WORKSHOP

Purification Therapies

LE IDEE PER LA RICERCA CLINICA

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Cardinale Giovanni Panico
Azienda Ospedaliera

CytoSorb as an organ support therapy during Acute Liver Failure after Hepatic Resection: A Case Report.

Cazzato MT[1], Gemma D[1], Viola MG[1], Caccetta F[2], Accogli A[2], Montinaro V[2], Pellis T[1].

1 Intensive Care Unit, Azienda Ospedaliera Pia Fondazione Panico, Tricase, Italy
2 Dialysis and Nephrology Unit, Azienda Ospedaliera Pia Fondazione Panico, Tricase, Italy

Background/Aims

Acute severe hepatic failure associated with persistent hyperbilirubinemia and inflammatory markers increase is a life-threatening critical illness affecting multiple other organs, including renal and cerebral function. Nowadays, extracorporeal techniques for blood purification are largely used in the context of sepsis and septic shock, for cytokines removal, and liver failure, for bilirubin adsorption. CytoSorb is an absorbent device composed by highly porous biocompatible polymer beads, that can be integrated in any extracorporeal circuits (CRRT, ECMO, CPB or isolated hemoperfusion) and is able to absorb from whole blood inflammatory mediators, in sepsis and septic shock, and bilirubin and other hepatic enzymes, in contexts as liver failure. Here we report the case of a patient with Acute Liver Failure and increase inflammatory markers, efficiently treated with CRRT with CytoSorb, as adjuvant therapy for organ support.

Case presentation

We report a case of a woman with an history of arterial hypertension, type 2 diabetes mellitus, psoriasis, obesity (BMI: 39), moderate CKD (eGFR 45), COPD with OSA in therapy with BiPAP and O_2. In 2017, she underwent left hemicolectomy surgery, following treated with adjuvant chemotherapy for colon cancer. In December 2018, the patient was candidate for right hepatic resection (ALLPS technique), for colorectal liver metastases. After liver surgery, the patient was moved to the ICU.

On the fifth postoperative day, we started CRRT (Ci-Ca CVVHDF, Multifiltrate), due to progressive deterioration of kidney function, associated with hemodynamic instability and electrolytes alterations. After a TAC evaluation, the patient needed a second surgery to complete the right hepatic resection and in the next few days a worsening in liver function (increased transaminase, bilirubin, ammonium and coagulation values) and renal and phlogosis indexes was observed. In order to support liver function, by reducing hepatic molecules, and to modulate the uncontrolled inflammatory response, CytoSorb column was placed in the CRRT circuit (predialyzer position). We performed 4 CytoSorb treatments, 24 hours each.

Results

The combined treatment improved general clinical conditions. We observed a reduction of the SOFA cardiovascular score as compared to baseline (4 vs. 2) after 4 days of CytoSorb treatment, accompanied by a spontaneous stabilization in the following days. Liver function indicators (GOT, GPT, LDH direct and total bilirubin) did not drastically worse as expected and maintained stable during the treatment. Furthermore, a rapid improvement of phlogosis index occurred, accompanied by a stabilization of metabolic and hemogasanalytic parameters and a progressive improvement of kidney function with diuresis recovery.

	ICU admission	2nd day	7th day	8th day	8th day	9th day	10th day	11th day	12th day	13th day	16th day
SOFA cardio (mcg/kg/min)	0	3 (0.09)	3 (0.09)	4 (0.16)	4 (0.23)	4 (0.16)	3 (0.06)	3 (0.08)	2 (0.01)	1	0
PCR (mg/dl)	2.49	1.17	27.01	27.27	13.54	12.88	17.8	18.6	15.36	14.11	13.12
PCT (ng/ml)	/	1.7	4.1	4.06	3.06	2.73	2.37	1.86	1.51	1.82	1.60
Lactate (mmol/l)	0.7	0.8	2.8	4.1	6	4.8	3.9	2.5	1.8	1.7	1.5
Diuresis (ml/h)	/	20	100	40	0	5	5	0	30	80	50
Creatinine (mg/dl)	1.08	1.43	2.92	3.53	3.16	2.46	1.85	1.59	1.52	1.33	0.75
eGFR (ml/min/m²)	49.6	35.3	14.9	11.8	13.5	18.3	25.8	31	32.8	38.5	77.10
GOT (U/L)	70	759	78	66	173	176	147	58	59	61	60
GPT (U/L)	69	655	240	168	115	108	/	/	45	44	52
Bilirubin TOT (mg/dl)	0.74	1.28	2.89	3.22	3.65	4.30	4.03	3.79	4.99	6.82	8.01
Bilirubin DIR (mg/dl)	/	0.65	1.84	2.11	2.36	2.63	2.47	2.12	2.99	4.11	4.70
LDH (U/L)	/	1659	181	/	522	336	/	/	260	237	245
Ammonium (umol/L)	/	67	52	67	87	61	/	67	57	59	46

Table 1 – SOFA cardiovascular score and Laboratory characteristics at baseline and during CytoSorb treatment

Conclusion

We present the use of combination therapies in a patient with Acute Liver Failure and uncontrolled inflammatory response. CytoSorb has proved to be an efficient therapy to reduce uncontrolled inflammatory response, thanks to the capability to remove inflammatory mediators from blood, allowing a stabilization of metabolic and hemodynamic parameters (lactates and hemogasanalytic values). CytoSorb also might help to support liver function and its recovery, thanks to the modulation of worsening hyperbilirubinemia, increasing toxic catabolites, hardly removable from blood, and cytolysis enzymes, also allowing a stabilization of coagulation parameters.