Case Report

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Systemic desensitisation with intravenous lidocaine and ketamine in treatment of refractory fibromyalgia: A case report

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Abstract

Fibromyalgia is a chronic pain disorder characterized by widespread musculoskeletal pain, fatigue, and sleep disturbances. Its pathophysiology is complex, with central sensitization playing a key role where there is dysregulation of pain processing. While standard treatments include pharmacologic and nonpharmacologic interventions, a subset of patients remain refractory to conventional management. Systemic desensitization which modulates central pain pathways may reduce neuronal hyperexcitability and improve pain and function.

This case report describes a 43-year-old female with a history of fibromyalgia unresponsive to conventional therapy, was successfully managed with systemic desensitization using intravenous lidocaine and ketamine. The protocol was repeated every day over a period of one week. The combination appears to target central sensitization mechanisms synergistically, representing a promising therapy in complex pain syndromes.

Keywords: Chronic Pain; Fibromyalgia; Ketamine; Lidocaine; Systemic Desensitization

INTRODUCTION

Fibromyalgia is a complex and often misunderstood chronic pain disorder that affects approximately 2–4% of the general population, predominantly women.[1] This disorder presents with widespread musculoskeletal pain, persistent fatigue, disturbed sleep and cognitive difficulties. Current evidence suggests that fibromyalgia is driven by central sensitization, which is a heightened central nervous system response to sensory input.[2]

Current management primarily focuses on symptom relief and improvement in daily functioning. Conventional therapy typically integrates pharmacologic agents such as pregabalin, duloxetine, and tricyclic antidepressants, alongside nonpharmacologic interventions, including exercise and cognitive behavioural therapy, which together constitute the mainstay of care.[3] However, a substantial subset of patients continues to experience persistent pain and disability despite these approaches. Both lidocaine, a sodium channel blocker, and ketamine, an N-methyl D-aspartate (NMDA) receptor antagonist, have both shown efficacy in reducing central sensitization and alleviating chronic pain.[4,5]

This case highlights systemic desensitization with intravenous lidocaine and ketamine in the management of refractory fibromyalgia. Their concurrent use temporarily disrupts the abnormal pain pathways,

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allowing the nervous system to reset toward a normal sensory threshold.

CASE REPORT

A 43-year-old woman presented to our pain clinic with a 20-years history of generalized musculoskeletal pain. Her symptoms began gradually with the recurrent headaches following menarche at age 13, subsequently progressing to a constant, diffuse, aching pain involving both axial and peripheral regions. In addition to pain, she had severe fatigue, non-restorative sleep, cognitive "fog" and mood disturbances, features typical of fibromyalgia. The patient also described marked functional impairment and emotional distress along with a range of somatosensory symptoms like dry throat, gastritis, menstrual disturbances, cramps, hair loss, headache, dizziness, insomnia, urinary problems, shortness of breath, palpitation and anxiety.

She met the 2016 revised American College of Rheumatology diagnostic criteria for fibromyalgia, with widespread pain index (WPI) of 11 and a symptom severity score (SSS) of 9 (table 1). Over a decade, she had been treated with duloxetine, pregabalin, physiotherapy, and relaxation therapy, all of which provided only minimal short-lived relief. Despite being on duloxetine (60 mg/day), pregabalin (150 mg/day), her pain significantly affected her daily activities and quality of life. Her medical history was notable for hypothyroidism, for which she is on levothyroxine 100mcg daily. She had also undergone several surgical procedures, including lower segment caesarean section, laparoscopic cholecystectomy, appendectomy, urethral surgery, endometrial ablation. On physical examination, she exhibited tenderness at multiple fibromyalgia tender points, with no focal neurological deficits. Laboratory investigations revealed mildly elevated erythrocyte sedimentation rate ESR (25mm/hr) and C-reactive protein CRP (17.5 mg/l) while Vitamin D (36.3 ng/l) Vitamin B12 (392pg/ml), thyroid stimulating hormone (TSH) (2.21 µIU/mL), and bone mineral density (BMD) were within normal limits. In view of her poor response to standard pharmacological and non-pharmacological treatments, and no change in WPI and SSS, the patient was considered for systemic desensitization therapy with intravenous lidocaine and ketamine.

The patient underwent the procedure in a day-care setting and was kept nil per oral 4 hours prior the procedure. The systemic desensitization was done using intravenous lidocaine and ketamine in a monitored clinical setting. Lidocaine (Xylocard) was given at an initial dose of 3.5 mg/kg diluted in 100 mL normal saline and infused over 60–90 minutes, with the dose escalated to 5 mg/kg in subsequent sessions. Low-dose Ketamine (0.1–0.2 mg/kg was added in same infusion mixture (table 2). The patient received daily infusions for seven days. Continuous monitoring of electrocardiography, blood pressure, oxygen saturation (SpO2), and neurological status was maintained throughout each session. During the infusions, she experienced mild light headedness and transient sedation, both of which resolved spontaneously without intervention. No hemodynamic instability, hallucinations, or psychomimetic adverse effects were observed. The patient was monitored for 2 hours following the infusion and discharged on the same day. After the first infusion, the patient described her pain as "less sharp" and "more manageable," with a reduction of VNRS from 8/10 to 6/10. With each subsequent session, she noted gradual improvement in pain, sleep quality and energy levels. By the sixth infusion, her VNRS had decreased to 3/10 accompanied by better sleep quality and the ability to resume household tasks and social activities (Table 2).

At a three- and sixth-month follow-up call, the patient maintained most of the therapeutic benefits, reporting a VNRS of 4/10 and an overall improvement in quality of life while continuing duloxetine 30mg/day, exercise and relaxation therapy. No delayed or late onset adverse effects were observed.

