

Use of CytoSorb hemadsorption in the management of hyperinflammation post CABG surgery following acute cardiac failure accompanied by pulmonary infection

Dr. T. S. Mahant¹, Dr. Manoranjan Sahoo², Dr. Vikramjit Singh Dhaliwal²

¹Department of Cardiothoracic Surgery & Vascular Surgery

²Department of Cardiac Anaesthesia, Fortis Hospital, Mohali, Chandigarh, India

This report describes the case of a 73-year-old male patient who presented to the hospital with a 7-day history of intermittent fever and cough with expectoration as well as complains about pain and swelling on his right side for two days.

Case presentation:

- From his medical history the patient was known to have diabetes mellitus type II, systemic hypertension along with peripheral vascular disease (reformed smoker)
- On physical examination a hematoma was present on his right side with bluish discolouration of the skin. Peripheral pulses were palpable with no signs of cyanosis, clubbing or lymphadenopathy. Vital parameters were: blood pressure (140/80 mmHg), heart rate (94/min) and respiratory rate (20/min)
- A CT of the abdomen revealed active bleeding from a branch of the internal iliac artery and the patient was immediately planned for embolization of the bleeding vessel
- Post embolization the patient underwent pulmonary examination for his respiratory complaints and sputum was sent out for microbiological investigation
- On the 3rd day of hospitalisation, he developed chest pain and a subsequent ECG revealed ST depression in the anterior and inferior leads
- To confirm the diagnosis, the patient was examined using coronary angiography which showed coronary artery disease with tricuspid valve dysplasia. Thus, the patient was scheduled for urgent coronary artery bypass graft (CABG) surgery
- The next day, the pain and size of the hematoma on the right side worsened and another CT examination was performed. During the procedure, extravasation of contrast agent was noticed and immediate embolization of the right epigastric artery was performed
- Microbiologic examination of the sputum revealed haemophilus influenza and antibiotics were escalated accordingly
- The patient was intubated and underwent surgical CABG procedure
- Postoperatively, renal function started to deteriorate with increasing retention parameters (serum creatinine 2.8 mg/dl) and the patient developed acute kidney failure (AKI)
- Furthermore, the patient postoperatively required norepinephrine (0.1 µg/kg/min) and epinephrine support (0.03 µg/kg/min) for hemodynamic stabilization
- In the context of multi organ dysfunction (along with pulmonary infection), sustained low efficiency dialysis (SLED) together with CytoSorb therapy were performed on the 2nd postoperative day to stabilize hemodynamics and to regain control of the uncontrolled inflammatory response

Treatment

- Two sessions of SLED (4008s, Fresenius Medical Care) together with CytoSorb were run (1st session for 8 hours followed by a 2nd session for 10 hours, separated by a pause interval of 12 hours)
- Blood flow rate: 1st session: 200 ml/min, 2nd session: 180 ml/min
- Anticoagulant: heparin

Measurement

- Need for catecholamines
- Inflammatory response
- Renal function

Result

- Combined treatment of SLED with CytoSorb resulted in a stabilization of hemodynamics and a concomitant reduction in norepinephrine and epinephrine dosages. Norepinephrine was stopped on the 3rd postoperative day while epinephrine could already be discontinued whilst under CytoSorb therapy
- Treatment was further associated with a control of the hyper-inflammatory response
- There also was an improvement in renal function under combined SLED and CytoSorb therapy

Patient Follow-up

- The patient was extubated on the 5th and transferred to the normal ward on the 8th postoperative day
- Echocardiography 10 days post CABG surgery revealed an improvement in cardiac function with an increase in systolic ventricular function from 25% before CABG to 40%
- CT chest later revealed subsegmental atelectasis of the lower lobes of both lungs
- The patient, however, managed to recover without any further complications and didn't require further procedures

Conclusion

- In this case of hyperinflammation post CABG surgery following acute cardiac failure accompanied by pulmonary infection the treatment with CytoSorb hemadsorption in combination with SLED led to a stabilization in hemodynamics, control of the hyper-inflammatory response and an improvement in renal and cardiac functions
- The presented case is a rare scenario of acute cardiac failure along with internal hemorrhage from abdominal vessels, which was managed by embolization and CABG surgery, but however progressed to postoperative development of hyperinflammation and dysfunction of the hemodynamic and renal systems
- Reduction of excess systemic inflammatory cytokine levels following implementation of CytoSorb has possibly helped to minimize further progression of multiple organ failure
- According to the medical team, this case nicely illustrates the effectiveness and safety of CytoSorb in managing a severe crisis, thereby potentially reducing mortality and hospital length of stay
- CytoSorb was easy and safe to use without any device-related adverse events