

Interventional management for chronic pain

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Abstract. Chronic pain is a common clinical condition affecting the quality of life of the population. This article aims to review the interventional options for chronic pain based on literature researches. Multiple searches using Medline were carried out and additional searches were made using reference lists of published papers and book chapters. The article discussed procedures ranging from selective nerve root or zygapophyseal (facet) joint block with local anaesthetics to irreversible neurodestruction with radiofrequency energy or neurolytic agents and epidural injection. Other techniques include intraspinal delivery of analgesics. There is evidence that these interventional procedures are valuable both diagnostically and therapeutically. (*JKS 2009; 3:139-144*)

Key words: spinal pain, neuropathic pain, intervention

Abstrak. Nyeri kronik adalah kondisi yang sering dijumpai dan mempengaruhi kualitas hidup penderitanya. Artikel ini bertujuan untuk membahas secara umum tentang penatalaksanaan intervensi yang bersifat minimal invasive pada nyeri kronik berdasarkan review terhadap berbagai literature. Dalam makalah ini didiskusikan tentang berbagai prosedur mulai dari prosedur dasar hingga yang lanjut. Sebagian penelitian membuktikan bahwa tindakan intervensi pada nyeri kronik memberikan manfaat baik secara terapeutik maupun diagnostic. (*JKS 2009; 3: 139-144*)

Kata kunci: nyeri spinal, nyeri neuropatik, tindakan intervensi

Introduction

Pain is an unpleasant sensation triggered in the nervous system to alert or caution the human body of impending or actual ongoing damage that endures and persists beyond the term of injury.¹ It can occur in any part of the body-back, neck or head. It can be categorised into spinal or non-spinal causes, and may be somatic or neuropathic in origin. The causes of chronic non-cancer pain are so diverse that it encompasses almost all aspects of medicine including trauma, musculoskeletal, neurological, vascular and degenerative diseases. With the multitude of aetiologies, it is not surprising that chronic non-cancer pain management continues to be a challenging and evolving field.

Chronic non-cancer pain is a common clinical condition afflicting 15% (2% to 40%) of the population¹ with 13% of them experiencing some form of functional disability.² Oral analgesics are considered first-line therapy and progression to the next step using stronger analgesics when pain control is not optimised. However, when pharmacological therapy or conventional surgery fails to control pain, the role of minimally invasive interventional procedures remain an option for the treatment of chronic pain. It is considered when drug therapy provides inadequate pain relief or when patients have intolerable side effects to drug treatment. Interventional procedures target the neural structures that are presumed to mediate the experience of pain.

Patient assessment and selection

Patient assessment begins with an accurate history and a focused physical examination. Malignancy, infection and fractures are some

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of the "red flags" that must be ruled out prior to the formulation and recommendation of treatment strategy. Magnetic resonance imaging (MRI) is the single most sensitive and most specific investigation to reveal conditions such as disc herniation, soft-tissue or neurological lesion, neoplasm or infection. Other tests ranging from plain film radiography to computed tomography (CT) scan can also be considered.⁴ Together, both clinical and objective diagnostics provide a more reliable assessment of the pain problem.

Pharmacological intervention

Drugs commonly used for interventional procedures include corticosteroids, local anaesthetics (lignocaine and bupivacaine), alcohol or phenol. Steroids relieve pain by reducing inflammation, blocking transmission of nociceptive C-fibre input and inhibiting the action of phospholipase A2, both responsible for cell membrane injury and oedema.^{5,6} Due to the risk of complications associated with prolonged use, corticosteroids for interventional procedures are administered not more than 3 to 4 times a year.² Local anaesthetics are used to confirm appropriate medication delivery and to provide temporary relief until the corticosteroids reach their therapeutic levels.⁷

Non-pharmacological intervention

A non-pharmacological intervention that is frequently advocated is RF lesioning of nerves or ganglion. RF is a neurodestructive technique that uses continuous heat to produce controlled tissue destruction (thermocoagulation), thereby modulating pain transmission without causing clinical signs of nerve damage. Although pain relief is also temporary due to axon regeneration, multiple controlled trials have shown strong evidence in providing lasting relief for facet joint pain.⁸

Interventional management for spinal pain

Zygapophyseal (facet) joint injection

Facet joints have been implicated in 15% to 45% of patients with back pain and 54% to 60% of patients with neck pain.^{1,11,12} Pain is usually described as dull, stiff or achy and is exacerbated by movements that compress the joints (extension). Pain in the lumbar facet joints usually radiates to the buttocks and upper posterior thigh, while cervical facet joint pain presents with headache, shoulder or mid-back pain. However, the location of referred pain cannot be used reliably to infer the exact spinal level where the pathology is. Furthermore, facet joint pain cannot be diagnosed by clinical examination or by imaging studies consistently.

