Review

Recent advances in chronic pain management in cancer patients

Rohit Gulati, DNB[1]

[1.] Nivaan Integrated Pain Therapeutics, New Delhi, India

Email: drrohitgulati@gmail.com

How to cite the article: Gulati R. Recent advances in chronic pain management in cancer patients. OncoCritiCare2023;1:58-59.

"Pain is inevitable, suffering is optional"

Cancer pain may affect up to 66% of patients with advanced cancer and severely effecting quality of life.[1] An observational study reported that that 1 in 5 patients with cancer pain were not treated with analgesia while over 1 in 4 patients treated with analgesia reported pain greater than 5 on the Numerical Rating Scale.[2] Pain control is an integral part of cancer therapy. For a long time, management of cancer pain was solely opioid based. Long term opioid has its own side effect. Clinician has to be very careful while choosing analgesia due to possible organ dysfunction and multiple drug interaction. The role of a pain specialist is of paramount importance. A comprehensive pain management comprise with detail assessment of pain, pharmacological therapy and minimally invasive interventional pain procedure. In last few decades, pain medicine has evolved as specialized branch. Like every other medical branch, it has grown and continuously advancing since its inception in a way to understand the pathophysiology of pain, its treatment and hence improving patient wellbeing and comfort.

Advancement in understanding of pain pathophysiology

Pathophysiology of pain is complex and involves nociception/transduction, conduction, pain modulation, ascending and descending inhibitory pathways and interplay of various neurotransmitter. Recent researches have explored role of four factors in persistent pain.[2] They are:

- nerve growth factor antagonists
- microglia actions in the central nervous system
- AMP-activated protein kinase (AMPK) activators
- genetic alterations affecting

Another interesting finding was that vascular endothelial growth factor-A (VEGF-A–) triggered sensory neuronal firing, was blocked by Spike protein of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and NRP-1 inhibitor EG00229. Thus, preventing VEGF-A/NRP-1 signalling was antiallodynic.[3]

Pain assessment

A detailed, systemic assessment of pain is essential to identify the underlying etiology and formulate a treatment plan. Clinical assessment assisted by 'Electronic Patient Visit Assessment" system developed by Janet Van Cleave, is more accurate tool for pain assessment.[4] Most used pain assessment scales are unidimensional. Brief Pain Inventory, the McGill Pain Questionnaire, Edmonton Symptom Assessment Scale and the Distress Thermometer are multi-dimensional tool. They include the most common symptoms i.e. depression, pain, fatigue and may also assess psychological, practical and spiritual aspects to pain in a systematic manner.[5]

Pharmacotherapy

Pharmacotherapy is the initial and main stay of treatment in chronic cancer patient. Tricyclic antidepressants (particularly amitriptyline), serotonin-norepinephrine reuptake inhibitors (particularly duloxetine), pregabalin and gabapentin are considered first line therapeutic agents. If these are not effective, lidocaine plasters, tramadol and capsaicin high concentration patches (for peripheral neuropathic pain only) can be tried. Other therapeutics options are: strong opioids and botulinum toxin A (for peripheral neuropathic pain), occasionally infusion therapy of ketamine and lidocaine are used in complex regional pain syndrome (CRPS). Following drugs have been recently approved for difficult to treat pain patients: Qutenza (An 8% Capsaicin patch 640 mcg per cm2), Mirogabalin and Ambroxol 20% cream.[7,8]

Minimally invasive intervention for pain relief

Studies reported that at least, 20 percent of patients were not relived by pharmacological therapy alone.[9] Chemical

neurolysis using alcohol, radio frequency ablation (cold and warm), cordotomy are commonly performed procedures that may rescue those patients who do not get relief with pharmacotherapy. Several devices have been invented and marketed to reduce opioid requirement for example "Quell" an AI powered wearable device by Neurmetrix, Breath VR by Neon and The SPRINT Peripheral Nerve Stimulation (PNS) System by SPR Therapeutics. The SPRINT device is an implantable device that gives excellent pain relief in chronic pain. The device consists of a single, thread-like wire, which can be implanted on the patient through a minimally invasive procedure that doesn't require anaesthesia and stimulates peripheral nerves for 60 days.[10]

