Review Article

Evidence Based Practice of Chronic Pain

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ABSTRACT

The patients with chronic pain are increasingly reporting to the physicians for its management. Chronic pain are associated with head, neck and shoulder pain, spinal pain, pain in the joints and extremities, complex regional pain syndrome and phantom pain. The chronic pain is being managed worldwide. The different specialty of medicine is producing a lot of evidence through the published literature but the same is not being published in the field of chronic pain management. Though some evidence is being reported as to different aspects of pain management from different parts of the world but same is lacking from Indian subcontinent. This is in contrast to much done clinical work in this field as well. We present here the available evidence in relation to chronic pain management.

Key words: Chronic pain, Evidence based practice, Nerve blocks, Pain management

INTRODUCTION

Chronic pain is defined as a complex and multifactorial phenomenon with pain that persists six months after an injury and/or beyond the usual course of an acute disease or a reasonable time for a comparable injury to heal, that is associated with chronic pathologic processes that cause continuous or intermittent pain for months or years, that may continue in the presence or absence of demonstrable pathology and may not be amenable to routine pain control methods with healing never occurring.[1,2] Chronic pain are associated with head, neck and shoulder pain, spinal pain, pain in the joints and extremities, complex regional pain syndrome and phantom pain. The National Uniform Claims Committee defined interventional pain management as the discipline of medicine devoted to the diagnosis and treatment of pain and related disorders by the application of interventional techniques in managing sub-acute, chronic, persistent, and intractable pain, independently or in conjunction with other modalities of treatments.[1] The interventional techniques has been defined as minimally invasive procedures, such as needle placement of drugs in targeted areas, ablation of targeted nerves, and some surgical techniques, such as discectomy and the implantation of intra-thecal infusion pumps and spinal cord stimulators.[1]

The chronic pain is being managed worldwide. The different specialty of medicine is producing a lot of evidence through the published literature but the same is not being published in the field of chronic pain management. Though some evidence is being reported as to different aspects of pain management from different parts of the world but same is lacking from Indian subcontinent. This is in contrast to much done clinical work in this field as well. We urge the Indian fidelity to publish the work related to pain management in the form of well conducted randomized clinical trials as the outcome from the western population may not be equally applicable in Indian population.

PATIENT EVALUATION

Patient with chronic pain needs through evaluation including history, physical examination and review of diagnostic studies by a pain physician.[3] The

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association of many disorders like diabetes, posttraumatic injury have been associated with chronic pain and thus mandating evaluation (Category B2 evidence).[3] Also, psychological evaluation helps in prediction of treatment success (Category B2 evidence).[3]

Multimodal and multidisciplinary interventions

The use of more than one therapy and individualized to patient need and response should be treatment protocol for patients with chronic pain. This usually required involvement of more than discipline to provide holistic approach. The evidence supports the multi disciplinary interventions representing multimodality approach as compared to conventional management in improving the pain management outcome. (Category A2 evidence).[3] However, the evidence is insufficient for evaluation of multimodal therapies vs. single modality interventions (Category D evidence).[3]

PHARMACOLOGIC MANAGEMENT

The drug therapy for chronic pain management includes non-steroidal anti-inflammatory drugs (NSAIDs), anticonvulsants, antidepressants, opioid, skeletal muscle relaxants, benzodiazepines, N-methyl-D-aspartate (NMDA) receptor antagonists, topical agents (e.g., lidocaine, capsaicin).[3] Anticonvulsants have been recommended for the effective neuropathic pain relief (Category A1 evidence).[3] Tricyclic antidepressants have been used effectively for various pain disorders (Category A1 evidence).[3] The evidence of the use of benzodiazepine is limited for chronic pain management (Category B3 evidence).[3] The evidence for use of NMDA receptor antagonists (e.g., dextromethorphan and memantine) is also limited for pain due to diabetic neuropathy, postherpetic neuralgia, or other neuropathic pain conditions (e.g., phantom limb pain, peripheral nerve injury, and CRPS) (Category C2 evidence).[3] However, it has been used for neuropathic pain (Category B2 evidence).[3] NSAIDs have been recommended for effective back pain relief (Category A2 evidence). Opioids (e.g., morphine, codeine and oxycodone) have been used for effective pain reliefin low back pain or neuropathic pain (Category A1 evidence).[3] Tramadol have a evidence Category A2 while immediate release opioids, transdermal opioids, and sublingual opioids have Category B2 evidence for back and neuropathicpain. Also, the evidence is good regarding establishing a goal for pain management when opioid are started for pain management.[4] Skeletal muscle relaxants have a low evidence for chronic pain management pain (Category D evidence). Topical agents have equivocal evidence for peripheral type of neuropathic and post herpetic pain (Category C2 evidence).[4] A strategy for monitoring and managing side effects, adverse effects, and compliance should be in place before prescribing any long-term pharmacologic therapy.

