A clinical experience of using extracorporeal cytokine adsorption device (CytoSorb) in a case of Dengue fever

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This case study reports on a 32 year old male patient who was transferred to a tertiary ICU with worsening multi organ failure, after presenting to a local hospital with fever, chills, dyspnea, yellow discoloration of skin and sclera the previous week.

Case presentation
- On admission the patient was pyrexic (100°F, heart rate 120 – 130 bpm, respiratory rate 26 – 30 per min, leukocytosis 16,400 µl, with acute organ dysfunction (agitation, thrombocytopenia, hypoxia, kidney dysfunction, metabolic acidosis and arterial hypotension), sepsis and septic shock. His APACHE score on admission was 27.
- Within 24 hours the patient needed to be mechanically ventilated because of worsening Acute Respiratory Distress Syndrome (ARDS) and hypoxia
- The patient received fluid optimization, nutritional support, antibiotics, proton pump inhibitors, treatments for hepatic encephalopathy, blood products and other standard support therapy

Treatment
- CytoSorb was added as a supportive therapy due to the systemic inflammatory response and multiple organ dysfunction
- The patient received three sessions of six hours each on days 2, 4 and 6 of admission.
- No anticoagulation was used, blood flow rate was 250 mL/min

Measurements
- Clinical and laboratory parameters before and after CytoSorb treatment: Creatinine, hematocrit, leucocytes, platelets, mean arterial pressure (MAP), ARF - Acute Renal Failure, GCS - Glasgow Coma Scale, aPTT - Activated Partial Thromboplastin Time, GOT - Serum Glutamic Oxaloacetic Transaminase (AST), GPT - Serum Glutamic Pyruvic Transaminase (ALT)
- Arterial blood gas values before and after CytoSorb therapy: pH, PaCO₂ - Partial Pressure of Carbon Dioxide, PaO₂ - Partial Pressure of Oxygen, SBC - Standard Bicarbonate, (A-a) O₂ - Alveolar-arterial oxygen gradient mmHg, Base Excess
Results

• There were no major complications during or after the CytoSorb therapy except mild irritability that settled with sedatives
• Patient showed gradual improvement with APACHE score after the third cycle decreasing from 27 to 12
• As a result of the treatment:
  - Creatinine decreased from 3.96 to 1.59 mg/dL
  - Leucocytes from 16,3000 to 13,000 /µL
  - Platelets from 50,000 to 311,000 /µL
  - GCS from 9 to >10
  - Mean arterial pressure from 84 to 104 mmHg
  - aPTT from 43 to > 60 seconds, GOT (AST) from 15690 to 156 U/L, GPT (ALT) from 3910 to 84 U/L
  - Serum lactate from 6.7 to 1.9 mmol/L

Post-treatment period and follow-up

• Patient was transferred from ICU on day 13, and subsequently discharged fully ambulant.

CONCLUSIONS

• CytoSorb helped to stabilize and revive this patient with dengue, MODS and shock.
• The majority of laboratory parameters were within the normal range after the therapy and no major adverse events were reported during or after the CytoSorb therapy.
• This is the first report of the clinical application of CytoSorb hemoadsorption in a case of dengue fever with MODS treated successfully with standard of care along with CytoSorb
• CytoSorb seems to be an interesting and safe option to stabilize and help dengue patients with MODS to recover