

Venlafaxine intoxication with development of takotsubo cardiomyopathy: successful use of extracorporeal life support, intravenous lipid emulsion and CytoSorb.

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This case study reports on a 19-year-old female with a history of depression, who was admitted to the emergency department 1 hour after ingestion of 18 grams of venlafaxine in a suicide attempt

Case presentation

- On admission she was asymptomatic, and hemodynamically stable so was treated with activated charcoal and admitted to ICU for observation
- Eight hours after ingestion she developed tonic-clonic seizures, followed by ventricular tachycardia with recurrent cardiac arrests. Due to hemodynamic instability from refractory cardiogenic shock extracorporeal life support (ECLS) was commenced 13 hours after ingestion.
- High dose catecholamines were necessary to maintain cardiac output and takotsubo cardiomyopathy with an ejection fraction (EF) < 10% was diagnosed. Disseminated intravascular coagulation (DIC) with massive gastrointestinal bleeding and complete loss of clotting factors followed. Severe lactic acidosis (pH 7.2, lactate 19.2 mmol/L) was seen and laboratory findings suggested progressive acute liver dysfunction (AST 5431 U/L, bilirubin 12 mg/dl). The patient was also anuric with acute kidney failure (AKIN stage 3, creatinine 2.8 mg/dL).
- Due to the multi organ dysfunction, she was commenced on high volume hemodiafiltration, invasive mechanical ventilation, massive transfusion and mild hypothermia.
- Due to persistent shock ILE was started. High blood flow ECLS was used to avoid high doses of catecholamines with vasopressin prescribed to maintain the blood pressure. Levosimendan and milrinone were used to support cardiac function.

Treatment

- One treatment with CytoSorb 32 hours after ingestion of venlafaxine
- CytoSorb was used in parallel with ECLS
- Blood flow rate: 300 ml/min
- Anticoagulation: low dose heparin due to (improving) DIC and ongoing bleeding problems

Measurements

- Levels of venlafaxine

Results

- The CytoSorb adsorber clotted after 9 hours, since effective anticoagulation was not possible due to ongoing DIC
- Blood samples for venlafaxine taken 11 and 42 hours post ingestion (42 hours was directly post CytoSorb), showed levels had decreased from 16,608 ng/mL to 9,569 ng/mL. Parent and metabolite ODM-venlafaxine decreased from 19,078 to 11,029 ng/ml.
- Despite the large volume of distribution of the venlafaxine and its metabolite, there were no clinical signs of rebound after cessation of the CytoSorb.

Patient Follow-Up

- High volume hemodiafiltration was continued for 2 days to regain acid-base and fluid homeostasis
- Transthoracic echocardiography on day 7 showed normal bi-ventricular function so the patient could be weaned from ECLS.
- Renal and hepatic function also improved with intermittent hemodialysis continued from day 7 – 19.
- Patient woke up 14 days after admission, and was transferred to the psychiatric ward one week later with no residual physical effects.

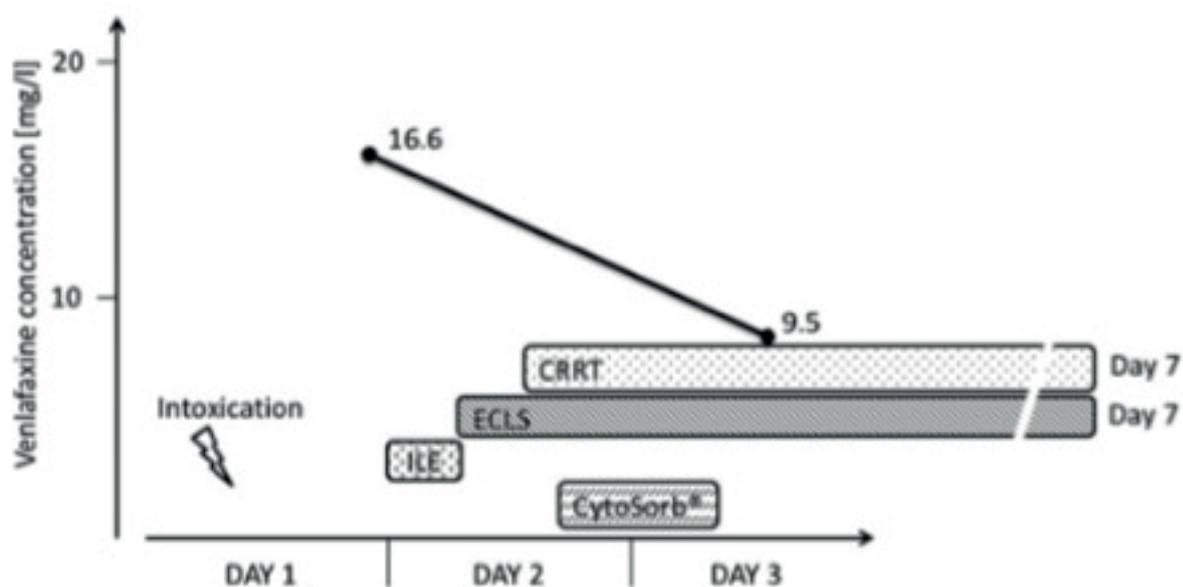


Fig 1. Timeline showing the key therapeutic interventions during the first 3 days after intoxication with venlafaxine (figure not to scale). Intravenous lipid emulsion (ILE) was started 12 hours after intoxication. Extracorporeal life support (ECLS) was started 13 hours after intoxication, Continuous renal replacement therapy (CRRT) was started 17 hours after intoxication. CytoSorb was started 32 hours after intoxication. Blood sample for venlafaxine concentration were taken 11 and 42 hours after intoxication.

CONCLUSIONS

- Use of CytoSorb to aid detoxification, intravenous lipid emulsion and ECLS in a patient with massive venlafaxine intoxication led to the successful recovery of the patient despite severe multi-organ dysfunction.
- This is the first reported use of CytoSorb for intoxication. No adverse events were noted. The use of ILE did not cause any problems with the CytoSorb or ECLS circuits.
- The authors note that, as CytoSorb is capable of adsorbing venlafaxine due to its structure, that its use may have played a pivotal role in the clearance of the drug.
- This is the highest amount of venlafaxine intake reported thus far in the literature, resulting in a positive outcome after combined therapy with ILE and CytoSorb.