Selective Nerve root block (lumbar)

Multiple causes of radiculopathy have been discovered. Pressure on the nerve may result in an autoimmune response that can elicit pain. Because the venous drainage lies on the outside of the nerve, pressure on the nerve increases the venous pressure, causing a compartment syndrome within the substance of the nerve. This syndrome causes ischemia and pain within the nerve root, and the pain can be referred along the dermatome for the particular root.

Phospholipase A has been implicated in radiculopathy as well. This chemical, the production of which is stimulated by extruded nucleus pulposus material, causes inflammation and pain in the adjacent nerve, even when no compression is present. Because steroids have anti-inflammatory actions, injections around the nerve root may reduce the inflammation, decreasing or eliminating the pain.

Although an epidural steroid injection may produce the same effect, an SNRB is a more elegant and focused injection that has more diagnostic value than an epidural injection, particularly in surgical planning. When the 2 techniques are compared, injections of a large amount of steroid throughout the epidural space (epidural injections) are mostly of use when the pathology is located centrally in the spinal canal (eg, central disk extrusion) or when 1 or 2 individual nerves cannot be identified as the most likely source of the symptoms during physical examination or imaging studies.

Epidural injection can be compared to a "shotgun blast" of steroids, covering a wide range of levels but placing only a small amount of steroid at each level. SNRB is more of a "sniper rifle" approach, with the injection of a relatively large amount of steroid around a specific nerve root. SNRB is useful when 1 or 2 nerve roots are considered to be the likely cause of the patient's symptoms.

Selective dorsal root ganglion blocks (SNRB), used to involve the use of palpated anatomic landmarks and a large amount of steroids and/or local anesthetics. As techniques have refined, fluoroscopic guidance has become popular, because this guidance allows more precise needle placement and thereby a smaller amount of injected pharmaceutical and a lower complication rate.

Efficacy

Steroids are widely used in nerve root blocks in an attempt to provide temporary relief from pain. When selective nerve root blocks are performed for disk herniations, the goal is to provide pain relief for enough time to allow the extruded disks to shrink. In more than 70% of disk herniations, the disk material resolves on its own. Given enough time; however, this process can take well over a year.

One prospective, randomized, controlled, double-blind study by Riew et al was performed in patients who were surgical candidates and who initially wished to undergo surgery to relieve radiculopathy from nerve root compression (*J Bone Joint Surg*

Am. Nov 2000;82-A(11):1589-93). Approximately 71% of those who underwent SNRB with betamethasone and bupivacaine elected not to have surgery (follow-up, 16 months), whereas only 33% of those injected with bupivacaine alone avoided surgery. A subsequent follow-up study in this cohort found that most of the patients who avoided surgery for at least 1 year after undergoing SNRB with bupivacaine, with or without betamethasone, continued to avoid operative intervention for a minimum of 5 years. Zennaro et al found the greatest efficacy of steroid injections in patients with foraminal stenosis, as compared with those who had foraminal disk herniations (*AJNR Am J Neuroradiol*. Feb 1998;19(2):349-52). Devulder found that SNRB with steroids was associated with decreased treatment scores in patients with failed back surgery syndrome, as compared with scores in those not treated with steroids (*Clin J Pain*. Jun 1999;15(2):132-5. Most studies report an average time of pain relief as 1-3 months in those patients that have initial improvement, although some studies have described longer relief in a high percentage of patients.

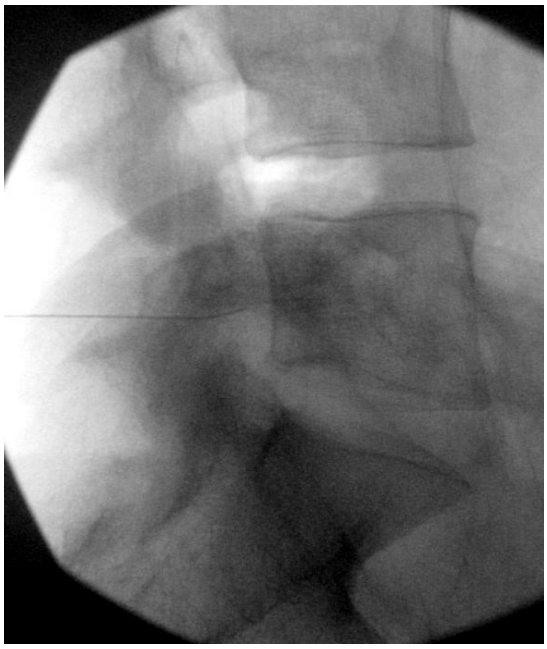
Technique (subpedicular), monitoring, drugs, and aftercare