The chronic pain may broadly be presented under three broad headings for the purpose of evidence based management as: Chronic non malignant pain, chronic cancer pain, management of chronic pain for palliation.

CHRONIC SPINAL PAIN

Chronic back pain is one of the most common types of pain which is presented to pain physician with an lifetime prevalence of 54-80%.[5] With the advent of newer technologies, the management including interventional modalities has seen a tremendous change in the recent years. The prevalence of neck, thoracic and low back pain ranges between 30-50%, 5-34% and 15-45% respectively.[5] The duration of back pain and its chronicity have been topics of controversy. It is believed by some physician that pain is short lived and resolves within about 6 weeks in 90% of patients irrespective of the administration or type of treatment, with only 5-10% of patients developing persistent back pain.[6] However, this is controversial and it has also been observed that such back pain tend to relapse and may become chronic in increasingly number of patients.[5]

DIAGNOSIS

The basic modality of evaluation includes history, physical examination, imaging and nerve conduction studies. The availability of diagnostic blocks has been found to be better in specific diagnosis in almost 85% of patients as compared to only 15% of patients with other conventional diagnostic modalities.[7-9] For a diagnostic block, criterion is primarily based on pain relief after the block rather than any other conventional parameter like imaging findings, operative findings or pathological findings.[5]

Diagnosis of low back pain: The low back pain may occur because of the involvement of the lumbar intervertebral discs, facet joints, sacroiliac joint, ligaments, fascia, muscles and nerve root dura.[10,11] These structures as causative factors for pain can be confirmed by diagnostic blocks like lumbar facet joint nerve blocks or zygapophysial joint blocks, lumbar provocation discography, and sacroiliac jointblocks.[12-14]

- Facet joint nerve blocks or zygapophysial joint blocks: Due to presence of neural supply to lumber facet joints, these can cause pain if some pathology occurs.[5] There is strong evidence [Level I or II-1 based on the (USPSTF)] for the diagnostic accuracy of lumbar facet joint blocks in evaluating low back pain and thus is recommended for patients with suspected facet joint pain.[5,15]
- Lumbar provocation discography: It is an invasive diagnostic used to determine architecture of the intervertebral disc and to determine if the intervertebral disc is a source of low back pain when a discogenicetiology is suspected.[5] It has a Level II-2 evidence based on USPSTF.[5] So lumbar provocation discography is recommended for patients with low back pain when other causes than disc have been ruled out. It is recommended for the identification of the targeted disc to be treated.[5]
- Sacroiliac joint blocks: Sacroiliac joint is difficult to diagnose on non-invasive diagnostic modalities. So this block is an appropriate to confirm the involvement of joint for the presence of chronic pain. Thus there is moderate evidence (level II-2) of using the block for evaluating sacroiliac joint pain.[5,16]

Diagnosis of neck pain: The various structures responsible for the neck pain includesintervertebral discs, facet joints, atlantoaxial and atlanto-occipital joints, ligaments, fascia, muscles and nerve root dura.[17,18] The diagnostic techniques include cervical facet joint nerve blocks and cervical provocation discography.[13,19]

