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Utilization of Enteral Tranexamic Acid To Stabilize Gastrointestinal Hemorrhage in Pediatric Patients on ECMO



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Background

- Incidence and management of Gastrointestinal (GI) bleeding on ECMO isn't well reported
- Patients on ECMO require systemic anticoagulation making GI bleeding difficult to manage
- We describe the use of enteral tranexamic acid (TXA) in two pediatric patients with GI hemorrhage on ECMO

Case 1

- 5yr old F with Wilm's Tumor
- Pulmonary hemorrhage and air leak requiring VV ECMO
- GI hemorrhage refractory to medical management (IV PPI, IV TXA gtt, IV octreotide gtt), multiple EGD and IR embolizations
- GI bleeding improved with enteral TXA (20 mg/kg q 8 hours)

Case 2

- 3-year-old female burn patient
- Complicated by sepsis and ARDS requiring VA ECMO
- GI hemorrhage refractory to medical management
- GI bleeding improved with IV TXA gtt and PO TXA (10 mg/kg q8h).

Observations

- Enteral TXA provided anti-fibrinolytic effects without disrupting systemic circuit anticoagulation
- Enteral TXA did not decrease the number of circuit or component changes
- The circuit had less clot burden comparatively to IV TXA administration

- There was a noticeable decrease in blood product administration in one patient after completing enteral TXA course

Discussion

- In both patients, enteral TXA allowed us to provide systemic anti-fibrinolysis, which was associated with cessation of bleeding but not associated with further circuit thrombosis.

Resources

- Lee PL, Yang KS, Tsai HW, Hou SK, Kang YN, Chang CC. Tranexamic acid for gastrointestinal bleeding: A systematic review with meta-analysis of randomized clinical trials. *Am J Emerg Med.* 2020 Aug 29;S0735-6757(20)30755-5.
- Saini A, Spinella PC. Management of anticoagulation and hemostasis for pediatric extracorporeal membrane oxygenation. *Clin Lab Med.* 2014 Sep;34(3):655-73.
- Khilnani P, Rawal N, Singha C. Gastrointestinal Issues in Critically Ill Children. *Indian J Crit Care Med.* 2020;24(Suppl 4):S201-S204.
- Attard TM, Miller M, Pant C, Kumar A, Thomson M. Mortality associated with gastrointestinal bleeding in children: A retrospective cohort study. *World J Gastroenterol.* 2017 Mar 7;23(9):1608-1617.



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BACKGROUND

- Significant gastrointestinal (GI) bleeding correlates with high (≥ 10) Pediatric Risk of Mortality (PRISM) Score
- Can represent a significant, sometimes terminal, event in a child with multiple coexisting comorbidities
- The incidence of GI bleeding while on extracorporeal membrane oxygenation (ECMO) support has not been thoroughly described in literature and its management is variable across ECMO centers as they attempt to balance risk of ongoing hemorrhage with circuit thrombosis and subsequent life threatening events.
- Strategies to treat GI bleeding include proton-pump inhibitors, octreotide, minimizing/withholding anticoagulation, replacement of clotting factors, as well as intravenous (IV) anti-fibrinolytic agents.
- In this case series, we describe the use of enteral tranexamic acid (TXA) in two pediatric patients with gastrointestinal hemorrhage while on ECMO.



Utilization of Enteral Tranexamic Acid To Stabilize Gastrointestinal Hemorrhage in Pediatric Patients on ECMO

