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Case of the week 04/2020

CytoSorb in the management of severe septic shock after coronary artery bypass graft surgery

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This case reports on a 58-year-old male was hospitalized with a 2-day history of chest pain and dyspnea on exertion (New York Heart Association Class III).

Case presentation:

- The patient had a history of type II diabetes mellitus with hypertension and was on medications for the same
- Electrocardiogram (ECG) revealed an ST-elevated inferior wall myocardial infarction, and coronary angiography showed triple-vessel disease
- Percutaneous balloon angioplasty of the left circumflex artery was performed to restore flow, and coronary artery bypass grafting (CABG) was advised considering the critical triple-vessel disease
- Echocardiogram showed moderate left ventricular dysfunction (ejection fraction [EF]: 40%–45%) and hypokinetic posterolateral area in the basal region
- Total leukocyte count (TLC) was high, and the patient was started on antibiotics
- CABG was planned and performed once the laboratory parameters were within the normal limits
- Postoperatively, the patient was admitted to the intensive care unit (ICU) on moderate inotropic support
- Within 12–24 h, the patient developed refractory hypotension with signs of multiple organ failure
- His hemodynamic condition deteriorated dramatically with a TLC of 19,240/μl, procalcitonin (PCT) >100 ng/mL, serum creatinine 4.6 mg/dL and increased liver transaminases
- Acute physiology and chronic health evaluation (APACHE) II score was 24, and sequential organ failure assessment (SOFA) score was 13
- The progressive deterioration in his hemodynamic state required the administration of epinephrine, norepinephrine, and vasopressin
- Electrocardiogram (ECG) did not show any new ST-T changes
- Echocardiography diagnostics performed in the ICU showed an EF of 35%–40% with no new regional wall motion abnormalities
- He was immediately started on broad-spectrum antibiotics, and continuous renal replacement therapy (CRRT) together with CytoSorb

Treatment

- One single 24-h treatment session was run with the CytoSorb adsorber
- CytoSorb was used in conjunction with CRRT (Multifiltrate, Fresenius Medical Care)
- Blood flow rate: 120 mL/min
- Anticoagulation: none
- CytoSorb adsorber position: pre-hemofilter

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Measurements

- Hemodynamics and catecholamine requirements
- Inflammatory parameters
- End-organ functions (renal, lung, liver)
- Lactate
- Disease severity (APACHE II score) and organ dysfunction (SOFA) score

Results

- Combined CRRT and CytoSorb therapy was associated a clear stabilization in the hemodynamic status (mean arterial pressure, pre 50-60 to post 75-80 mmHg) accompanied by a decrease in vasopressor and inotropic requirements
- Furthermore, improvements in the inflammatory and other laboratory parameters were noticed (leucocytes, pre 19,240/µl to post 10,870/µl) accompanied by a normalization in body temperature
- Treatment also resulted in improvements in end-organ functions i.e. renal (urine output, pre 0-10 ml/h to post 50-70 ml/h), lung (PaO_2/FiO_2, pre 223 to post 385 mmHg and decreased ventilatory requirements) as well as liver function (decrease in GOT, GPT levels) so that organ support could be gradually withdrawn
- There was a normalization in lactate levels from 6.53 mmol/l to 1.5 mmol/l throughout the treatment
- APACHE II score improved from 24 to 7 and SOFA score from 13 to 8 when comparing pre and post-treatment levels

Conclusions:

- In this patient with severe septic shock after coronary artery bypass graft surgery, treatment with a single session of CytoSorb therapy resulted in a marked improvement in the laboratory parameters a stabilization in hemodynamics with a concomitant reduction in vasopressor dosages as well as a normalization in lactic acidosis and an improvement in lung, liver and renal function
- The authors note that CytoSorb was an effective, safe and easy option in the management of severe septic shock post cardiac surgery and seems to be a promising tool in stabilizing hemodynamics in refractory vasoplegia
- In patients with known risk factors, CytoSorb therapy could be used during surgery
- Septic shock increases the risk of multiple organ failure and also adds to the financial burden, which was reduced by CytoSorb therapy