- Cervical facet or zygapophysial joint blocks: It involves blocking of the joint or the medial branches of the dorsal rami to confirm the source of pain. The block has strong evidence [Level I or II-1 based on the USPSTF criteria] for the diagnostic accuracy of cervical facet joint blocks.[5,15] It is recommended in patients with somatic or non-radicular neck pain or headache and upper extremity pain, with duration of pain of at least 3 months, average pain levels of greater than 6 on a scale of 0 to 10, intermittent or continuous pain causing functional disability, has failed to respond and has not resolved with more conservative management, lack of preponderance of evidence of discogenic pain, disc herniation, or evidence of radiculitis.
- Cervical provocation discography: The level of evidence is Level II-2 based on the modified USPSTF criteria.[15] It is recommended in patients with chronic pain where other causes have been ruled out.[5]

Diagnosis of thoracic pain: The facet joint and intervertebral discs are the structures responsible for the chronic thoracic pain. The diagnostic modalities includes facet or zygapophysial joint blocks and thoracic provocation discography.[5]

- Facet or zygapophysial joint blocks: Blocking the thoracic medial branch blocks that innervate the target joint gives a clue for the source of pain. The evidence for this block is Level II-1 based on USPSTF criteria.[15] It is recommended for patients with somatic or non-radicular upper back or mid back pain with a duration of at least 3 months, average pain levels of greater than 6 on a scale of 0 to 10, intermittent or continuous pain causing functional disability, failure to respond to more conservative management and in patients where discogenic pain has been ruled out.[5]
- Thoracic provocation discography: There is paucity of evidence for this diagnostic block and based on published literature, the level of evidence isLevel II-3.[5] It is recommended to decide if an intervertebral disc is painful or not when other causes have been ruled out.[5]

Interventional techniques for spinal pain management

The chronic spinal pain has been managed with interventional techniques in addition to other standard of care. The various intervention techniques include:

- Facet joint interventions: The various interventional modalities for facet joint pain includes intra-articular injections, medial branch blocks, or neurolysis of medial branches.[5] There is paucity of data for the therapeutic intra-articular injections. The evidence for lumbar intra-articular injections is Level III (limited) with 2C/very weak recommendation. There is inadequate evidence for cervical and thoracic intra-articular blocks and hence, therapeutic intra-articular facet joint injections are not recommended.[5] The reported level of evidence for facet joint medial branch blocks is Level II-1 or II-2.[15] There is strong recommendation (1B or 1C) for facet joint nerve blocks in the treatment of chronic facet joint pain.[20] The evidence for cervical medial branchradio frequency neurotomy is Level II-1 - II-2, Level II-2 - II-3 for lumbar radiofrequency neurotomy, and with no evidence available for thoracic medial branch radiofrequency neurotomy.[15] There is strong recommendation (1C) for cervical and lumbar radiofrequency neurotomy.[20]
- Epidural injections: The epidural space has been accessed through the caudal, interlaminar, and transforaminal approaches with variable responses.[5] The epidural steroid injections have been used for pain arising due to disc herniation and radiculitis, post surgery syndrome, spinal stenosis and discogenic

pain with variable results when other conservative modalities have not responded well. The evidence is Level I for managing chronic low back and lower extremity pain secondary to lumbar disc herniation and/or radiculitis and discogenic pain without disc herniation or radiculitis. The indicated evidence is Level II-1 or II-2 for caudal epidural injections in managing low back pain of post-surgery syndrome and spinal stenosis. The caudal epidural injection have been recommended for lumbar pain due to disc herniation and radiculitis or discogenic pain without disc herniation or radiculitis (the recommendation is 1A or 1B/strong) and post-lumbar laminectomy syndrome and spinal stenosis (the recommendation is 1B or 1C/strong). The evidence is Level II-2 for interlaminar injections.[15] The level of evidence for blind lumbar interlaminar epidural injections for managing chronic low back and lower extremity pain secondary to lumbar disc herniation and/or radiculitis is Level II-2 while it is Level III for pain of discogenic origin without disc herniation or radiculitis. The recommendation for cervical interlaminar epidurals is 1C/strong.[20] The recommendation for disc herniation and radiculitis for blind lumbar interlaminar epidural injections is 1C, for short-term relief. However, for long-term relief, the recommendation is 2B/weak recommendation. For spinal stenosis and discogenic pain without disc herniation and radiculitis, the recommendation is 2C/very weak. The indications for therapeutic lumbar transforaminal epidural injections include chronic low back and/or lower extremity pain resulting from herniated discs and radiculopathy, spinal stenosis, and failed back surgery syndrome. The evidence for lumbar transforaminal epidural steroid injections is Level II-1 for short-term relief and Level II-2 for long-term relief in managing chronic low back and lower extremity pain.[15] The recommendation for lumbar transforaminal epidural injections, in managing chronic low back and lower extremity pain, is 1C/strong recommendation.[20]

