

with low bioavailability leading some to believe risk of toxicity is low. However, MEGX has a longer half-life than lidocaine and nearly equipotent neurotoxicity. In 21 reported toxic viscous lidocaine ingestions, mortality rate was 43% and seizure incidence 57%. 3 of 7 subacute ingestions had clinical neurotoxicity despite non-toxic serum lidocaine concentrations. By contrast, 1 of 12 symptomatic acute ingestions had initial nontoxic concentrations. MEGX accumulation may explain neurotoxicity in subacute ingestions. This is supported by neurotoxicity at lower serum lidocaine levels after oral versus intravenous exposure. Cautious oral dosing should be considered due to lidocaine and MEGX toxicity. Measurement of both metabolites should be considered in toxic ingestions.

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FOLLICULAR CARCINOMA OF THE THYROID PRESENTING WITH ANTERIOR MEDIASTINAL MASS AND CARDIOGENIC SHOCK

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Learning Objectives: Anterior mediastinal mass is a well described and potentially life threatening complication of neoplastic processes arising within the chest. Predominantly germ cell and thymic in origin, tumors in the mediastinum may progress to involve the heart, pericardium, great vessels, and airway. Frequently requiring aggressive surgical intervention, perioperative critical care management of these patients can present a number of hemodynamic, respiratory, and airway management challenges. We present the case of a patient with carcinoma of the thyroid resulting in progressive decompensated heart failure and cardiogenic shock. A 63 year-old male with a history of atrial fibrillation and hypertension presented with three-weeks of dyspnea, fatigue, and edema. Transthoracic echocardiography (TTE) demonstrated normal ventricular function and size, trivial valvular regurgitation, and a large pericardial effusion without evidence of tamponade. Leftward tracheal deviation associated with a mass at the right thoracic inlet was noted on plain radiography. Needle biopsy of the mass was consistent with thyroid origin. After initial improvement, the patient decompensated on hospital day 4, requiring pericardiocentesis to remove one liter of bloody pericardial fluid. Subsequent TTEs demonstrated rapid progression of mitral, tricuspid, and aortic valvular regurgitation in the presence of normal ventricular function and no evidence of ischemia. Due to progressive airway involvement, the patient was taken urgently for thyroidectomy on hospital day 12, where echocardiography demonstrated severely decreased biventricular function, severe bi-atrial enlargement, as well as severe tricuspid and mitral valvular regurgitation. Cardiac and valvular function stabilized after sternotomy, and the patient was transferred back to the ICU on high dose vasopressor and inotropic support in addition to inhaled nitric oxide. Following surgical resection the patient progressively improved, was weaned from hemodynamic support, and transferred in stable condition on post-operative day six.

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CHARACTERIZATION OF 4-FACTOR PROTHROMBIN COMPLEX CONCENTRATE IN ORTHOTOPIC HEART TRANSPLANTATION

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Learning Objectives: High risk cardiac surgery patients, such as orthotopic heart transplant (OHT) following mechanical circulatory assist device (MCAD) explantation, can experience fatal bleeding. Post-operative blood loss is multifactorial and is in part due to dilution of clotting factors and activation of hemostasis. An increase in transfusion of fresh frozen plasma (FFP), platelets and packed red blood cells (PRBC) are significant sequelae of cardiac surgery. 4-Factor prothrombin complex concentrate (4F-PCC) contains therapeutic amounts of factors II, VII, IX, and X, along with heparin, and protein C and S. Urgent reversal of warfarin in adult patients with major bleeding is the only FDA approved indication for 4F-PCC. Compared to FFP, 4F-PCC more rapidly reduces international normalized ratio (INR), causes a greater increase in coagulation factors and has a similar safety profile while limiting infusion size and need for blood group specificity. The use of 4F-PCC for INR reversal is well documented in the literature, however off-label use of 4F-PCC to reduce post-cardiac surgery bleeding in patients undergoing cardiopulmonary bypass (CPB) has not been well characterized. We report a case series of 4 patients who received intraoperative 4F-PCC while undergoing MCAD device explantation followed by OHT to reduce post-operative bleeding. The mean age was 43 years and 75% were male. All patients had anticoagulation reversed pre-operatively. The mean dose of 4F-PCC administered was 21.6 units \pm 9.8 as factor IX. The mean INR was 2.9 \pm 0.56 at baseline and 1.7 \pm 0.21 within 140 minutes of 4F-PCC which was administered after stopping CPB. There were no thromboembolic events within 48 hours of

4F-PCC administration. One patient required one unit each of PRBC and FFP within 48 hours of surgery. Overall, 4F-PCC was effective at rapidly correcting cardiac surgery associated coagulopathies in 4 patients undergoing OHT without any thrombotic complications. Further research is warranted despite anecdotal success with intraoperative 4F-PCC during OHT.

