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Encouraging Results of Pulsed Electromagnetic Field Treatment for Back Pain Secondary to Prolapsed Disc in Lactating Patients: A Case Series

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Abstract

Five lactating female patients aged 24 to 39 with infants under 6 months of age reported with lower back pain (LBP) of numerical rating score (NRS) > 7 of more than 4 weeks duration. They were subjected to 30 minutes of 15 sessions of pulsed electromagnetic field (PEMF) treatment over 3 weeks with full-body PEMF gel mattress QRS 101 system.

A remarkable reduction in pain intensity (NRS 9-7 to 0-3) and substantial pain relief (70-100%) was observed. There was more than 50% reduction in Pain Quality Assessment Scale, Modified Oswestry Disability Index, and Beck's Depression Inventory. No adverse effects were reported.

The present case series underscores the potential of PEMF as a non-invasive, safe, and effective intervention for subacute or chronic back pain in lactating patients with back pain offering significant relief without jeopardising maternal and infant well-being.

This should be further explored.

Keywords: *Lumbar disc herniation; PIVD; lactating mothers; subacute pain; chronic pain; pulsed electromagnetic field; PEMF; pain management.*

Introduction

Low back pain (LBP) secondary to prolapsed intervertebral disc (PIVD) is a prevalent musculoskeletal disorder that can lead to excruciating pain and functional impairment, affecting individuals across various age groups.[1] In lactating patients, oral pain medications, epidural steroids, and surgical interventions are not favoured in view of potential adverse effects on maternal and infant health. In the absence of established and safe interventions, the challenge presents a clinical dilemma.[2]

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To address this therapeutic void, there arises a compelling need to investigate alternative interventions that prioritize safety and efficacy in lactating patients with LBP.[2]

Pulsed electromagnetic field (PEMF) treatment involves the generation of electromagnetic pulses that creates a pulsating energy field when applied to the body and produces anti-inflammatory and bone-healing effects by decreasing the production of free radicals and stimulating osteoblasts by creating minute electromagnetic currents in the applied body area increasing calcium inflow yielding dense bones. It is previously shown effective in various musculoskeletal conditions and LBP. [3]

The present case series of 5 patients explores the viability of PEMF as a safe and efficacious treatment option for subacute or chronic LBP in lactating patients with PIVD.

Case Description

Five lactating female patients aged 24 to 37, with infants under 6 months of age presented with LBP secondary to PIVD of pain numerical rating scale (PNRS) > 7, Pain Quality Assessment Scale (PQAS) > 160; Modified Oswestry Disability Index (ODI) > 50 and Beck's Depression Inventory (BDI) > 30. All patients were subjected to 15 sessions of full body PEMF over 3 weeks, with full-body Quantron resonance system (QRS) 101 gel mattress.

Assessment at the end of treatment revealed reduction in PNRS to 0-3 with pain relief of 70-100%, PQAS of <144, ODI of < 40 and BDI of < 10.

Patient 1: A 29-year-old lactating female, 4 months postpartum, presented with BP of PNRS 9 secondary to diffuse disc bulges at L3-4 and L5-S1vertebral levels. After undergoing PEMF treatment PNRS reduced to 2 with 90% relief. PQAS, BDI and ODI also improved. [Table 1]

Patient 2: A 24-year-old lactating mother, 2 months postpartum, suffered from debilitating BP of PNRS 10 with bilateral radiculopathy (left > right). MRI revealed diffuse postero-central discprotrusion at L3-L4 indenting thecal sac narrowing bilateral lateral recess with impingement on bilateral descending nerves causing moderate neural compression on bilateral existing nerve roots. After completion of 15 PEMF sessions, PNRS reduced to 1 with 100% pain relief with improvement in PQAS, BDI and ODI. [Table 1]