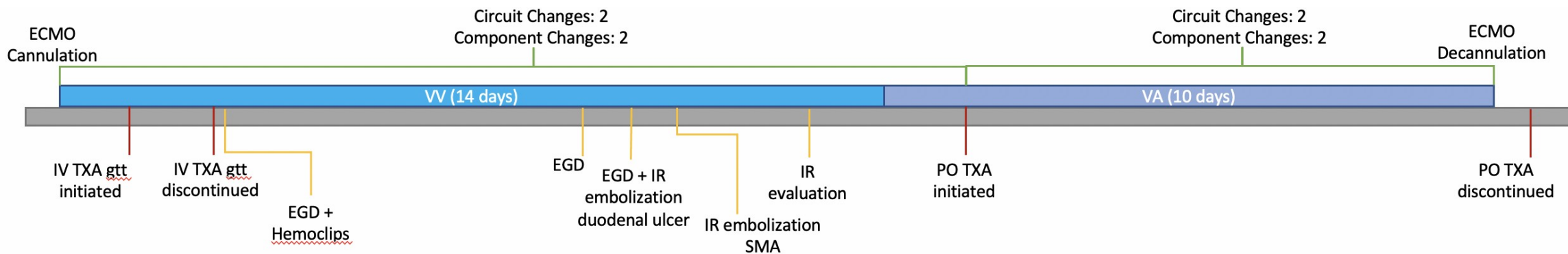


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CASE I

- 5-year-old girl with Wilm's Tumor required (VV) ECMO support secondary to pulmonary hemorrhage and air-leak syndrome
- Course complicated by severe upper GI hemorrhage (4-6 mg/kg/hr) refractory to IV PPI, IV TXA gtt (2-10 mg/kg/hr) and octreotide gtt.
- Anticoagulation:
 - Heparin anticoagulation was intermittently stopped due to ongoing hemorrhage and need for multiple blood product transfusions.
- Procedures:
 - Several esophagogastroduodenoscopies (EGD) revealed multiple non-perforated gastric ulcers that required hemoclips.
 - Two embolization procedures of the gastroduodenal artery and superior mesenteric artery branch.
 - Third arteriogram did not identify a source of bleeding.
- TXA:
 - Enteral TXA (20 mg/kg q 8 hours) initiated & continued for a total of 20 days
 - Following initiation of enteral TXA, GI bleeding resolution and significant reduction in blood product transfusion was noted





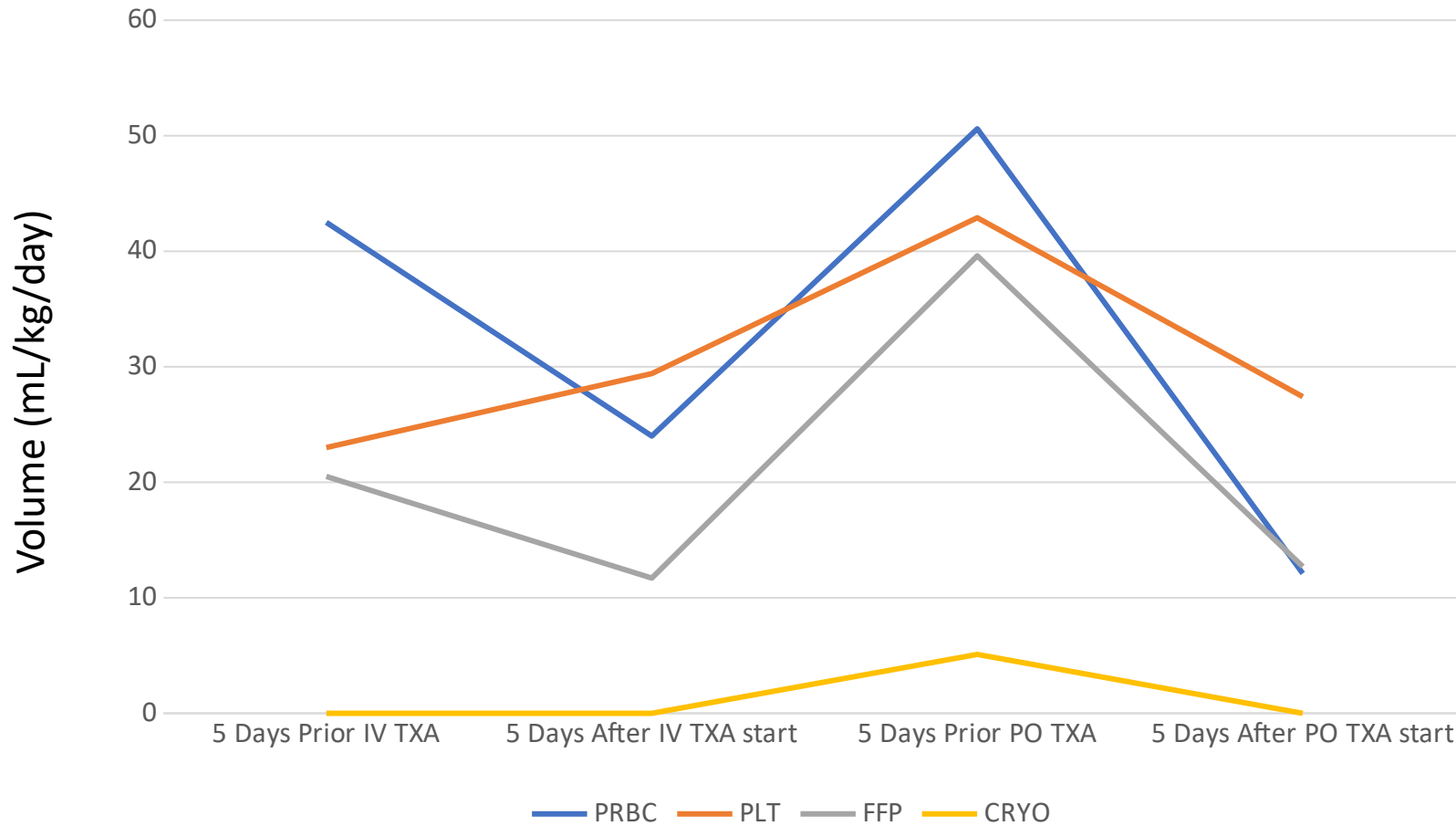
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Case 1 Transfusion Requirement