- Lumbar epidural adhesiolysis: The technique is required to separate adhesions and thus better spread of the drug for management of chronic pain. It is indicated in patients with chronic low back and/or lower extremity pain resulting from post surgery syndrome, epidural fibrosis, and spinal stenosis. It can be performed either via percutaneous adhesiolysis or spinal endoscopic adhesiolysis. The level of evidence in post lumbar surgery syndrome is Level I to II-1with a strong recommendation (1B or 1C) for percutaneous adhesiolysis and evidence ofII-1 or II-2 for endoscopic adhesiolysis in post lumbar laminectomy syndrome with an strong recommendation (1C).[15]
- Sacroiliac joint interventions: Intra-articular injections and neurolysis of joint is used in sacroiliac joint pain.[5] There is limited evidence, Level II-3 for radiofrequency neurotomy and no evidence for intra-articular sacroiliac joint injections for therapeutic purposes. Thus no recommendation has been reported.
- Intradiscal therapies: The discogenic pain has been managed with various interventions. The evidence for Intradiscal Electrothermal Therapy (IDET), Intradiscal Biacuplasty (IDB), radio frequency annuloplasty is Level II-2, III (limited), II-3 with 2A/weak, no, no recommendation respectively.[15,20]
- Percutaneous disc decompression: The primary goal of surgical treatment of a disc prolapse, protrusion, or extrusion is the relief of nerve root compression by removing the herniated nuclear material.[5] Several alternative techniques to open discectomy and microdiscectomy include automated percutaneous laser discectomy (APLD), percutaneous lumbar laser discectomy (PLLD), mechanical disc decompression with a high rotation per minute device or DeKompressor and nucleoplasty. The indicated level of evidence based on USPSTF criteria is Level II-2 for short- and long-term relief for APLD with 1C/strong recommendation.[15,20] The indicated level of evidence for PLLD based on USPSTF criteria is II-2 for short- and long-term relief with 1C/strong recommendation.[20] Based on USPSTF criteria, the indicated evidence for nucleoplasty is Level II-3 in managing predominantly lower extremity pain due to contained disc herniation.[15] There is no evidence available for axial low back pain. The recommendation based on Guyatt *et al.*'s criteria is 2B/weak recommendation in managing radicular pain due to contained disc herniation.[20] No recommendation is available in managing axial low back pain. The indications are the same as for APLD. Based on USPSTF criteria, the indicated evidence for Dekompressor, Mechanical High RPM Device is Level III for short- and long term relief. No recommendation is provided for Dekompressor.
- Spinal cord stimulation: Spinal cord stimulation is primarily implanted for failed back surgery syndrome (FBSS) and complex regional pain syndrome (CRPS).[5] The indications are neuropathic pain of FBSS or CRPS. The indicated evidence for spinal cord stimulation is Level II-1 or II-2 for long-term relief in managing patients with FBSS. Based on Guyatt *et al.*'s criteria, the recommendation is 1B

or 1C/strong recommendation for clinical use on a long-term basis.[20]

- Implantable intrathecal drug administration systems: Continuous infusion of intrathecal medication is used for control of chronic, refractory, malignant and non-malignant pain.[5] The indicated evidence for intrathecal infusion systems is either Level II-3 or Level III, for long-term relief of chronic non-cancer pain of longer than one-year based on USPSTF criteria with 1C/strong recommendation.[15,20]

TRIGGER POINT INJECTIONS

The evidence is limited for trigger point injections as compared with sham for management of chronic pain (Category D evidence). However, some evidence is reported for its use in myofascial pain (Category B2 evidence).[3]

Delivery of the interventions

The evidence is grossly lacking for the type, dosage and frequency of interventions for chronic pain management. By consensus, it has been assumed that average relief duration may be considered at par for the frequency of interventions. The various steroids like methylprednisolone, triamcinolone acetonide, and betamethasone acetate and phosphate mixture have been used for the blocks in pain management.[5] Again based on experience and consensus, non-particulate steroids may be the agents of choice for most blocks.