Neuromodulation is a non-addictive, drug-free clinical tool for treating chronic neuropathic pain. It works by sending controlled physical energy to pre-identified neural targets in the central nervous system, either by actively stimulating nerves to produce a natural biological response or by applying targeted pharmaceutical agents in tiny doses directly to the site of action. In neurostimulation, electrodes are applied to the brain, spinal cord, or peripheral nerves through a neurostimulation devices. Spinal Cord Stimulation works through the stimulation of the dorsal columns of the spinal cord by administering electrical impulses at frequencies of approximately 50 Hz. Scrambler therapy is a novel form of superficial neuromodulation, electro-analgesia therapy for non-invasive pain relief in chronic neuropathic and cancer pain. Another neurostimulation techniques are Deep Brain Stimulation, Peripheral nerve stimulation, Transcutaneous Electrical and Electromagnetic Stimulation, Repetitive Magnetic Stimulation etc.[11,12]

Apart from the well-established therapy, there are also some novel techniques that have explored in chronic pain management. Some of them are immersive virtual reality, Breathing Controlled Electrical Stimulation (BreEStim), Optogenetics, Photon Stimulation or Pulsed Infrared Light therapy, Vibration Stimulation and Molecular Modalities including ion channel expressions, immune reactions, and inflammatory substrate diffusion. Regenerative medicine includes the usage of biomaterials that may include natural polymers like hyaluronic acid, collagen, and chitosan. Synthetic polymers like polycaprolactone and poly-lactic-co-glycolic acid. They specifically act in bone cartilage and nerve repair.11,12

There is no single specific therapy that is effective for a particular patient. It should always be multi modal. This approach not only increase the efficacy but also decrease the side effect because of high dose of medication. It has been proved in various studies that combined four-pronged therapy combining physiotherapy, nutrition and psychotherapy all guided by pain management physician gives almost 80% of pain relief as compared to pain management without other three subspecialities. [13,14]

Conflict of interest: Nil

References

1. Bennett MI, Kaasa S, Barke A, Korwisi B, Rief W, Treede R-D. The IASP classification of chronic pain for ICD-11: chronic cancer-related pain. *Pain*. 2019; 160:38–44
2. Riboli E, Hunt KJ, Slimani N, Ferrari P, Norat T, Fahey M, et al. European Prospective Investigation into Cancer and Nutrition (EPIC): study populations and data collection. *Public Health Nutr.* 2002; 5:1113–24
3. Cohen I, Lema MJ. What's new in chronic pain pathophysiology. Can J Pain. 2020 30; 4:13-18
4. Aubin Moutal, Laurent F. Martin, et al. SARS-CoV-2 spike protein co-opts VEGF-A/neuropilin-1 receptor signaling to induce analgesia. Pain. 2021; 162: 243–252.
5. Clark CW, Yang JC, Tsui SL, Ng KF, Clark SB. Unidimensional pain rating scales: a multidimensional affect and pain survey (MAPS) analysis of what they really measure. Pain. 2002; 98:241-247.
6. Naveen Malhotra, Muralidhar Joshi, Recent trends in chronic pain medicine. Indian J Anaesth. 2023; 67: 123–29.
7. Haefeli M, Elfering A. Pain assessment. Eur Spine J. 2006;15: S17–24.
8. Nersesyan H, Slavin KV. Current approach to cancer pain management: availability and implications of different treatment options. Ther Clin Risk Manag. 2007; 3:381-400
9. Janet H Van Cleave, Mei R Fu, The development, usability, and reliability of the Electronic Patient Visit Assessment (ePVA) for head and neck cancer. Mhealth 2019 Jul 29; 5:21
10. Namrata Hange, Sujan Poudel. Managing Chronic Neuropathic Pain: Recent Advances and New Challenges. Neurology Research International Volume 2022, Article ID 8336561, 14 pages.
11. The future of pain management beyond painkillers: new lines of research to keep an eye onOctober 14, 2019, in Health, Science
12. Herta Flor, Thomas Fydrich, Efficacy of multidisciplinary pain treatment centres: a meta-analytic review, Pain 1992 ;49:221-230.