

## Low Dose 4-Factor Prothrombin Complex Concentrate in Reversal of Xa Inhibitors in a Neuro ICU

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There is no FDA-approved reversal agent for Xa inhibitors, however 4-factor prothrombin complex concentrate (4PCC) is used off-label. A dose of 50 units/kg is commonly cited in the literature. This study evaluated the effectiveness and outcomes of 4PCC 35 units/kg in Neuro ICU patients requiring reversal of Xa inhibitors.

This IRB approved, single center, retrospective cohort study evaluated patients admitted May 2013 – February 2016 to the NSICU of a level-1 trauma center. Patients were  $\geq 18$  yr, received a Xa inhibitor near time of admission, had a major hemorrhagic event, and received 4PCC  $\sim 35$  units/kg per institution protocol. Pregnant and incarcerated patients were excluded. The primary outcome was assessed using computed tomography (CT) to evaluate bleeding progression. Hemostasis was defined as a stable radiographic image performed after administration of 4PCC. Data collection included: patient demographics, admission APACHE and GCS scores, hemorrhage type, 4PCC dose, ICU and hospital LOS, disposition, and adverse events.

A total of 38 patients were included: The mean (SD) age was 72.9 (13.9) yrs and 53% were male. Twenty patients presented with a TBI, 10 with a SAH, and 8 with an ICH. Median (IQR) admission APACHE II score was 17 (IQR: 13-25) and GCS was 14.5 (IQR: 11-15). Twenty-nine patients were on rivaroxaban and 9 patients were on apixaban primarily for atrial fibrillation (73.7%). The median (IQR) 4PCC dose was 32.8 (IQR: 27.9-35.1) units/kg. Repeat CT showed no progression of the bleed in 33 (86.8%) patients. Three of the 5 patients without cessation of bleeding received a 2nd dose, all with cessation of bleeding. Median (IQR) ICU LOS was 2.1 (1.5-6.1) and hospital LOS was 9 (3.8-15.2) days. Two died; 1 due to infection and 1 due to family withdrawal of care. Fourteen (36.8%) were discharged to a SNF/Rehab, 13 (34.2%) to home, 5 to hospice, and 4 to LTAC.

Use of 4PCC 35 units/kg was associated with cessation of bleeding, clinically and radiologically, in 86.8% of patients taking Xa inhibitors. Prospective randomized studies are needed.

## **Defibrillation Skills of Pediatric Acute Care Providers: Are They Faster with Paddles or Pads?**

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### **Introduction/Hypothesis**

For every minute delay in defibrillation, survival from ventricular fibrillation cardiac arrest (VFCA) decrease 7% to 10%. There is lack of sufficient data on time taken by pediatric providers to apply shock using defibrillator paddles versus pads. We hypothesized that the time-to-shock by pediatric providers in VFCA is significantly longer with use of paddles as compared to pads.

### **Methods**

We conducted a prospective observational study of video evaluation of hands-on defibrillation skills of pediatric providers in a simulated VFCA in our children's hospital. Each provider was asked to use pads to provide 2 J/kg shock to an infant manikin in VFCA. Following this, the same provider was asked to use paddles to provide 2 J/kg shock for the same scenario. The time-to-shock was defined a priori as time between switching on the defibrillator to the actual delivery of the shock. Videos were evaluated by 2 independent reviewers and disagreements resolved by a moderator. The data was analyzed using student t-test with significant p-value <0.05.

### **Results**

Total of 51 (44 nurses, 7 non-nurse) pediatric providers were evaluated for time-to-shock using LifePak 20e ("study defibrillator"). Of these, 49% (25/51) had <5 yr of experience and 59% (30/51) were PICU providers. All the providers were PALS trained and the last PALS certification was median 288 days prior to VFCA scenario. The number of providers who had used either the study defibrillator or different defibrillator or both in real and/or mock resuscitation was 44 (86%), 7 (13%) and 15 (29%), respectively. The median time to apply paddles was 48.5 sec and to apply pads was 42.5 sec. The median time-to-shock with paddles was 97 sec (IQR: 60-122.5 sec), whereas the median time-to-shock with pads was 77.5 seconds (IQR: 59-105 sec) There was no significant difference for time-to-shock between use of paddles versus pads ( $p>0.05$ ).

### **Conclusions**

The time-to-shock (from defibrillator switch-on to shock delivery) by pediatric providers in VFCA using defibrillator paddles is not significantly different from that using defibrillator pads.