Scrambler therapy: An opioid-sparing, non-invasive modality for chronic pain in patients

To the editor,
Scrambler therapy is a non-invasive modality used to modify pain pathways by a unique mechanism in patients who are inadequately managed due to chronic pain of varying etiologies. Giuseppe Marineo described scrambler therapy in 2003 by publishing his work on 11 terminally ill cancer patients who were experiencing chronic visceral pain due to advanced malignancy. Out of 11, 9 patients stopped using their prescribed analgesics after the end of the fifth session with no adverse events in any of the patients.[3]

When transcutaneous electrical nerve stimulation (TENS) is used for pain management, a low-intensity, pulsed, non-painful electrical impulse is generated through the electrodes. This selectively targets the mechanoreceptors (A-beta fibers), thus interfering with the pain signals from nociceptors (A-delta and C fibers) to reach the brain.[3] Whereas TENS targets the A-beta fibers, in scrambler therapy, it is the surface receptor of C-fibers which is the area of interest. The principle of TENS is inhibition of pain transmission, whereas scrambler therapy produces painless information.

When scrambler therapy is used in any patient, it produces sensory deceptions due to the production of painless information due to the stimulation of tactile C-fibers, thereby remodulating the perceived pain. This painless information is at times perceived as pleasant sensations in some patients akin to massage. Many researchers describe the mechanism as the substitution of pain signals with sensations of an itch, tingling, vibration, or pressure. Few have hypothesized that the long-lasting pain relief after several sessions of scrambler therapy could be due to either resetting of calcium channel receptors at the neuromuscular junction or remodulation of the central and peripheral nervous system.[3]

Electroanalgesia is provided by a specialized device involving 5 electrodes which are placed at the area where the pain is perceived. A stimulating current up to a maximum of 5.5 mA is administered. If the patient experiences pain, burning sensation, or discomfort, the position of the electrode needs to be changed. Once the final position is identified, treatment sessions of 30 minutes per day for over 2 weeks are initiated with a gap of 2 days in between. The treatment session in scrambler therapy consists of 5 daily sessions for 2 consecutive weeks. Once the patient is pain-free for more than 24 hours after a session, the clinician can stop the treatment. Based on the pain relief conferred, additional boosters can be given after a few months if the pain relapses.

Ricci et al.[4] conducted an open-label study to validate the efficacy of MCA-5 Calmare®, the product used for providing scrambler therapy, in 73 patients (40 with cancer pain and 33 with non-cancer pain). Based on the encouraging results, the authors concluded that scrambler therapy using MCA-5 Calmare® can be offered as part of a multimodality approach to the treatment of chronic pain.

In a pilot, randomized study by Marineo et al.[5] involving 52 patients, they compared scrambler therapy with conventional, guideline-based drug management of chronic pain. On reassessment of pain scores after a month, the authors found a statistically significant reduction in pain scores in patients who were offered scrambler therapy when compared to regular medications.

In a prospective, observational study involving 20 patients, Kashyap et al.[6] offered 12 sessions of scrambler therapy in patients with bony, neuropathic, or mixed pain (10 sessions on consecutive days and one session on two follow-ups after 1 week for 40 minutes). The authors concluded that all patients had pain relief starting from the first session at every follow-up. A prospective, observational study by Ricci et al.[7] had 219 patients with chronic pain of variable intensity enrolled (83 cancer patients and 136 non-cancer patients) and studied over 6 years. The authors offered 2 consecutive weeks of treatment with 5 sessions of 30 minutes each and a follow-up after 2 weeks. All patients reported significant pain relief starting from the first week until the follow-up with no adverse events.

In a study by Min et al.[8] the authors investigated the discrepancies in pain relief in chronic pain of different phenotypes in 31 patients. The authors concluded that the response to scrambler therapy differs based on the neuropathic pain phenotypes, with more favorable outcomes in patients with paroxysmal pain rather than persistent pain.

After reviewing the safety, efficacy, and feasibility of scrambler therapy, the US-FDA approved its use as a noninvasive electroanalgesic device, albeit different from TENS in terms of its mechanism of action. MCA-5 Calmare® has been approved by the US FDA for scrambler therapy. In 2020, MCA-5 was replaced by the new ST-5A model, which is
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now produced in Italy (https://www.scramblertherapy.info/ST_Medical_Device-EN.htm, Figure 1).

To conclude, considering the safety and efficacy of scrambler therapy, it can be offered to patients who are either not adequately relieved with conventional pain medications or those who have side effects due to ongoing medications.

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Conflicts of interest
There are no conflicts of interest.

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