Organ Dysfunction and Plasma Exchange in Children with Thrombocytopenia-Associated Multiple Organ Failure (TAMOF):
The Prospective Children’s TAMOF Network Study

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Children’s TAMOF Network

- Enrolling centers (site co-I):
  - Children’s of Atlanta at Egleston: coordinating center (Fortenberry)
  - Children’s of Pittsburgh (Raj Aneja/Joe Carcillo)
  - Cincinnati Children’s (Derek Wheeler)
  - Nationwide Children’s-Columbus OH (Mark Hall)
  - Phoenix Children’s Hospital (Sandra Buttram/Heidi Dalton)
  - Texas Childrens’ Hospital (Laura Loftis/Trung Nguyen)
  - University of Michigan-Mott Children’s (Yong Han)
  - Minnesota (Rod Tarrago)
  - Vanderbilt Children’s (Frederick Barr)
Thrombocytopenia-Associated Multiple Organ Failure (TAMOF)

- A thrombotic microangiopathy described in children (Nguyen, Carcillo 2001)

Similarities to TTP
- Deficient ADAMTS-13
- Increased ADAMTS-13 inhibitors
- Increased vWF antigen
- Increased ULvWF multimers

Primarily secondary to sepsis
High mortality in children reported
Potential benefit of plasma exchange (Pex)
Thrombotic Microangiopathy: TAMOF
Children’s TAMOF Network

- Developed national network of Pediatric ICUs
- Goals:
  - Create a study group to perform prospective, observational studies
  - Identify TAMOF and evaluate:
    - Clinical and biochemical course
    - Use of specific therapies
    - Associated outcomes
  - Inform development of future randomized therapeutic trial
Hypotheses

- Children with TAMOF demonstrate decreased ADAMTS-13 levels and increased vWF antigen levels.
- Plasma exchange (PEx) in TAMOF patients is associated with improvement of organ dysfunction vs. those receiving standard therapy alone.
Methods

- Prospective, nonrandomized cohort study
- Enrolled patients 1 month-21 years of age meeting TAMOF criteria:
  - Sepsis, transplant, chemotherapy
  - Platelet count < 100,000/mm$^3$
  - Organ failure index (OFI) > 2
- Data collected via web-based registry
Methods

- Blood obtained for:
  - ADAMTS-13
  - vWf antigen levels
  - Studies performed at Baylor college of Medicine (Trung Nguyen MD)

- Therapy/use of PEx at attending/center discretion
  - Based on standard centrifugation approach
  - Fresh frozen plasma: 1.5x plasma volume day 1
  - 1x plasma volume daily exchanges x 4 days
  - Continued at MD discretion
Conclusions

- Septic TAMOF patients demonstrated:
  - Decreased ADAMTS-13, increased vWF antigen
  - Consistent with TTP profile
- Use of PEx was associated with greater improvement in organ dysfunction than standard therapy alone
- PEx was associated with improved survival by multivariate analysis
Speculation

- These results could inform a randomized trial to determine contribution of PEx to TAMOF outcome