

Is There Risk of Neurologic Complications Due to Vascular Infarction Associated with Particulate Steroid Use During Interlaminar Epidural Steroid Injections?

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Myth: Interlaminar epidural injection with particulate as opposed to non-particulate steroid poses a greater risk of thrombotic/embolic-related neurologic complications.

Fact: There is insufficient evidence to determine if an interlaminar epidural injection with particulate as opposed to non-particulate steroid is associated with a greater risk of thrombotic/embolic-related neurologic complications.

An important characteristic that distinguishes various injectable corticosteroids from one another is whether or not they contain particles/particulate matter, defined in this context as aggregates of molecules larger than red blood cells. Steroids such as dexamethasone do not contain particles under normal circumstances, whereas methylprednisolone, for example, does contain particulate matter [1].

SIS and the Multisociety Pain Workgroup (MPW) recommend against the use of particulate steroids as a first line choice for lumbar or cervical transforaminal injection [2]. Alternatively, there is no recommendation regarding particulate versus non-particulate steroid use during interlaminar epidural injection.

Numerous case reports have implicated particulate steroids as a cause of spinal cord infarction during transforaminal epidural steroid injection due to inadvertent injection into the vertebral artery at a cervical level, the artery of Adamkiewicz at a thoracolumbar level, or a radiculomedullary artery at any level [3]. These arteries enter the neuroforamina at various levels, but do not traverse the interlaminar epidural space [4,5].

Vascular complications secondary to interlaminar epidural steroid injection have rarely been attributed to particulate steroid. The primary vasculature in the dorsal epidural space is the epidural venous plexus, which is not susceptible to embolization by particulate steroid. Arterial spinal cord embolization and infarction have rarely been reported in the medical literature as a result of interlaminar epidural steroid injection. Two reports describe spinal cord ischemia after an IL ESI, though in both cases, the patients had a prior

lumbar decompression and there were no lateral or contralateral oblique fluoroscopic images provided to confirm proper technique [6,7]. Bleeding complications reported due to interlaminar epidural steroid injection include hematoma from venous bleeding causing compression of the spinal cord and/or cauda equina with subsequent neurologic injury [8], or bleeding due to accidental rupture of an arteriovenous fistula [9]. However, these rare bleeding complications are unrelated to steroid choice.

Conclusion

While SIS and the MPW recommend against the use of particulate steroids as a first-line choice for transforaminal epidural injection, there is insufficient evidence to support the theory that particulate (vs. non-particulate) steroid delivered via an interlaminar approach increases the risk of any thrombotic/embolic-related neurologic complication.

References

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