Non interventional management of spinal pain management

Apart from interventional procedures, other supportive and non-interventional procedures have also been proposed for the management of the back pain.[21,22] The role of exercise cannot be overemphasized. The literature presents evidence to recommend proprioceptive and therapeutic exercises for chronic, sub acute, and post surgery back pain. However, the evidence is lacking regarding the use of thermotherapy, therapeutic massage, electromyography biofeedback, mechanical traction, therapeutic ultrasound, Transcutaneous electrical nerve stimulation (TENS) and electrical stimulation. So, well designed randomized controlled trial is warranted regarding the utility of these techniques.

Neuropathic pain

Neuropathic pain (pathophysiologic pain) may be defined as 'pain caused by a lesion of the peripheral or central nervous system or both manifesting with sensory symptoms or signs'.[23] It is usually associated with diabetic neuropathy, lumbosacral radiculopathy, postherpetic neuralgia, HIV-related neuropathy and postsurgical neuropathy. It needs to be managed with pharmacological and non-pharmacological treatments. Though evidence for conservative non-pharmacological treatment is limited, however it needs to be initiated wherever possible. Based on evidence, step wise approach has been proposed for the management of neuropathic pain. However, it is limited by the lack of evidence for any specific drug for its superiority. So, an individualized approach including adverse effects, co-morbidities, cost, patient response and acceptance for drug selection needs to be emphasized. The recommended first line treatment includes antidepressants (tricyclic antidepressants, TCAs and selective serotonin and norepinephrine reuptake inhibitors, SSNRIs), calcium α 2-δ ligands (gabapentin and pregabalin) and topical lidocaine.[24] The second line drugs include opioids including tramodol and should be used where first line treatment is not effective or not tolerable by the patient. Certain antiepileptic (carbamazepine, lamotrigene, oxcarbazepine, topiramate, valproic acid) and antidepressant (bupropion, citalopram, paroxetine) medications, mexiletine, NMDA receptor antagonists and topical capsaicin may be considered as third line drug therapy. Also the drug choice for different type of neuropathic pain have been evaluated based on published literature for numbers needed to treat (NNT) and numbers needed to harm (NNH).[24] The lowest NNT was for TCAs followed by opioids, gabapentin and pregabalin for peripheral neuropathic pain. However, the data is limited for central neuropathic pain.

Role of ketamine for chronic pain management

Overall the evidence is moderate to weak for the use of ketamine in chronic pain management. Ketamine has been used not only for acute pain but also for chronic pain management when not being managed with conventional drugs. For chronic pain, it has been assessed and being recommended variously for different types of pain. For pain of central origin, it has level II and level IV evidence of efficacy when used parenteral or oral respectively.[25] In patients of complex regional pain syndrome, ketamine use has a level of evidence of IV while it is Level II for fibromyalgia.[25] It reduces trigger point tenderness and increases endurance. Role of ketamine in neuropathic pain is very varied with level of evidence of II-IV. Level II evidence exists for phantom limb pain and postherpetic neuralgia.[25] Ketamine is usually alternate therapy and for short term pain management.

