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Case Report

Management of Chronic Pain in a Patient with Major Depressive Disorder

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Abstract

We reported the case of a 43-year-old woman with history of depression who presented with recurrence of chronic lower limb pain when she developed a major depressive disorder. A concerted multimodal pharmacological and multidisciplinary treatment program failed to improve her pain, psychosocial functioning and depression. Her cognitive impairment hindered her ability to institute many helpful self-management techniques for her pain. It was not until she underwent a course of ECT treatments that her depression improved and with this her persistent pain and psychosocial function also improved in tandem. Throughout the course of her treatment, she continued to receive multidisciplinary support focussing on cognitive behavioural, acceptance and commitment and physical therapies which helped her to regain her confidence and self-management skills. This case also highlights the importance of a dedicated multidisciplinary team approach in the management of patients with chronic pain and major depression.

Keywords: Chronic pain; Major depression; ECT; Multidisciplinary approach; Self-management

Case Report

Mrs C is a 43-year-old woman who presented to the Multidisciplinary Pain Clinic with a 6-month history of rapidly escalating severe bilateral burning pain in the shins and soles of her feet. Her pain presentation coincided with syndromic depression symptoms which occurred within a month of her abandoning an arduous invitro fertilisation process after a number of unsuccessful cycles. Her pain was aggravated by cold and activities such as standing, walking and wearing shoes with no relieving factors. This resulted in profound difficulties in attending to household chores, vocational demands, parental duties and getting out of the house. She became house-bound and dependent on her husband.

Prior to the presentation, she had sought opinions from multiple medical specialists including neurologists, neurosurgeon, psychiatrist, rehabilitation specialist and pain medicine specialists. She had undergone extensive investigations with MRI scans of the brain and spine, nerve conduction studies, vascular studies and metabolic blood screens which did not elucidate the aetiology of her pain. She was treated as for chronic neuropathic pain of unknown cause and concurrent depression. On presentation, her

medications include venlafaxine 337.5 mg daily, gabapentin 300 mg mane, tapentadol extended release 50 mg BD, paracetamol 1 g TDS, amitriptyline 25 mg nocte, olanzapine 7.5 mg nocte and meloxicam 7.5 mg daily PRN. In addition, she had three recent brief admissions to two private psychiatric hospitals for major depressive disorder and had one episode of electroconvulsive therapy (ECT) on 2 occasions after which she discharged herself and on the third occasion, she left before the treatment due to her complaint of transient short-term memory impairment with the ECT. She also underwent physiotherapy involving range of motion exercises and desensitisation techniques which she ceased after developing aversion to it. She also had a bilateral L5 perineural nerve block without any effect.

Mrs C had experienced a similar pain presentation affecting the same locations amidst her mother's passing 4 years previously. At that time, similar extensive investigations were conducted, and she was diagnosed with Major Depressive Disorder and Chronic Primary Pain. Her condition significantly improved within 6 months with venlafaxine 150 mg daily and land-based exercises and hydrotherapy supervised by a private pain specialist and psychiatrist.

In addition, Mrs C also had a history of major depression 8 years previously, family history of a major mood disorder (in first degree relative) and likely personality vulnerabilities (in the context of relational difficulties in early life).

On examination, Mrs C appeared anxious and adopted a stooped posture with poor eye contact. Her thought and speech showed perseveration around pain and fear of disability though there were no psychotic symptoms. She presented sitting in a wheelchair but was able to mobilise for a short distance without assistance. Examination of the lower limbs showed protective responses suggestive of hypersensitivity with fear of aggravating pain but otherwise did not demonstrate any localising signs.

Following the multidisciplinary assessment with the pain physician, clinical psychologist and physiotherapist, it was proposed to concurrently managed Mrs C's chronic pain and mental health condition using multi-modal therapies such as psychoeducation with her and her husband, active pain management strategies such as value-based goal setting, relaxation techniques, desensitisation techniques, graded activities and exercise therapy. In addition, the tapentadol was gradually weaned off with no change in pain severity but improvement in concentration and short-term memory. A diagnostic lignocaine infusion was administered which did not provide any relief.

