



# A Novel Method for Determining the Appropriate Dosage of Prothrombin Complex Concentrate (PCC)

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March 19-21, 2014

Gold Coast Convention and Exhibition Centre, QLD, Australia



# Background

- Prothrombin Complex Concentrate (PCC) is currently being used to normalize the INR and reverse the coagulopathy associated with Warfarin-related intracranial hemorrhages (ICH)
- No definitive consensus exists in the literature regarding the appropriate dosage of PCC in this setting
- Dosage guidelines range from 10-100 International Units (IUs) of PCC per kilogram of body weight
- Discussion has centered on creating a standardized method for determining the appropriate dosage of PCC for use in patients with ICH secondary to Warfarin usage

# Objectives

- To propose an alternative and novel method for determining the appropriate dosage of PCC for patients presenting to the Emergency Department (ED) with Warfarin-related ICH

# Methods

- Retrospective chart review study (conducted at a suburban academic ED in the United States which utilizes a Quality Improvement database)
- After IRB approval, the hematology services team released to the investigators a database of all patients who had received PCC between January 1, 2011, and March 31, 2013.
- Charts of patients meeting inclusion criteria were reviewed for INR values and PCC administration during ED length of stay

- **INCLUSIONS:** Patients diagnosed with ICH, subdural hematoma (SDH), subarachnoid hemorrhage (SAH), cerebellar hemorrhage, or any other conditions involving bleeding in the brain via CT scan in the ED.
- Additional inclusion criteria consisted of:  $\geq 18$  years of age and documented Warfarin use at the time of presentation

# Results

## Subject Demographics

Total subject enrollment (n)	47
Mean subject age	77 years

## PCC Administration

Average PCC amount	853 IU
Average PCC dose	11.62 IU/kg
Minimum PCC dose	3 IU/kg
Maximum PCC dose	44 IU/kg

## Presenting INR

Average presenting INR	3.35
Minimum presenting INR	1.39
Maximum presenting INR	11.19

## Post-PCC INR

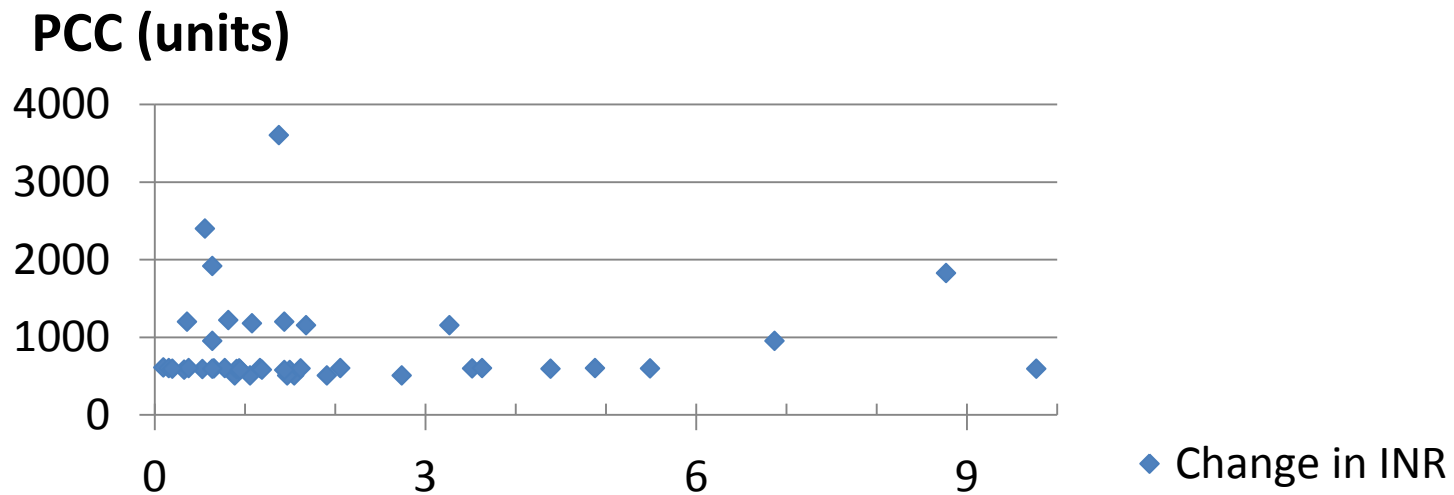
Average post-PCC INR	1.58
Minimum post-PCC INR	0.99
Maximum post-PCC INR	3.46

## INR Normalization

INR normalization by second check (n)	17
INR normalization by third check (n)	37
Mean normalization time	7.7 hours (after first INR)
Mean decrease in INR	1.83 (by second INR check)

# Results Continued

- Each unit of PCC dropped the INR by a mean of 0.0026 INR units with a range of 0.001 – 0.0165
- Scatter plot analysis showed a trend toward linearity for this relationship.



# Discussion

- PCC dosing is historically difficult and many dosing paradigms are known, though no consensus currently exists
- Although multiple variables are currently associated with the coagulation cascade and controlling INR in conjunction with utilizing PCC and other blood products, we suggest a simple method to determine a starting dose pattern for low-dosed PCC administration
- Analysis showed an association between the amount of decrease in initial to second INR by approximately 0.002 points per IU of PCC administered
- We suggest the following formula for determining the amount of PCC to be administered (in IUs)

$$\text{PCC} = (\text{Initial INR} - \text{Target INR}) / 0.002$$

# Presenter Contact Information

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