EVIDENCE-BASED CANCER PAIN MANAGEMENT

Pain is an important concern with the cancer with an occurrence in 14 - 100% of patients.[26,27] Pain management is an integral part for the overall management of cancer patients. The evidence based pain management including screening, assessment, treatment and follow-up improves the patient outcome and satisfaction.[26,28] The screening for the presence of pain and its assessment for the intensity, etiology and functional impairment has been emphasized by National Comprehensive Cancer Network and Joint Commission.[29] Pain education has been recommended based on published evidence.[26] Though use of break through opioids in patients receiving long-acting formulations has been recommended but evidence is limited for the same.[26] Bowel regimen (constipation) using laxative for patient on chronic opioids is recommended but the evidence is limited.[26] Also, the evidence is lacking regarding the continuity of pain management in different settings using drug and dose equivalency. In patients of cancer with chronic pain needs to be followed up to improve the quality of care and acceptable pain control.[26] This may require dose adjustment, change of drug class or modality of administration, addition of another drug or any intervention like nerve block or radiotherapy. Patients with metastatic bone pain may be managed with radiation therapy (single fraction), unless contraindicated. Patients with cord compression needs to be managed with steroids and evaluated (MRI, myelography) within 24 hours of onset of symptoms.[26] This should be followed by definitive treatment (radiotherapy or surgical decompression) within 24 hours with a follow up.

Evidence based pain management practices in home hospice and palliative care

In spite of guidelines, pain management in hospice is not adequately managed and in particular undertreated. Guidelines are readily available however; methods to incorporate them into practice need further evaluation. Evidence relating to pain management is lacking with respect to documentation and follow up though initial assessment is appropriate in this clinical setting.[15,30] The literature for translating-research-into-practice pain improvement study needs to be emphasized in hospice programs as well.[31] The evidence is lacking to predict the optimal timing to initiate palliative care services. The timing should be individualized on patient's clinical presentation and in discussion with patient.[32] The use of nonsteroidal anti-inflammatory drugs, opioids, bisphosphonates and radiotherapy is supported in the literature with strong recommendation and moderate quality of evidence for management of cancer pain.[32] The evidence is lacking for the exercise or acupuncture techniques for palliative management of pain.[33,34] The utility of neurolytic celiac plexus block for pain relief in visceral cancer is well documented.[35] However, evidence for pain management is lacking in patients with advanced heart failure or dementia.[35]

PSYCHOLOGICAL TREATMENT

Psychological treatment plays in important role as a part of multidisciplinary chronic pain management. It includes cognitive behavioral therapy, biofeedback, relaxation training, supportive psychotherapy, group therapy, or counseling. Cognitive behavioral therapy, biofeedback, or relaxation training (Category A2 evidence) while supportive psychotherapy, group therapy, or counseling have category B3 evidence for chronic pain management.[3]

DOCUMENTATION

Documentation is to provide evidence or information. Documentation includes evaluation and management services, procedural services, and billing and coding. While the purpose of documentation is to provide information, it reflects the competency and character of the physician. However, with a good level of evidence, it has been reported to have comprehensive assessment and documentation before the start of opioid therapy.[3]

Evidence-based pain management practices acceptance

At times, even though the evidence of particular concern/management is available but it may not be practiced. The factors that may have impact for acceptance of evidence based pain guidelines i.e. translation of research into practice include reluctance of the care givers or primary care physician in practicing these evidence based guidelines. Some specific individual or organizational concerns may also play an additional deterrent factor. In fact, this is another area where evidence needs to be generated to determine the factors that contribute to the lack of adherence or acceptance of the evidence based practice and also the best strategy to implement the evidence based practice. It also required evaluation of the particular evidence based guideline in a particular organization or particular socio-economic strata and to develop a strategy to implement these guidelines. It needs the commitment from the individuals and the organization to emphasize the need and adherence to the evidence based practice. Also, we need to generate well-designed, high quality, controlled studies conducted in accordance with the guidelines of 'Good Clinical Practice' for the management of chronic pain management.

CONCLUSION

As a pain physician, we need to realize evidence based practice is essential not only for clinical practice, but also, is an integral component of patient's autonomy and prevents against any medico-legal suit. So, evidence based pain practice provides authentic, trustworthy, tested with robust clinical trials and their systematic analysis for transferring acquired knowledge into clinical practice. It is also urged from the pain physician fraternity to conduct more robust clinical trials and share the clinical experience for the benefit to the society in creating evidence.

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