitate in the Study Guide of the American College of Emergency Physicians, and a copy is in the Emergency Department." The resident also stated, "I had always used only FFP for this, but apparently when the situation is urgent the effects of Coumadin are more quickly reversed by using cryoprecipitate as well." The transfusion medicine physician traced the source of the aforementioned recommendation to **Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 6th Edition, page 1357**, which actually states: "For patients with life-threatening hemorrhage and who require rapid, complete reversal (of Coumadin), coagulation factor concentrates are more reliable and preferred (over FFP)." Apparently, **the term 'coagulation factor concentrate' was misinterpreted** by the emergency department personnel (attendings and residents) **to mean cryoprecipitate**, since it is a concentrated product that contains some

coagulation factors. However, what the authors of the textbook most likely meant by "Factor concentrates" was Prothrombin Complex Concentrates (or other commercially prepared Factor concentrates), and not cryoprecipitate. The attending physicians at the transfusion medicine physician's hospital now unanimously agreed that **cryoprecipitate is NOT a good choice to rapidly reverse Coumadin effect.**



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**Posted:** July 14, 2005

**Addenda:** July 19 & 21, Aug.  
10, 2005