Nerve Blocks for Chronic Pain

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KEYWORDS

• Nerve block • Chronic pain • Diagnosis • Therapy

KEY POINTS

- Nerve blocks can be performed for a variety of conditions, providing diagnostic and therapeutic modalities.
- Whenever considering nerve blocks, risks and benefits must be considered before intervention.

INTRODUCTION

Nerve blocks are often performed as therapeutic or palliative interventions for pain relief. However, they are often performed for diagnostic or prognostic purposes. When considering nerve blocks for chronic pain, clinicians must always consider the indications, risks, benefits, and proper technique, in order to provide maximal benefit for the patients. Nerve blocks encompass a wide variety of interventional procedures. The most common nerve blocks for chronic pain and that may be applicable to the neurosurgical patient population are reviewed in this article. This article is an introduction and brief synopsis of the different available blocks that can be offered to a patient.

DIAGNOSTIC VERSUS THERAPEUTIC NERVE BLOCKS

In general, nerve blocks may be divided into diagnostic and therapeutic interventions. Pain is a subjective unpleasant sensation, the exact pathophysiology of which is uncertain or multifactorial in most clinical situations. In human beings, chronic pain is a complex process that is compounded by psychosocial, financial, and sometimes legal matters.[1] When the cause of pain is unclear despite appropriate history taking, physical examination, and imaging or electrodiagnostic studies, diagnostic or prognostic nerve blocks may be in order. For instance, pain originating in the zygapophyseal joints or the sacroiliac joint cannot reliably be diagnosed by clinical examination or imaging studies and diagnostic local anesthetic blocks are frequently called on to confirm the diagnosis.[2,3] However, there are significant limitations to nerve blocks in making the leap from pain relief to establishing that pain is mediated by the targeted nerve, because performance of a nerve block takes into consideration many assumptions:

1. The nerve being blocked is responsible for generation, conduction, or maintenance of the painful stimulus
2. The operator performing the procedure is skilled in the performance of the block
3. The needle is placed in the exact and correct anatomic location
4. The patient does not have anatomic variations or aberrant physiologic or pharmacologic responses to the medication used
5. The volume of the medication injected is appropriate for the nerve/space

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6. The medication injected will remain in place and anesthetize only the targeted nerve and no other nerves or structures or act systemically
7. The patient is able to understand and interpret the response to the block appropriately

Nonetheless, when properly performed in the appropriate clinical setting, nerve blocks can provide valuable adjunct information that, when taken together with the patient's complete clinical picture, may help in decision making about the cause of pain.

The most commonly performed diagnostic nerve blocks include:

1. Selective nerve blocks. These may be indicated in the presence of radicular symptoms and questionable or multiple levels of abnormalities on imaging studies. Assessing selective nerve root blocks is challenging given that no loss of cutaneous sensation occurs following surgical division of a single nerve root.[1] Multiple studies attest to the high positive predictive value of selective nerve root blocks and their accuracy is superior to that of imaging and electrodiagnostic testing.[4–7] Nonetheless, accuracy of these blocks awaits authentication in controlled blinded trials.
2. Joint injections. Controlled diagnostic blocks have been used successfully to identify the sacroiliac joint and other joints as a source of pain and represent the most reliable way of diagnosing painful joint syndromes. Sacroiliac joint pain accounts for between 15% and 20% of patients presenting with axial low back pain. Even though their validity has yet to be proved, small-volume local anesthetic blocks are still the most used method for diagnosing sacroiliac joint pain.[8]
3. Medial branch blocks. Medial branches of posterior rami supply zygapophyseal (facet) joints at the same level and the level below. Hence, blocking a single facet joint requires blockade of 2 medial branches. Diagnostic medial nerve branch blocks are the gold standard to establish facet-mediated pain. Lumbar zygapophyseal pain accounts for up to 15% of patients with axial low back pain.[9]
4. Differential nerve blocks. These blocks are often performed in the setting of abdominal or pelvic pain of unknown cause. An anatomic (nerve-by-nerve block) or pharmacologic approach may be used. The pharmacologic approach is preferred and involves epidural blockade of all innervation to the target area (typically T4 level) and evaluation of the pain response as the epidural block resolves. It is most useful to differentiate organic peripheral pain that would be amenable to further interventions from central pain.[10]

False-positive responses occur with blocks even with the use of imaging. For instance, a placebo response rate of 38% (false-positives) has been shown for uncontrolled lumbar facet joint blocks and a low positive predictive value of 31%.[11] To curtail the rate of false-positive responses, repeat blocks or comparative local anesthetic blocks have been performed, resulting in refinement of diagnostic accuracy.[12,13]

Diagnostic blocks typically provide a patient with relief limited to the duration of action of the local anesthetic used, although longer-lasting responses are occasionally noted.

THERAPEUTIC NERVE BLOCKS

Therapeutic interventions allow longer-term pain relief. The many common therapeutic nerve interventions include epidural steroid injections, radiofrequency ablations, and sympathetic nerve neurolysis.

Epidural Steroid Injection

Introduction

Epidural steroid injections have been used for chronic spinal pain relief for decades. Depositing steroids in the epidural space helps reduce inflammation around nerve roots contributing to pain. Epidural steroids can be delivered by several approaches, including the interlaminar, transforaminal, and caudal approaches.[14,15]

Epidural steroid injection can be performed as a more conservative approach than surgery, when surgery is not indicated or as a palliative bridge to surgery. Epidural injections can benefit a patient when the pain is secondary to disc herniation, discogenic pain, or spinal stenosis.[15] Benefits involve predominantly short-term pain relief, although occasionally long-term pain relief occurs. A series of 3 injections can be done in a 6-month span; however, this standard relates to limiting steroid toxicity. The main concern with repeated epidural steroid injections centers on the amount of total steroid injected and the possibility of causing adrenal suppression and affecting bone reabsorption.[14–16]

Indications

Indications for epidural steroid injection include radiculopathy secondary to disc herniation, isolated spondylotic spurring of the foramina, or neurogenic claudication associated with spinal stenosis.[15]