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EXTRACORPOREAL LIFE SUPPORT IN TOXICOLOGY - WHAT IS THE EVIDENCE AND WHEN SHOULD IT BE USED

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Objectives: Drug-induced cardiovascular failure remains a leading cause of death. Calcium-channel blockers (CCB) and beta-blockers (BB) account for about 40% of cardiovascular drug exposures, while CCB and glycosides represent the first causes of cardiotoxicant-related death.

Methods: This presentation will review the predictive factors for failure of the pharmacological treatments of drug-induced cardiovascular failure and define the place of extracorporeal life support (ECMO) in poisonings.

Results: Severe cardiotoxicity usually appears rapidly after the exposure with the sudden onset of hypotension, high-degree atrio-ventricular block, asystole, pulseless ventricular arrhythmia. Other critical features include mental status deterioration, seizures, hyperlactacidemia, and renal, liver and respiratory failure. Determination of the mechanism of cardiovascular failure is mandatory. Overdoses with CCB, BB, and membrane-stabilizing agents (MSA) result in myocardial negative inotropic effects and arterial dilatation. Prognostic factors remain poorly investigated and seem to be specific for a class of toxicants. Despite optimal supportive and antidotal treatments, management of drug-induced cardiovascular failure is difficult. Ventricular arrhythmia, sudden cardiac arrest, and refractory cardiovascular failure may cause death, despite tight monitoring and aggressive resuscitative measures and vasopressors. Prognosticators of refractoriness to conventional treatments are lacking. Due to large volumes of distribution and high protein binding ratios, extracorporeal elimination enhancement techniques are not feasible options. Lipid emulsion has been extensively used but due to the lack of randomized controlled studies, this treatment should be used only in local anesthetic systemic toxicity and lipophilic cardiotoxin intoxication with an immediate threat to life and ineffectiveness of other therapies. ECMO for reversible cardiac toxicity has a sound basis but clinical experience is also still limited in toxicology with insufficient evidence to conclude for its recommendation (grade C). The purpose of ECMO is to take over the heart function during refractory cardiac shock until recovery can occur, thus minimizing myocardial work, improving organ perfusion, and maintaining the renal and biliary elimination of the toxicant. By contrast, ventricular pacing can only be considered if the inotropic heart function is preserved. Interest of intra-aortic balloon pumps is limited due to the need for intrinsic cardiac rhythm for synchronization and diastolic augmentation.

Conclusions: Supportive and antidotal treatments are usually efficient to treat drug-induced hypotension. However, due to persistent high-rate of mortality, there is a need for more aggressive management in patients not responding to conventional treatments. Clarification of prognosticators of refractoriness is mandatory. Usefulness of ECMO remains a matter of debate and recommendations from the scientific societies are expected.

Learning Objectives:
1. To understand the role of ECMO in supporting drug-induced cardiac failure
2. To be aware of the optimal antidotes for the usual cardiotoxicant-induced poisonings
3. To understand how to assess refractoriness of drug-induced cardiovascular failure to the conventional pharmacological treatments
4. To understand the principles of management of the poisoned patient treated by ECMO 3. Plan and integrate available external toxicology educational resources into an established residency or fellowship training program

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Conclusion: Improved care of patients presenting at Sri Lankan hospitals has seen a decrease in case- fatality. Young women are the group with highest rate of oleander poisoning, compared to other modes of self-harm. Yellow oleander toxicity may vary by region and season.