Informed and written consent obtained to proceed with the procedure. Explain the rational and benefits (pain relief, improved mobility and function) of the procedure and go over potential risks (bleeding, infection, reaction to drugs, increased pain, dural puncture, nerve injury, and spinal headache). Also explain to the patient the risk of temporary and fully reversible numbness and lower limb weakness following the injection. Contra-indications are a history of contrast, local anaesthetic, or steroid allergy or previous anaphylactic reaction, evidence of focal or systemic infection, known bleeding diasthesis, pregnancy, and immunosuppression. If the patient is on warfarin, discuss the case with the consultant Physician and consider a three day break from Warfarin. Restart the Warfarin on the same evening of the procedure.

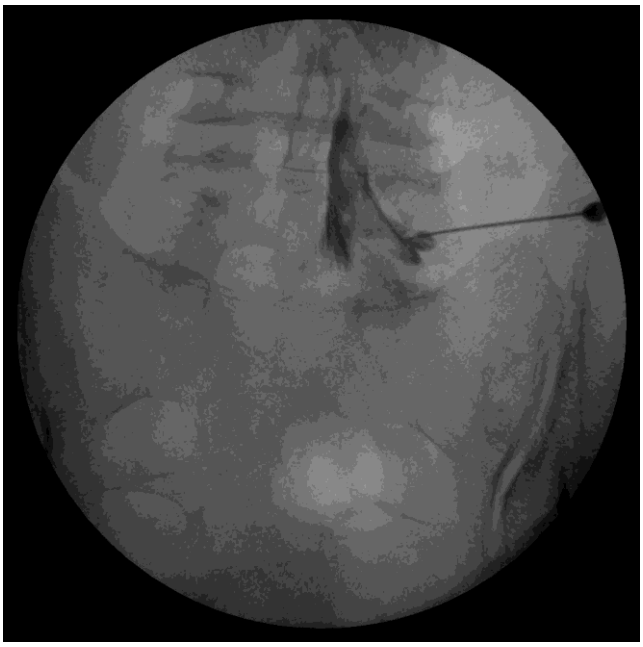
A C-arm Fluoroscope is used. Stand opposite to procedure side. The patient is put into the prone position on the radiography table. BP and pulse are taken and documented. A Pulse and Oxygen saturation monitor is turned on and the sensor fitted to the patient's index finger. The parameters are monitored throughout and after the procedure.

After appropriate disinfection of the physician's hands with Hibiscrub, sterile gloves are worn and the area of the lower back disinfected with Betadine and a cover applied over the patient's buttocks. The C-arm is adjusted to the for a PA view of the lower lumbar spine. Obtain a slight oblique view (towards the affected side) and align the endplates closest to the target which is usually the inferior endplate closest to the superior artericular process. The target is lateral to the pars interarticularis, in the upper lateral reaches of the safe triangle under the pedicle. Using a 23G 1 ¼ blue needle, the skin is anaesthetized at the access point with 1ml 1% lidocaine. Using a spinal needle (22GA 3.5inch) with the tip slightly bent, the needle tip is advanced under X-ray guidance. Once the needle has reached a satisfying position below the pedicle in the safe triangle, go to lateral views for assessing depth and reaching under the pedicle. Align both ileopectineal lines. The further caudal the needle position is away from the pedicle, the further ventral the tip of the needle will need to travel before approaching the spinal nerve. Next, go back to the PA views and advance the needle up to the 6pm position. Advancing any further increases the risk of an epidural puncture. 2mls of non-ionic contrast are injected to confirm correct needle tip position and to demonstrate a positive radiculogram. The contrast medium spreads medially following the course of the nerve

root sleeve. A solution containing 40mg Kenalog and 1-2ml 1% Lidocaine is then injected. The needle is withdrawn and the skin cleaned and a sterile dressing applied. The patient is monitored for 30 minutes and then allowed to leave the clinic with a relative driving (no driving for the patient for 24hrs). The patient is provided with aftercare notes (potential adverse reactions following steroid injections, delayed effect of steroid, short-term anaesthetic effect, signs of infection, emergency telephone number in case required of clinic out of hours) and reviewed a fortnight later.



(A)



(B)

(A) Lateral view shows correct needle tip position under the pedicle. Image (B) shows a PA view with the needle tip at the 6pm position and a positive radiculogram and partial epidurogram. Note the outline of the dorsal root ganglion.