DISCUSSION

Fibromyalgia is a chronic pain disorder driven by central sensitization, where normal sensory input is abnormally amplified through altered spinal and cortical processing. In this case, the patient exhibited marked clinical improvement following systemic desensitization with combined intravenous ketamine and lidocaine, supporting the therapeutic potential of this approach in refractory cases. Although standard definition of treatment-refractory fibromyalgia is lacking, the term has been used to describe patients who continue to experience clinically significant symptoms despite adequate trials of multiple guidelines recommended pharmacological and non-pharmacological therapies, after exclusion of alternative diagnoses.[5]

The combination of intravenous lidocaine and ketamine provides a synergistic, dual-level desensitization of the nervous system in fibromyalgia. Lidocaine stabilizes hyperexcitable peripheral and spinal neurons, reducing spontaneous ectopic discharges and dampening aberrant nociceptive input. Concurrently, Ketamine acts

Table 1: Widespread Pain Index (WPI) and Symptom Severity (SS) Score of the case.

Widespread Pain Index (WPI)

Region	Left	Right
Jaw	☐	☐
Shoulder girdle	■	■
Upper arm	■	■
Lower arm	☐	☐
Hip (buttock, trochanter)	■	■
Upper leg (thigh)	☐	☐
Lower leg (calf)	■	■
Axial regions		
Neck	■	
Upper back	■	
Lower back	■	
Chest	☐	
Abdomen	☐	

Total WPI score (0-19) =11

A. Symptom Severity (SS) Scale

0 = none, 1 = slight, 2 = moderate, 3 = severe

Symptom	0	1	2	3
Fatigue	☐	☐	☐	■
Waking unrefreshed	☐	☐	■	☐
Cognitive symptoms ("fibro fog")	☐	☐	■	☐

Subtotal A (0-9) =7

b. Somatic symptoms in general0 = few, 1 = moderate number, 2 = many, 3 = very many

Somatic symptoms	Score (0–3)
Gastrointestinal, urinary, headaches, insomnia, muscle pain, weakness, shortness of breath, rash, hair loss, numbness, loss of appetite, heart burn, cramps, constipation, irritable bowel syndrome, dizziness, frequent urination, painful urination, depression etc.	

Subtotal B (0-3) = 2

Total A+B= 9

Blue box: presence of symptoms

Table 2: Response of case with systemic desensitisation therapy

Days	Treatment		Vital signs			Pain score	Remarks
	Xylocard (preservative free lignocaine: 21mg/ml)	Ketamine (10mg/ml)	Blood pressure (millimetre of mercury)	Pulse rate (Beats per minute)	SpO2 %	VNRS 0-10	(weight=85kgs)
1.	3.5mg/kg/hr(14ml)		117/72	94	97	8 to 6	Mild dizziness post infusion
2.	3.75mg/kg/hr(15ml)	10mg (1ml)	120/76	98	96	6 to 5	Improvement in fatigue/lethargy and sleep but persistent Low back pain
3.	4mg/kg/hr((16ml)	10mg (1ml)	116/70	88	98	5	No improvement in Low back pain
4.	4.25mg/kg/hr(17ml)	15mg (1.5ml)	124/90	90	97	5	Much improvement in fatigue/sleep
5.	4.5mg/kg/hr(18ml)	15mg (1.5ml)	129/66	74	97	4	Decreased Back pain
6.	4.75mg/kg/hr(19ml)	15mg (1.5ml)	116/70	78	98	4	Improvement of fatigue/sleep, back pain
7.	5mg/kg/hr(20ml)	20mg (2ml)	122/72	72	97	3	Improvement of fatigue, lethargy, sleep and back pain.

centrally by modulating glutamate-mediated excitatory transmission through NMDA receptor antagonism, thereby interrupting central amplification and disrupting the "wind-up" phenomenon characteristic of chronic pain.[6]

Several studies have reported that both lidocaine and ketamine reduce central sensitization and are effective in managing chronic pain disorders such as, fibromyalgia, complex regional pain syndrome, and neuropathic pain.[7,8]

Clinically, the synergistic effect of lidocaine and ketamine permits the use of lower doses of each agent, improving tolerability while producing more sustained analgesia than either drug alone. By targeting both peripheral and central mechanisms of pain, the combination provides an effective strategy for reducing pain severity, improving function, and maintaining a desensitized state in treatment- resistant fibromyalgia.[9,10]

This "resetting" effect is not permanent due to the inherent plasticity of the nervous system. Factors such as psychological stress, inadequate sleep, or renewed peripheral nociceptive input can gradually re-establish central sensitization over weeks to months. Therefore, periodic maintenance infusions, continued use of central-acting agents like duloxetine or pregabalin, and integration of lifestyle modifications and rehabilitative strategies are essential to sustain symptom relief and prevent relapse.[9-11]

Although the precise mechanism of the prolonged benefit remains unclear, it is hypothesized that these agents may help restore normal pain processing and modulate cortical pain network activity. Further research, including well designed randomized controlled trials, is warranted to validate this therapeutic approach, establish optimal dosing protocols, and evaluate its long-term safety profile.[12,13]

Overall, systemic desensitization using intravenous ketamine and lidocaine represents a promising therapeutic strategy for refractory fibromyalgia, especially when integrated with pharmacologic and non-pharmacologic interventions to sustain the desensitized state.

CONCLUSION

This case highlights the potential benefit of systemic desensitization using intravenous lidocaine and ketamine in patients with refractory fibromyalgia. The therapy was well-tolerated and provided sustained pain relief and functional improvement when combined with ongoing maintenance therapy and multidisciplinary care. Although limited to a single patient, these findings support the need for further controlled studies to establish this approach as part of a comprehensive, multimodal pain management strategies.

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