Recombinant angiotensin II therapy in a child with cardiac dysfunction and *Pandoraea* and *Candida* sepsis

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Introduction

- Recombinant angiotensin II (AT-II) is an emerging drug therapy for refractory hypotension in the critical care setting
- Potential responders have disruption of the Renin-Angiotensin-Aldosterone System (RAAS) which can be quantified by serum direct renin levels
- **We present a case of a child that responded to AT-II in the setting of septic shock and right ventricular dysfunction**

Initial Case Presentation

- A previously healthy 19-month old female initially presented with a febrile respiratory illness
- After a prolonged medical course, she was diagnosed with a bilateral necrotizing pneumonia
- Required veno-venous extracorporeal membrane oxygenation (VV-ECMO) due to the development of pediatric acute respiratory distress syndrome (pARDS)
- Referral was made to our institution for potential for lung transplantation
- Initial infectious work-up was notable for respiratory cultures with *Acinetobacter spp* and gram-negative rods (GNR, *not identifiable*), viral panel positive for adenovirus, and urine cultures positive for *Candida spp*

Timeline

Day 0

Arrival from outside hospital; Goals for transplant eligibility established: weaning sedation, lung rehabilitation, treatment of residual infections

Day 1

Bronchoscopy respiratory cultures positive for GNR; ECHO demonstrated normal cardiac anatomy, normal biventricular function

Days 2-7

Continued serial bronchoscopies, weaning from sedation.

Day 8

Respiratory culture positive for methicillin-susceptible *Staphylococcus aureus* (MSSA)

Day 9

Development of significant fluid overload, metabolic acidosis; initiation of continuous renal replacement therapy (CRRT)

Day 11

Blood cultures positive for MSSA

Day 16

Hemodynamically unstable with significant hypotension

Day 16

Blood cultures positive for *Candida parapsilosis*. Initiation of antifungal therapy and removal of all indwelling lines. ECHO demonstrated RV hypertension, diminished RV function, and mild RV dilation

Days 16-17

Initiation of norepinephrine, epinephrine, vasopressin infusions. Started on steroids, inhaled nitric oxide (iNO), and fluid replacement → Persistent refractory shock

Day 17

Initiation of AT-II: initial dose 10 ng/kg/min. Direct renin level 4284 pg/mL (ref 3.2-52.2 pg/mL). Within an hour of initiation, blood pressures normalized and able to wean other vasoactive drips

Day 19

Despite titration of AT-II to 40 ng/kg/min, blood pressures b ecame labile again

Days 20-22

Code event requiring CPR; discussion with family with decision to withdraw care

Discussion

- Bacterial cultures containing GNR were later identified with bioMerieux Vitek MS MALDI-ToF system as *Pandoraea spp*
- *Pandoraea spp* is reported in literature as an infectious agent in patients with cystic fibrosis; **this is the first documented pediatric non-CF patient**
- The patient was identified as a 'responder' to AT-II therapy based on direct renin levels and the response within the first 24 hours of initiation
- In a patient with mixed shock, AT-II is a potentially powerful vasoactive agent in lieu of the common medications used in the PICU/CICU

Conclusions/Speculations

- AT-II has also been used in the adult setting after cardiac surgery and cardiopulmonary bypass; there is potential for its use in pediatric cardiac surgeries
- Currently AT-II has been used for refractory hypotension; optimal timing for use and dosing is not fully understood

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