Peri-Operative Management of Combined Factor V and Factor VIII Deficiency

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Medical history

- 33-year old male

- Past history of rheumatic fever

- Severe mitral stenosis
  - Status post mitral valve replacement
  - Heart failure and severe pulmonary hypertension

- Factor V and Factor VIII Deficiency
  - Factor V level 11 U/dL
  - Factor VIII level 9 U/dL
Additional patient history

- Originally had valve replacement in India in 2008
- Required massive plasma transfusion
- Serious clinical condition at time of admission to KU
Combined Factor V and Factor VIII Deficiency

- Prevalence of 1:1,000,000
- Middle Eastern or Indian descent
- Autosomal recessive mutation in LMAN1 or MCFD2 genes
  - Involved in intracellular transportation and secretion of Factor V and VIII
- Most patients experience only mild bleeding
- Treatment: Fresh frozen plasma (FFP), Factor VIII, desmopressin, platelets
Goal

- Replete Factors V and VIII to hemostatic level (>30 U/dL)
Trial of Fresh Frozen Plasma Transfusion

- Six units of FFP transfused in eight hours
- Factor V rose from 11 U/dL to 17 U/dL
- Factor VIII rose from 9 U/dL to 23 U/dL
Trial of Fresh Frozen Plasma Transfusion

- Resulted in significant fluid overload
- Factor levels deemed inadequate for surgical hemostasis
Trial of Therapeutic Plasma Exchange (TPE)

- 1.0 volume TPE with 15 units FFP as the replacement fluid
- Factor V rose from 11U/dL to 48 U/dL
- Adequate Factor V level and stable hemodynamics - kept euvoletic
Trials of Factor VIII Replacement

- Trial of recombinant antihemophilic factor (Helixate), 4000 units
  - Factor VIII levels rose from 9 U/dL to 20 U/dL

- Trial of human monoclonal purified antihemophilic factor (HEMOFIL-M), 4000 units
  - Factor VIII rose to 98 U/dL
Treatment Strategy

- Daily TPE with FFP before, during, and after surgery
- Factor VIII replacement with HEMOFIL-M
Factor V and Factor VIII Levels on the Day of Surgery

- Factor V
- Factor VIII

Time:
- 6:00
- 8:00
- 10:00
- 12:00
- 14:00
- 16:00
- 18:00
- 20:00
- 22:00
- 0:00

Factor Level (U/dL): 0 to 250

Surgery Start
TPE Start
Peri-Operative Course

- No increased or unexpected bleeding during surgery
- Minimal chest tube drainage on post-operative day 1
- Patient discharged on the 7th post-operative day with adequate cardiac and pulmonary functions
- No hemorrhagic complications to date
Peri-Operative Course

Factor level (U/dL)

Date and Time

- Factor V
- Factor VIII
- Surgery Start
- TPE Start

Use of TPE with FFP in Similar Cases

- Patient with Factor V and Factor VIII deficiency treated with TPE with FFP
- Patient with acquired prothrombin deficiency with an inhibitor, due to antiphospholipid syndrome
- Four patients with severe Factor XI deficiency and bleeding prior to surgery
- Two patients with Factor V deficiency prior to surgery
- Patients with strong coagulation factor inhibitors
Summary

- Peri-operative management of Factor V and Factor VIII deficiency with aggressive TPE with FFP as the replacement fluid

- The patient successfully tolerated a difficult repeat mitral valve replacement with minimal blood loss
Conclusion

- TPE with FFP is a promising therapeutic modality for patients with coagulation factor deficiencies for which a specific factor concentrate is not available.
References

- Valentino LA, Cooper DL, Goldstein B. Surgical experience with rFVIIa (NovoSeven) in congenital haemophilia A and B patients with inhibitors to factors VIII or IX. Haemophilia 2011;17:579–89. doi:10.1111/j.1365-2516.2010.02460.x
Acknowledgments

- Thank you to Dr. Tilzer and Dr. Plapp