

Intralipid in Action: A Case Study on Distinguishing Local Anesthetic Systemic Toxicity (LAST) from Serotonin Syndrome in Post-Operative Care

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Abstract:

Background/Introduction:

Local anesthetic systemic toxicity (LAST) and serotonin syndrome (SS) share overlapping symptoms, posing a diagnostic challenge. LAST arises from excessive local anesthetics, causing initial CNS excitation followed by cardiovascular collapse. SS results from serotonergic hyperactivity, leading to neuromuscular excitation, altered mental status, and autonomic instability. Distinguishing these conditions relies on understanding the temporal onset, associated medications/procedures, and subtle nuances in clinical presentation. Prompt differentiation is essential, as LAST treatment centers on supportive care and lipid emulsion therapy, while SS management may necessitate serotonin antagonists. Quick and accurate diagnosis can also help prevent unnecessary, potentially harmful, interventions.

Case Presentation:

We present the challenging case of a 70-year-old female patient who developed altered mental status, slurred speech, perioral numbness/tingling, severe shortness of breath, and hypotension in the post-anesthesia care unit (PACU) following left reverse total shoulder arthroplasty and open subpectoral biceps tenodesis. The patient had an interscalene peripheral nerve catheter in place infusing Ropivacaine 0.2% at 6 ml/hr. Initial concerns of LAST prompted cessation of the Ropivacaine infusion, and administration of 100 ml of Intralipid. Despite negative aspiration of catheter for blood, and a negative test dose for LAST, the patient's symptoms persisted, leading to further evaluations of differential diagnoses such as stroke, seizure, and pulmonary embolism.

Subsequent evaluations showed findings of large hiatal hernia and cardiomegaly, complicating the clinical picture with respiratory distress which necessitated management with CPAP. The case was further complicated by transient blood pressure elevations, and possible seizure activity suggested by facial and oral movements resembling tardive dyskinesia. However, it was confirmed that no medications known to cause tardive dyskinesia had been administered. Despite initial concerns for LAST, the administration of Intralipid, and removal of the interscalene catheter, the patient's symptoms persisted, leading to broader differential diagnoses including seizure, given the patient's history, and the potential for pharmacological interactions like serotonin syndrome suggested by the patient's collection of symptoms.

Discussion:

LAST is diagnosed when predisposed patients exhibit consistent symptoms. Risk factors include advanced age, pediatric status, hepatic dysfunction, cardiac conditions, pregnancy, and metabolic syndromes. Symptoms involve neurological changes (altered mental status, agitation, perioral

numbness, seizures) and cardiovascular instability (bradycardia, hypotension, arrhythmia, respiratory arrest).

Hypertension and tachycardia in this patient reduce the likelihood of LAST as the primary cause. Despite the presence of perioral numbness and respiratory distress, the multifaceted origins suggest other causes. Excluding LAST involves administering Intralipid, catheter aspiration, and an epinephrine test dose. In this case, these steps were properly conducted, but the patient's condition did not improve, suggesting another causative underlying mechanism.

The mainstay treatment of LAST includes supportive measures including airway management, cardiocirculatory support and seizure prevention. More recently, the administration of lipid emulsion via intravenous route has been theorized to improve outcomes. The hypothesized mechanism of using lipid emulsions in LAST include the shunting of local anesthetic from organs such as the heart and the brain to more peripheral organs involved in detoxification such as the liver and musculature. This is protective due to the decreased toxicity and the increased metabolism and sequestration of the local anesthetic away from vital organs. As such, lipid emulsions should be administered quickly when suspecting LAST in a patient.

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