Despite the multidisciplinary management, the patient's pain and mental health continued to decline. There was difficulty with compliance especially with graded exposure due to her severe depression even though she has a good understanding of the concept. As she explained, she knew what to do but just could not do it. After careful consideration and collaboration with her private psychiatrist, it was proposed that Mrs C's pain was a manifestation of her underlying major depressive disorder. It was decided to trial a ketamine infusion first and if unsuccessful, to proceed with ECT with the primary outcome of improvement in mood and reduction of pain. Unfortunately, after 5 days of ketamine infusion with gradual titration to 20 mg/hr, Mrs C showed no sign of improvement in pain or mood. Her private psychiatrist, who had previously commenced ECT as described above, recommended assessment by the community mental health team, due to concerns for her personal safety. Mrs C was subsequently admitted to a public mental health unit as an involuntary patient and received 12 sessions of right unilateral ECT. The pain clinical psychologist and physiotherapist continued to provide clinical input by telehealth during the patient's one-month admission. The ECT resulted in significant improvement of mood and pain after the 6th session which was maintained with the following sessions.

Following discharge, Mrs C continued treatment with her private psychiatrist along with telehealth and face-to-face multimodal pain management with the clinical psychologist and physiotherapist in close liaison with her GP. Pain treatments involved Cognitive Behavioural as well as Acceptance and Commitment Therapy, wind down techniques, patient and family counselling along with graded exposure and exercise therapy with the aim of establishing a routine home exercise program consistent with her subjective tolerance. In addition, there was focus on identifying signs of relapse of depression, acknowledging and encouraging valued goals, and improving participation in social roles. Education sessions for the patient and husband included the topics of graded return to parental role, intimate relationship, improving assertive communication, pacing, preparation for return to work and encouraging seeking help through resources available including patient support groups.

Mrs C continued to be followed up by her psychiatrist and the multidisciplinary pain team and at 12-, 24- and 36-months post ECT, she continues to remain stable with depression and pain under control and achieving her psychosocial goals of remaining productive at work and in family and functional activities.

Discussion

This patient presented with clinical features of intractable bilateral lower limb pain in the context of and following the development of major depression. There was no evidence of this pain being nociceptive (related to actual or threatened tissue injury) or neuropathic (related to disease of the somatosensory nervous system) in nature from her investigations. In this clinical context of uninjured tissue without evidence of neuropathy, it is likely that the pain presentation is related to altered nociceptive function and

processing in the nervous system and now classified as nociplastic pain. The presence of hypersensitivity leads to the clinical inference that sensitization may be the underlying mechanism [1].

A substantial body of literature has recognised that depression is commonly associated with chronic pain. The most prevalent view has been that the physical and psychological distress of persistent pain interacts with both individual and social vulnerability to precipitate depression rather than the reverse [2,3]. There have been recommendations of treating both components of pain and depression to enhance treatment effects beyond the benefits of treating either condition alone [4]. This case highlights the alternate view that depression can be a precursor to and contribute to severe pain and somatic preoccupation [2]. Studies have suggested this to be quite common, with a mean prevalence of 65% [2,5]. One mechanism could be that depression may reduce pain thresholds and tolerance due to lowered levels of the pain modulating neurotransmitters serotonin and noradrenaline [5]. This is consistent with the formulation of this being nociplastic pain [5,6].

Despite optimisation of her SNRI antidepressant medication, her response had been poor, and this is consistent with reports suggesting that the presence of severe pain is associated with poor response to antidepressant treatment [2,6,7]. This patient has underlying vulnerabilities to development of depression from an intense grieving process: one related to loss of her mother [8,9] and the other from the traumatic experience of multiple unsuccessful fertility treatments [10,11]. There was also a strong family history of depression. The risk of recurrent depression after the first major depressive episode is 60% and rising to 70% after two major episodes and 90% after three or more episodes [12]. Her previous depressive episode was also associated with similar pain presentation. Early psychiatrists had postulated that this development of pain had evolved from a psychic organisation and used as a psychic regulator. It can also be viewed as a replacement for a significant loss. They come to view chronic pain as an expression of a depressive disease and the pain syndrome as a pain-prone disorder [13,14]. However, this view is not universally accepted [15].

Growing evidence indicates a significant overlap in the neurobiological pathways underlying the development of both depression and chronic pain [16-19]. The co-occurrence of chronic pain and depression is associated with alterations in glutamate regulation, inflammatory responses, and increased levels of certain cytokines in specific brain regions. Dysfunctions in neurotransmitters like serotonin and dopamine, as well as inflammatory cytokines, play a role in modulating nociceptive and mood regulation [16,20-23]. Structural changes in the brain, such as those observed in the prefrontal cortex and the limbic system, are associated with cognitive deficits, behavioural changes, and negative affect in both conditions [18,24-27]. Furthermore, studies have shown that individuals with depression exhibit reduced Diffuse Noxious Inhibitory Controls (DNIC) function compared to healthy controls leading to increased nociceptive sensitivity and perception [28-30].