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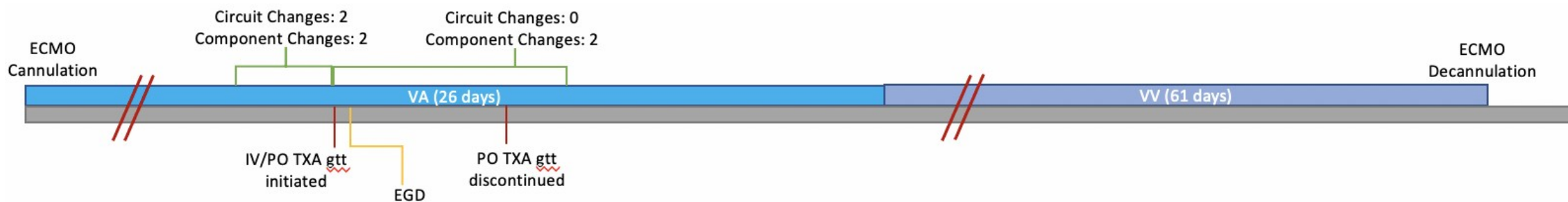


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CASE 2

- 3-year-old female recent burn patient, Complicated by sepsis and ARDS requiring VA ECMO
- Course complicated by significant pulmonary and gastrointestinal hemorrhage refractory to IV PPI and IV octreotide infusion
- Procedures:
 - EGD did not identify source of bleeding, presumed GI bleeding secondary to localized trauma from her nasogastric tube.
- Anticoagulation:
 - No interruption in circuit anticoagulation.
 - Transitioned from heparin gtt to bivalirudin gtt in order to target tighter circuit anticoagulation.
- TXA:
 - started on IV TX (1 mg/kg/hr) and enteral TXA (10 mg/kg q 8 hours)
 - remained on enteral TXA for 48 hours until herGII bleeding resolved.
 - remained on IV TXA infusion and topical intratracheal TXA for ongoing pulmonary hemorrhage.



