

## A rare case of acute liver failure with intrahepatic cholestasis due to dengue hemorrhagic fever: CytoSorb<sup>®</sup> and plasma exchange aided in the recovery: case report

Gunasekera AM, Eranthaka U, Priyankara D, Kalupahana R.  
National Hospital of Sri Lanka, Colombo, Sri Lanka  
*BMC Infect Dis* 2022; 22(1): 938

*This case reports on a 54-year-old obese Sri Lankan woman (Body Mass Index - BMI of 32) who presented to the hospital with a 3 day history of fever, headache, vomiting and generalized malaise.*

### Case presentation

- The patient had a medical history of type 2 diabetes mellitus, hypertension and right-sided ischemic stroke
- On admission, she was febrile (38.7 °C) with stable hemodynamics while the rest of the systemic examination was unremarkable including abdominal examination
- Initial investigations revealed a white blood cell count (WBC) of 5.9 ( $\times 10^3/\mu\text{L}$ ), platelet count of 179 ( $\times 10^3/\mu\text{L}$ ), hemoglobin of 12.8 g/dl, aspartate aminotransferase [AST] 47 (U/L), alanine aminotransferase [ALT] 37 (U/L) and bilirubin levels within the normal range
- The next day (day 5 of her illness), there was a dramatic decrease in platelet and WBC counts with positive dengue IgM antibodies, finally confirming the diagnosis of acute dengue infection
- The patient was managed according to the national dengue guidelines with meticulous monitoring of her vital parameters and urine output while carefully balancing fluid intake
- Over the next few hours, her clinical condition deteriorated with tachycardia (100/min) and low urine output of  $< 0.5$  ml/kg/hour, although she was maintaining a stable blood pressure at 140/90 mmHg and capillary refilling time less than 2 s
- Bed side ultrasound scan showed free fluid in the peritoneal cavity which was suggestive of dengue hemorrhagic fever (DHF)
- The clinical picture was further complicated by acute per-vaginal bleeding with a 20% decrease in hematocrit. Hence she was transfused with 1 unit of red cell concentrate in addition to crystalloids
- Despite all these measures, her condition further deteriorated with a decrease in her level of consciousness
- Blood gas analysis revealed metabolic acidosis, with a pH of 7.27, bicarbonate -  $\text{HCO}_3^-$  17.7 mmol/l and lactate 2.7 mmol/l
- The subsequent clinical course was complicated by acute renal failure (ARF), acute disseminated coagulopathy (DIC) and acute liver failure (ALF), with latter being diagnosed due to altered liver parameters, coagulopathy and encephalopathy
- She was started on intravenous N-acetyl cysteine (NAC) infusion and transferred to the Medical Intensive Care Unit (ICU)
- On arrival in the ICU, she was encephalopathic with a Glasgow coma scale (GCS) of 12–14 and had oliguric ARF
- Blood gases revealed worsening metabolic acidosis with increasing lactate plasma concentrations (2.7–4.1 mmol/l). Inflammatory markers such as C-reactive protein were normal. Blood and urine cultures were sterile, excluding sepsis

- Over the next few days, hepatic encephalopathy worsened and she was intubated due to low GCS
- At this point, her non-contrast CT (NCCT) brain was normal and electroencephalogram showed acute encephalopathic changes
- Even though her transaminases were decreasing, she had persistently increasing direct bilirubinemia with high levels of alkaline phosphatase (ALP) and Gamma glutamyl transferase (GGT) resulting in development of deep jaundice
- On retrospective review, she had had no exposure to drugs which could have caused cholestasis or hepatotoxicity while contrast-enhanced computed tomography of the abdomen did not reveal extra-hepatic biliary obstructions
- Hepatitis A, B, C, cytomegalovirus (CMV), Epstein Barr virus (EBV) and leptospira serology were negative as well as anti-nuclear antibody (ANA) and anti-mitochondrial antibody (AMA)
- Liver biopsy was performed after correction of coagulopathy and the histology revealed intra hepatic cholestasis
- She was initiated on continuous renal replacement therapy (CRRT) to stabilize metabolic parameters and to mitigate the worsening lactic acidosis. However, despite escalating the dose of CRRT, lactic acidosis worsened (7.3–8.2 mmol/l) and so a CytoSorb hemoadsorption cartridge was additionally installed into the CRRT circuit

### Treatment

- CytoSorb was introduced on day 7 of her intensive care stay and run for a total of 2 days
- The adsorber was run in conjunction with CRRT

### Measurements

- Metabolic parameters (lactate, pH)
- Liver parameters
- Creatinine

### Results

- CytoSorb treatment was accompanied by a dramatic reduction in lactate levels (from 8.2 to 2.6 mmol/l) with a correction of the metabolic acidosis (from 7.23 to 7.4) while other metabolic parameters returned to normal
- Also, a clear reduction in transaminases (ALT, AST) as well as of ALP, and GGT was observed over the course of the treatment

### Patient Follow-Up

- She was transfused with fresh frozen plasma, platelets and cryoprecipitate guided by rotational thromboelastometry studies, resulting in a cessation of the pervaginal bleeding and normalization of INR
- Later (on days 18 and 19) she was started on therapeutic plasma exchange (TPE) due to persistently rising serum bilirubin levels and severe encephalopathy, after which the GCS started to improve and the patient was safely extubated

- A total of 4 cycles of TPE were performed with recovery of GCS to 15/15
- Hyperbilirubinemia was treated with ursodeoxycholic acid
- The patient was discharged home after a good recovery
- On review 1 month later, she was asymptomatic, her bilirubin levels had returned to baseline levels and repeat ultrasound of the liver was normal other than a grade 2 fatty liver

## Conclusions

- In this case, acute liver failure with a prolonged phase of intrahepatic cholestasis as a very rare complication of the acute dengue illness, was managed successfully with supportive therapy, also aided by CytoSorb hemoadsorption