The patient demonstrated an elevated level of pain catastrophisation and fear avoidant behaviours which are maladaptive cognitive coping styles leading to prolongation of pain and impeding functional recovery. Furthermore, passive strategies used to relieve pain including reliance on analgesia further entrenches a passive coping style [31-33]. Our clinical psychologist and physiotherapist had placed emphasis on learning and utilising active strategies of pain management and provision of support to her husband. The patient found this difficult to implement when her depression was severe but once this was treated successfully, it led to successful management of pain and improvement in her physical and psychosocial function. Studies have shown the synergistic effect of psychological interventions, psychoeducation and use of physical modalities to equip patients with active pain management strategies and for the family to cope with stress from the patient's pain and suffering [34-36]. This case study also highlights the importance of a dedicated psychiatrist in a multidisciplinary pain service who can assist with early identification and appropriate treatment of underlying mental health disorders [6,37].

Her history of insomnia which is worsened by the development of major depressive disorder can be another perpetuating factor for her persisting pain [38]. Patients with insomnia are likely to have higher degrees of depression and pain related impairment and hence it is important to manage this comorbidity [39,40]. The management plan should emphasise non-pharmacological strategies such as improving sleep hygiene and Cognitive Behavioural Therapy (CBT) [41,42].

Rationalisation of analgesia including cessation of the opioid was an achievement in this case that resulted in improvement of mood and cognition. This highlights the importance of careful consideration of opioids in chronic non- cancer pain patients. If opioids are trialled, it is imperative to closely monitor the benefits and risks and cease the trial if the use is not proven to be beneficial or the risk of use outweighs the benefits [43].

Ketamine, a dissociative anaesthetic with analgesic properties, shows promise as a novel approach for treating comorbid pain and depression [44]. It has demonstrated effectiveness in controlled dosages for chronic pain [45,46,47]. The existence of neurophysiological overlaps suggests common activating factors in the central nervous system when pain and depression are linked. If ketamine targets these shared areas, it could be a new frontier in treating patients with comorbid intractable depression and pain [45,47]. Ketamine exhibits rapid therapeutic action,

with intranasal administration providing immediate relief and intravenous infusions showing longer-lasting effects in treatment-resistant depression. However, studies often lack formal delivery, monitoring, and data collection protocols [45]. Unfortunately, the trial of ketamine infusion in this patient did not produce improvement in pain or mood.

ECT is a well-tolerated and safe biological treatment with minimal severe complications in treatment of intractable Major Depressive Disorder (MDD) [48]. This therapeutic approach involves delivering a pulsed electrical current to the brain, inducing a controlled seizure for therapeutic purposes. It has documented effectiveness, showing success rates ranging from 70% to 90% in treating severe depression [48,49]. Despite its initial success, relapse rates following ECT can be significant, exceeding 50% within six months, even with maintenance pharmacotherapy [50-52]. Nonetheless, evidence-based pharmacological management, and in certain cases, continued or maintenance ECT can effectively reduce the risk of relapse [53].

ECT is likely to benefit patients whose pain is clearly secondary to psychiatric conditions such as psychotic or melancholic depression [54]. The potential neurobiological mechanisms of action include modulation of endogenous opiate systems by increase in its biosynthesis, release and receptor numbers as well as reducing the frontal-subcortical connectivity to reduce the patient's emotional reaction to the pain [54]. The potent reduction of blood flow and slowing of EEG frequencies in the frontal lobes have been correlated with the antidepressant effects of ECT [54]. Although ECT led to a significant breakthrough in managing the patient's mental state and subsequently reducing pain, she remains at high risk of recurrent MDD and pain.

The socio-psycho-biomedical approach, within the context of a multidisciplinary team collaboration, has yielded favourable outcomes for this patient and her family regarding the management of her chronic pain and depression. A comprehensive multifaceted treatment plan, facilitated through an evidenced-based multidisciplinary and interdisciplinary collaboration played a crucial role in helping the patient to improve her pain self-management skills, address maladaptive pain-related coping strategies, mend her relationships, develop a graded return to work plan and ultimately improve her quality of life [6,35,55-58]. Taking patients seriously has also been said to be therapeutic in its own right [6].

Conclusion

This case highlights the importance of interdisciplinary collaboration and communication within the multidisciplinary team using the biopsychosocial framework which promoted consensus, consistency, a uniform approach and a robust therapeutic relationship with the patient and family [59,60,61]. It showed that when pain is predominantly a manifestation of a major depressive disorder, treating the pain on its own and even instituting active self-management strategies may not be successful. It requires an effective treatment of depression which in this case was ECT which then led to some relief of pain and allowed the patient to institute effective self-management strategies to manage her pain while providing continuing support to the patient and her family.

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