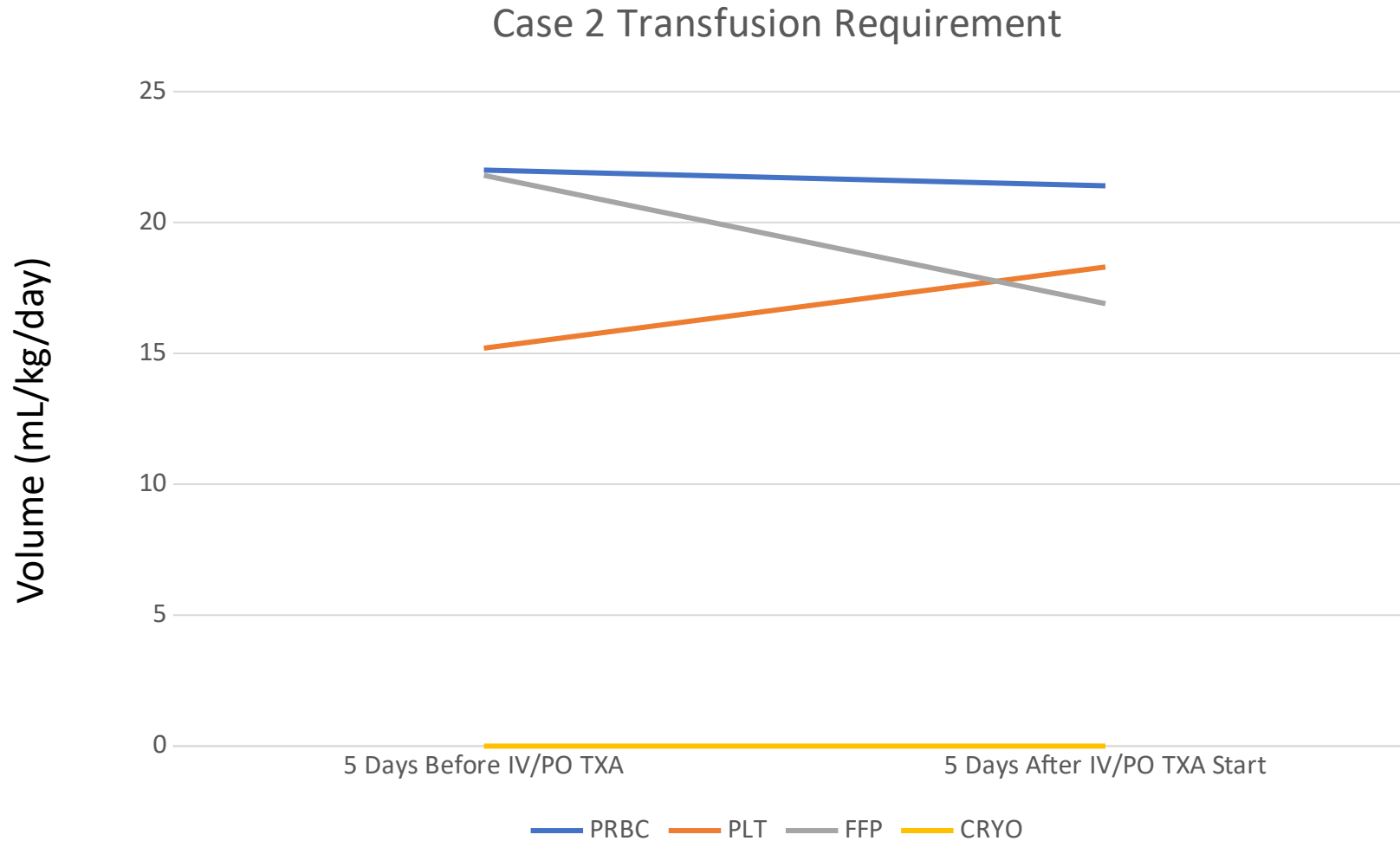


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Case 1: 1/23 IR embolization



Case 1: IR embolization 01/24/2018

