

Mini Review

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Caudal Epidural Steroid Injections-A Mini Review

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Abstract

Caudal epidural steroid injections have been used through the decades for the management of Sciatica pain. It is a safe, effective procedure when performed under fluoroscopic visualization. Caudal epidural injections when performed blindly result in intravascular injections amongst other complications. This mini review will discuss the good (advantages), the bad (disadvantages) and the evil (complications) associated with caudal epidural injections.

Keywords: Caudal epidural steroids; Sacral hiatus; Fluoroscopy

Introduction

Caudal epidural steroid injections have been given for low back pain as early as 1901 [1-4]. However, steroid was added in this injection in 1952 and it was being used widely for sciatica [5-8]. The popularity of caudal epidural injections has fluctuated through the decades. Through this mini review I have tried to provide an unbiased look at the outcomes of the various studies seen in the literature.

Advantages “the good”

Caudal entry into the epidural space is relatively easy and there is very little risk of dural puncture. On comparing its efficacy amongst interlaminar, caudal and transforaminal the literature is in favour of the caudal epidural injections. Out of the 13 trials screened 5 were of caudal epidural which showed good results in 4. The remaining 8 trials were screening the lumbar injections wherein only 3 studies showed good response. [9-14].

On estimating the cost of injections the caudal epidural injections and transforaminal steroids were around \$3k whereas interlaminar or lumbar epidural steroids were just double the cost [13]. Another advantage of caudal epidural injections is that it can be used in patients suffering from coagulopathies and in fact they were safer than interlaminar or transforaminal injections. Caudal epidural injections have also proved to be advantageous for use in post lumbar laminectomy patients or in patients suffering from chemical or compressive radiculitis at S1 nerve root [15]. Some case reports have even mentioned the use of caudal epidural steroid injections for the management of pain related to pelvis, rectum and perineum.

Disadvantages “the bad”

The main disadvantages of caudal epidural steroid injections are the necessity of injecting a large volume of fluid [9-12,15,16] for it to act and wrong needle placement in a large number of cases [9-12,16-23]. Early experiences, by Evans [24] with caudal epidural injections showed that large volumes of procaine (up to 140 ml) were not associated with any complications. Cyriax [25] also used large volume for caudal epidural injections from 1937 with over 50,000 injections; using 50ml of procaine saw that there were no major complications seen except in 5 cases who recovered without any lasting harm. Bogduk et al. [10,26] concluded in their study by saying the volume of injection can vary from 10 to 64ml with 10 ml being for L5 vertebra and 15ml for L4 vertebra and so on.

Large volumes have been associated with complications like increase in the intraocular pressure with retinal haemorrhage [27-32]; however, no studies were found comparing the differential values of the anesthetic drug and the normal saline. Manchikanti et al. [15] did a study to estimate the filling patterns of the lumbosacral epidural space by injecting nonionic contrast. This was done not only to validate Bogduk theory but also to assess the optimal dose of the injection. It was seen in this study that there was no improvement in the filling pattern on increasing the volume over 10 ml and that there was only a 12% chance of the drug reaching the L5 nerve root in non-operated patients compared to a 88% chance of reaching the S1 nerve root. Hence, it was deemed to be useful in lesions involving S1 roots.

Another problem with caudal epidural injections is the needle placement with the needle entering either the extra epidural or intravascular space. In the absence of fluoroscopic guidance inaccurate placement of the needle was reported in 9% to 38% of cases [9-11,16-23]. This has caused many authors to recommend the use of fluoroscopy to inject epidural injections [9,10,16-20]. Fluoroscopic guidance would not only improve the accuracy of needle placement but also decreasing the risk of an intrathecal injection or asubarachnoid puncture. Stitz & Sommer [22] recommended that caudal epidural should be performed under fluoroscopic guidance but if not available then caudal epidural injection may be ideally placed by identifying the anatomical landmarks and also by the absence of palpable subcutaneous air over sacrum. Renfrew et al. [19] in a study found incorrect needle placement in 38% when in experienced hands. This indicated that fluoroscopic guidance is required even in experienced hands. White et al. [16] in a study reported 6% incidence of intravascular uptake. The majority of cases seen were done by the caudal route. Manchikanti et al. [15] found intravascular uptake to be in 7% of cases with caudal epidural injections. Sullivan et al. [23] found the incidence of overall intravascular uptake during lumbar spinal injection procedures as approximately 9%. Caudal epidural injections have been associated with other disadvantages such as unreliable spread, patchy effect, high risk of infection. It is mainly suited for lower lumbar and spinal pathology.

Complications “the ugly”

The main complication is infections. Complete aseptic preparations by using povidone-iodine 10% scrub should be done in all the patients who are not allergic to iodine. Special care should be taken for the immunocompromised patients. Post injection pain may be present at the entry site, the sacral hiatus, but this usually resolves in 2-6 months. There maybe redness or rash associated at the injection site. Intrathecal injection may occur and may be associated with prolonged and/or high subarachnoid block, respiratory distress or arrest, totalspinal anesthesia and even death. It has also been seen that adhesive arachnoiditis may develop from the solvent of depot-steroid polyethylene glycol. Postdural puncture headache may also follow the injection [33]. Earliest sign of an intrathecal injection is that the patient will not be able to feel his lower extremities soon after injection, or the patient may not be able to push up their knees while lying down. Frequently, many patients have numbness in the lower extremities soon after injection which is generally not expected in an epidural injection.

Nerve injuries may also occur, but it is very rare and generally not associated with the procedure. Intravascular or intraosseous injection leads to toxicity of anesthetic drugs with symptoms ranging from nausea, metallic taste in mouth, oral numbness, dizziness, drowsiness, sedation, seizures and respiratory arrest. Bupivacaine may produce cardiac toxicity, whereas, lidocaine may produce respiratory depression in high doses. Urinary

retention and incontinence may occur following the procedure but they are due to the use of opioids rather than depot-steroid injections.

Conclusion

Chronic low back pain is a common problem faced by the general population. Caudal epidural steroid injections have proved to be effective in many studies which have been done. However, it has also been seen that with sound anatomical knowledge and fluoroscopic guidance the complication rates may be brought down to negligible number.

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