Routine Intravenous Access for Epidural Steroid Injections Without Sedation

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Myth: Intravenous access should be routinely obtained prior to epidural steroid injection without planned use of sedation.

Fact: The published evidence does not support the rationale for routine placement of intravenous access prior to epidural steroid injections. For serious adverse events, such as spinal cord injury or stroke, intravenous access is irrelevant to management. For rare adverse events, such as seizure, anaphylaxis, or arrhythmia, intramuscular administration of therapeutic medications is no less effective than intravenous administration. More common adverse effects, such as symptomatic hypertension and vasovagal reaction, are not improved by immediate intravenous treatment.

Some physicians routinely establish intravenous (IV) access prior to epidural steroid injections (ESI), even if there is no intention to administer IV sedation. Ostensibly the rationale for this practice is that IV access facilitates the immediate management of adverse events, should they occur. However, this rationale lacks foundation either in principle or in the face of published evidence.

Systemic side-effects of corticosteroids, such as light-headedness or nausea without changes in vital signs, or facial flushing or burning, do not require IV treatment. Nor is IV access required to treat unintended dural puncture, disc puncture, or spinal block. IV access provides no therapeutic benefit for spinal cord injury or cerebral stroke.

Theoretically, IV access might appear beneficial for adverse events for which therapeutic medications are indicated or may be useful. These include seizure, arrhythmia, anaphylactoid reaction, allergic reaction without anaphylaxis, symptomatic hypertension, and vasovagal reaction. The published evidence, however, shows that this is not necessarily so.

Seizure

Seizures may occur when local anesthetic is inadvertently injected into a blood vessel, but seizures are a rare complication of ESI. Seizures were not encountered in two, prospective studies of 16,638 [1] and 2,025 [2] patients in which cervical, thoracic, and lumbar interlaminar and transforaminal ESI were performed in accordance with the guidelines of the Spine Intervention Society [3]. There are no published reports of seizure after caudal ESI.

One seizure was reported in a study of 4,612 consecutive cervical transforaminal ESI [4]; and a case report [5] described seizures after injection of local anesthetic into a vertebral artery during a cervical transforaminal injection. In both instances, the patients did not require anticonvulsant medication; they were managed with nasal oxygen and IV saline. Likewise, one patient experienced a diverse neurologic symptoms, but not seizures, after a local anesthetic test dose during a cervical transforaminal injection, but did not require IV treatment [6].

Based on the current literature, the typical small doses of local anesthetic used in cervical epidural injections do not provoke status epilepticus. However, in the event of status epilepticus, both intramuscular and intravenous formulations of several benzodiazepines, fosphenytoin, and levetiracetam exist, without evidence of superiority of the IV formulations [7,8]. Thus, there is no indication that immediate IV access would change the outcome of seizure management during an epidural procedure.

Arrhythmia

Arrhythmia has never been reported as a complication during cervical or lumbar interlaminar, lumbar transforaminal, or caudal ESI. In the one reported case of tachycardia during a cervical transforaminal injection, the tachycardia resolved before an EKG could be obtained [5].

For cardiac arrest, current recommendations are that chest compressions are by far the most important acute intervention; and the intramuscular route for administration of medications can be utilized during advanced cardiac life support [9]. Cardiac arrest algorithms can be followed for a minimum of 4 minutes.
before IV access becomes possibly relevant [9]. Although IV amiodarone is recommended as an alternative to epinephrine if 2 minutes of compressions and defibrillation followed by 2 more minutes of compressions fail to yield return of spontaneous circulation during episodes of ventricular fibrillation or tachycardia, there is no evidence that switching to amiodarone is more effective than continuing intramuscular epinephrine [9]. A randomized study showed no survival benefit associated with administration of intravenous drugs during advanced cardiac life support after out-of-hospital cardiac arrest [10].

Anaphylactic Reaction

The literature contains no reports of anaphylactic reactions during lumbar interlaminar or transforaminal ESI or cervical interlaminar ESI, but one case has been reported following a cervical transforaminal ESI [4], two during caudal ESI [11,12], and one in which the spinal level and route of access was not stated [13]. Although three of these patients were treated using IV access, the intramuscular route can be used to administer first line treatments for anaphylactic reactions [14], and recommendations exist that the decision to obtain IV access depends on the patient's response to a first dose of IM epinephrine [14]. Therefore, it is unlikely that prior IV access would influence the outcome of an anaphylactic reaction in the setting of an ESI procedure.

Symptomatic Hypertension

Symptomatic hypertension during ESI has rarely been reported. In one case, the procedure was terminated and symptoms resolved once the painful stimulus was removed [2]. In the other case, the patient was treated with IV labetalol after the procedure (with no prior IV access) with resolution of symptoms and no sequelae [15]. Because severe hypertension is driven primarily by pain during an ESI procedure, symptomatic hypertension is most effectively treated by procedure termination, and upon doing so, symptoms should resolve. There is insufficient evidence to suggest that immediate IV access would prevent permanent sequelae of symptomatic hypertension during an ESI procedure at any spinal level using any route of epidural access.

Vasovagal Reaction

Vasovagal reactions are the most common adverse events during ESI procedures, with rates ranging from 0.2% to 5.0% [1,2,16] with conflicting evidence when retrospective, non-systemic studies are considered [17-22]. The treatment of vasovagal reaction may include the Trendelenberg position, ice packs to the head and neck, physical counter-pressure maneuvers, smelling salts, and IV fluids and/or atropine if the reaction is severe and sustained [23]. In the largest cohort studies of ESIs to date IVs were never placed routinely and all vasovagal reactions were treated without the use of IV medication [1,2,16]. Thus, although the treatment of vasovagal reactions may be optimized with IV treatments in severe cases, a minor delay to IV access may prolong symptom duration slightly, but is not likely to affect the clinical outcome or patient safety during ESI procedures at any level and any route of epidural access.

Summary

The current literature indicates that placement of IV access prior to ESI will not prevent or influence the outcome of adverse events such as seizure, arrhythmia, anaphylactic reaction, vasovagal reaction, and symptomatic hypertension. None of the reported cases of seizure, arrhythmia, or anaphylactic reaction resulted in a poor outcome due to lack of immediate IV access, and current evidence suggests that IM medication administration for the initial acute management of these events is no less effective than the IV route [7-10,14]. Any purported benefits of routine IV placement must be weighed against the disadvantages. The costs associated with lost staff time, lost procedure time, and supplies may range from $5-20 per IV [24]. When multiplied by the estimated greater than 2 million epidural steroid injections performed annually in the U.S. Medicare population alone [25], costs of IV access represent a significant expenditure of healthcare dollars. Apart from IV insertion being painful for some patients, routine placement of IV needles on a large scale increases the incidence of infection, thrombophlebitis, extravasation, hematoma, and vascular injury. These unnecessary adverse effects may result in increased difficulty with obtaining venous access during future non-elective procedures [24]. The lack of evidence to support the necessity of routine IV access for ESI, and the cumulative risks and costs of obtaining IV access in all patients who undergo ESIs leads us to recommend against this practice, regardless of the spinal level or route of epidural access.
References