Injection of local anaesthetic into a facet joint can aid the clinician in determining the source of pain.^{2,13} Deriving at least 50% pain relief after injection is considered a true positive. Corticosteroids may also be added to reduce inflammation and they act by inhibiting synthesis or release of pro-inflammatory substances.^{2,14} The actions of local anaesthetics and corticosteroids are synergistic and additive, yielding immediate as well as long-term effects. Local anaesthetics confirm the source of pain and provide temporary relief, allowing corticosteroids to reach therapeutic level after 24 to 48 hours of the intervention. Following a single intra-articular injection, there is short term relief (less than 6 weeks) in 46% to 75% of patients while long-term relief (6 weeks or longer) is seen in 20% to 36% of the patients.⁸ Thus, this intervention is both practical and cost-efficient as it is diagnostic as well as therapeutic.

Combined intra-articular local anaesthetic and steroid injection, unfortunately, does not appear to be equally efficacious in all spinal areas and some differences in efficacy can be expected. However, studies involving both the cervical and lumbar regions demonstrate significant improvement in overall functional

status, psychological status and employment eligibility within 12 months of treatment.^{15,17}

One drawback of intra-articular facet joint injections or medial branch nerve blocks is that pain relief is not permanent. As such, denervation of the facet joint may be offered to prolong the analgesic effect and this is achieved by RF thermoablation – a neurodestructive process that involves heating and eventual destruction of nerves supplying the joint. However, it is prudent to bear in mind that the duration of pain relief is only extended and not lifelong. RF neurotomy of lumbar and cervical medial branches demonstrated strong and moderate evidence for short- and long-term relief, respectively.¹ Complications of RF neurotomy include cutaneous hyperaesthesia or dysaesthesia, neuritis, neurogenic inflammation, anaesthesia dolorosa and deafferentation pain. Excessive burning of tissue outside the target area may also cause escalation of pain.^{20,21}

Sacroiliac joint injection

The sacroiliac (SI) joint receives its innervation from lumbosacral roots and as such, is responsible for pain in 10% to 30% of patients with chronic lower back pain.¹² This diarthrodial joint can produce pain that radiates to the thigh, lower extremity, groin and occasionally, abdomen.

Improvement after intra-articular injections has been reported in 62% of patients at 3 months and 58 at 6 months.²² SI joint injection is moderately accurate in clinching the diagnosis.²³ When performed in conjunction with pain provocation tests (distraction, thigh thrust, right and left-sided Gaenslen's test, compression and sacral thrust tests), a sensitivity of 94% and specificity of 78% is reached.^{24,25} Complications are rare and include infection, sciatic nerve trauma, embolic phenomena, and other problems arising from drug administration such as epidural spread and foraminal filling.¹ Numerous studies have also shown that

percutaneous RF neurotomy of SI joints provide long-term relief.²⁷ RF lesioning produces 50% relief in 89% of patients for at least 6 to 9 months.^{26,28} Complications are infrequent and the most common is neuritis, which occurs in less than 5% of patients.²¹

Transforaminal epidural steroid injection

Transforaminal epidural or selective nerve root blocks using local anaesthetic can be used to confirm the source of radicular pain in 45% to 100% of cases, especially when imaging studies suggest multiple nerve root involvement.²⁹ When combined with steroids, such interventions are therapeutic as well with significant relief lasting for 2 months or more in 30% of patients with reports of improvement in functional ability in 75% of patients.³⁰ The majority of studies report strong evidence for short-term and moderate for long-term improvement in managing lumbar and cervical nerve root pain.⁸

Neuropathic pain

When pain results from nerve injury or dysfunction, it is known as neuropathic pain.³¹ Neurogenic causes account for 20% of pain complaints in chronic pain patients.^{12,32,33} Pain may be described as constant, burning, intense and shock-like, which can occur spontaneously or be evoked by movement and touch. Features of allodynia and hyperalgesia are frequently present. However, all these features do not confirm a diagnosis of neuropathic pain.³¹ Neuropathic pain conditions include trigeminal neuralgia, chronic post-surgical pain, peripheral nerve impingement syndromes, post-herpetic neuralgia, complex regional pain syndrome, and phantom limb pain.² Sympathetic blockade with local anaesthetic as well as RF neurotomy have been shown to provide pain relief.^{34,35}

Complication

The benefits of interventional pain strategies are attractive for any symptomatic patient but one must be wary of the potential risks and complications of any procedure. Most problems are related to needle placement and include haemorrhage, haematoma formation, dural puncture, spinal cord and nerve trauma that can lead to paralysis. Infection, intravascular injection, pneumothorax, radiation exposure, facet capsule rupture and intrathecal or epidural spread may also occur. Drug administration may also be responsible for some complications and these include chemical meningitis and steroid side effects. All these adverse effects, however, are rare and often minor.^{1,2,19}

Conclusion

Non-cancer pain can arise from pathology of the facet joints, sacroiliac joints, nerve roots of the spine as well as dysfunction of the sympathetic nervous system. The various interventional pain management procedures have been discussed. There is evidence that these interventional procedures are valuable both diagnostically and therapeutically. They are especially beneficial for patients who have contraindications for or refuse surgery or who have poorly controlled pain despite optimising pharmacotherapy. However, interventional procedures carry some risk. These can be avoided by comprehensive evaluation for patient suitability for the procedure, a thorough discussion with the patient regarding the benefits, risks and complications as well as proper surgical technique.

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