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THE TOXIC EFFECTS OF SYNTHETIC CANNABINOIDS

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Learning Objectives: Recreational synthetic cannabinoid (SC) use has tripled in the past 5 years. Marketed as incense products, SCs are inexpensive, potent, easily purchased, and evade toxicology screening. We present a case of acute intoxication with SCs causing serious sequelae. A 27-year-old female with no past medical history was brought in by ambulance altered and vomiting. Per her partner, she drank 2 glasses of wine and smoked a substance packaged as "Diablo Botanical Incense". She then became unresponsive and vomited multiple times. EMS found her hypertensive at 157/84, tachycardic to 168 bpm, tachypneic at 33 breaths/min, with a normal O₂ saturation, and GCS of 6. She was unresponsive to noxious stimuli, diaphoretic and had bilateral non-reactive, dilated pupils. She was intubated in the ED for airway protection. Serum EtOH level was 0.07g/dL. The following morning, she became responsive, was extubated and discharged home. Comprehensive urine toxicology performed at SFGH Clinical Lab by mass spectrometry and gas and liquid chromatography was negative for amphetamines, cocaine, opiates, THC and other toxins. The Diablo incense, provided by the patient's partner, was subsequently analyzed and tested positive for the SC XLR-11 and metabolite AB-PINACA. The negative urine panel is attributed to the unstable nature of the analogs with prolonged storage. SCs share activity with marijuana and THC at CB1 and CB2 receptors. Unlike THC, which acts as a partial agonist at the receptors, SCs exhibit full agonist activity. This poses potent and unpredictable side effects, notable for tachycardia, hypoalgesia, catalepsy, and intractable emesis. Although pupillary dilation has been reported, we did not find any cases of fixed and dilated pupils after SC exposure. Treatment is limited to supportive care. Despite federal banning of major classes of SCs, new chemical compounds are created and distributed regularly, making regulation and screening difficult. Physicians must consider SCs, particularly in altered, young adults with a suggestive history and negative toxicology panel.

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INTRAVENOUS INJECTION OF ORAL NARCOTICS CAUSING ACUTE RIGHT HEART FAILURE IN CYSTIC FIBROSIS PATIENT

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Learning Objectives: Pulmonary hypertension often occurs with cystic fibrosis (CF), and a worsening of right heart pressures may be seen with an exacerbation of CF-related lung disease. We report an 18-year old male who died of acute right heart failure, who on autopsy was found to have pulmonary pathology suggestive of intravenous (IV) injection of enteral narcotics. He was admitted with hypoxia and dyspnea, and treated for Pseudomonas bronchopneumonia. Other CF-related complications included pancreatic insufficiency, recurrent thrombosis of percutaneous intravenous central catheter (PICC) lines, and chronic back pain for which he was on Methadone and Oxycodone. His lung function stabilized, but he developed central-line associated blood stream infection requiring PICC removal. Echocardiography prompted by persistent fevers was negative for endocarditis, but showed newly elevated right ventricular pressures. Chest computed tomography (CT) ruled out pulmonary embolism, but revealed scattered inflammatory nodules new from chronic CF changes. Over time, his right heart function worsened and prompted transfer to the Pediatric Intensive Care Unit for initiation of Milrinone therapy. Shortly after, he sustained a cardiopulmonary arrest and died despite resuscitative efforts. On post-mortem, Movat pentachrome stain of the lung showed polarizable crystalline material, consistent with cellulose and talc. This finding is associated with flordil foreign body granulomatosis and occurs with injection of the insoluble material found within oral tablets into the venous circulation. Young patients with chronic illness such as CF are vulnerable to IV drug abuse because of access to pain medication, availability of long-term IV catheters, and concurrent social and mental health problems. A high index of suspicion, especially among pediatric providers, and recognition of the clinical, radiologic and histopathologic features is crucial for diagnosis and prevention of death in these high-risk patients.