
Inadvertent Intra-Articular Injection of Epinephrine. A Case Report.

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Introduction: Epinephrine, a potent vasoconstrictor, is a common pharmacological additive used intra-operatively to promote hemostasis in various surgical procedures such as plastic reconstruction, ear-nose-throat and orthopedics. Inadvertent epinephrine overdose is unfortunately not an uncommon event which can result in significant morbidity and even mortality. However, defining the toxic levels of epinephrine is difficult depending on the route and duration of administration. Most of the case reports in the literature describe events involving accidental intravascular injections, or rapid absorption through mucosal surfaces, subcutaneous tissue and incisional wounds which can lead to ventricular dysrhythmias, myocardial ischemia, renal failure, pulmonary edema and cardiomyopathy. We report an unusual case of unintentional intra-articular injection of high dose epinephrine resulting in ventricular dysrhythmia.

Case: A previously healthy 63 year old gentleman presented for a diagnostic shoulder arthroscopy. Following an uneventful induction of general anesthesia with Propofol, Fentanyl and Rocuronium, the patient's trachea was intubated and he was then placed in a beach chair surgical position. Anesthesia was maintained with Sevoflurane, Nitrous Oxide, and Fentanyl. Surgeons proceeded to inject what they believed to be local anesthetic into the operative joint space. Within 2 minutes following injection, the patient became acutely hypertensive with blood pressures greater than 200/110 mmHg and developed a wide complex tachycardia at a rate >140 bpm with ST depressions seen on EKG in leads II and V. It was quickly identified that 15 mg of undiluted epinephrine (15 cc of 1:1000) was inadvertently used. Patient was treated immediately with 100% oxygen, Labetolol and later Esmolol, as well as following the ACLS protocol of management of stable monomorphic ventricular tachycardia. Concurrently the surgeons aggressively aspirated and irrigated the shoulder joint space with normal saline. The patient's vital signs were restored to baseline within 5-10 minutes. An arterial line was placed for close blood pressure monitoring. The patient was extubated uneventful and he was admitted to the ICU for monitoring given the potential of a delayed response from late absorption of any residual epinephrine. In the ICU a 12 lead EKG was obtained which showed evidence of improving ST depressions in the lateral leads. An initial set of cardiac enzymes were obtained and despite multiple attempts to monitor the patient closely in the ICU and to complete the rule out myocardial infarction protocol, the patient signed out against medical against. Follow up EKG one hour after the initial one, just prior to the patient leaving, showed resolving ST segment depressions. At the time of his discharge, the patient was asymptomatic without any chest pain; however, he did receive a total of 250 mcg of Fentanyl intra-operatively. In a follow up telephone interview and clinic visit, the patient remained asymptomatic with no significant sequelae from the event. He underwent his diagnostic shoulder arthroscopy uneventfully 4 months later.

Conclusion: A review of the literature through Medline search demonstrates no previously published case reports of inadvertent intra-articular injection of high dose epinephrine. This particular route of injection raises questions about the depot effect of epinephrine in a joint space. In addition, it also brings into considerations the possible benefit of dilution within the joint space, limited slow intravascular absorption, and the ability to aspirate remaining epinephrine. We will discuss the doses of epinephrine, the effects of an epinephrine overdose reported in the literature and the management of our patient. Critical incidents caused by medication errors have resulted in significant morbidity and mortality among hospital patients. This case highlights the importance of cross checking all medications used by nurses and surgeons in the operating room to avoid near-misses such as the one reported here.

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