Table 1: Quantitative parameters of PIVD Back Pain at different time intervals

	Pre PEMF (Baseline)	Post PEMF (at 30 sessions)	Follow up (1 month)	Follow up (3 months)	Follow up (12 months)
Lower Back Pain- Pain NRS(L1-S1)	7-10	0-3	0-3	0-3	0-4
Radicular pain- Pain NRS	7-10	0-2	0-2	0-2	0-3
PQAS	150-168	130-144	110-136	106-121	96-110
Modified ODI	50-54	34-40	21-33	18-22	22-28
BDI	20-30	8-15	8-10	8-10	8-14
Oral medications:					
NSAIDS(Acetaminophen) Opioid (Tramadol) SMR(Baclofen) TCA(Amitriptylline) AED (Pregabalin/Gabapentin) equivalent dose (mg/day)	Acetaminophen 1gm, Tramadol NA, Baclofen NA, Amitriptylline NA, Pregabalin/ Gabapentin NA	Acetaminophen 500 mg, Tramadol NA, Baclofen NA, Amitriptylline NA,Pregabalin/ Gabapentin NA	Acetaminophen 325 mg, Tramadol NR, Baclofen NR, Amitriptylline NR, Pregabalin/ Gabapentin= NR	Acetaminophen sos, Tramadol NR, Baclofen NR, Amitriptylline NR, Pregabalin/ Gabapentin NR	Acetaminophen sos, Tramadol sos, Baclofen NR Amitriptylline NR, Pregabalin/ Gabapentin NR

NRS- Numerical Rating scale (range 0-10); PQAS- Pain Quality Assessment Scale (range 20-200); ODI – Oswestry Disability Index (range 6-60); BDI- Beck's Depression Inventory (range 0-63) NSAIDS- Nonsteroidal anti-inflammatory drugs; SMR- Skeletal Muscle Relaxants; TCA- Tricyclic Antidepressants; AED- Antiepileptic drugs; PEMF – Pulsed Electromagnetic Field; NR- Not required; NA-Not advised.

Patient 3: A 37-year-old lactating patient, 6 months postpartum, presented with debilitating BP of PNRS 8 with lumbar disc prolapses at L1-L2. After undergoing 15 PEMF sessions, her pain intensity reduced to NRS 3, with 70% pain relief with improvement of PQAS, BDI and ODI. [Table 1]

Patient 4: A 33-year-old lactating mother, 2 months postpartum, came with chief complaints of severe lower back pain (NRS 9) after history of administration of epidural regional anaesthesia during her vaginal delivery. This was accompanied radicular pain in both lower limbs and cervical pain for last one month. MRI findings revealed early multiple dessications at L1-2-3 lumbar vertebra and C1-2 cervical vertebrae. She was not on any pain medications due to the uncertain safety profile of these medications. Physical therapy and local heat packs were tried with no relief. She was initiated on PEMF treatment, after the completion of 15 PEMF sessions of 30 minutes each, her pain intensity diminished to NRS 2, and she reported 85% pain relief in lumbar, and radicular pain. She also reported 60% improvement in cervical pain. Her PQAS score indicated improved pain quality, and her ODI score highlighted enhanced functional ability. [Table 1]

Patient 5: A 28-year-old lactating female, 4 months postpartum, presented with history of low back pain (NRS 8) attributed to PIVD. She complained of sudden onset, stretching type pain in the lower left back with electric current like sensation radiating to the left leg in the past 20 days. She was diagnosed as a case of Hemibody Pain Syndrome. MRI findings revealed reduced disc space, facet arthropathy and diffuse disc bulge at L5-S1 with L4-L5-S1 ligaments hypertrophy. After receiving 15 PEMF sessions, her pain intensity decreased to NRS 3, and she reported 70% pain relief. PQAS, ODI and BDI showed improvement. [Table 1]

None of the patients revealed any adverse effects.

Follow up at 1, 3 and 12 months revealed > 50% improvement in all parameters in all patients. [Table 1].

Ethical clearance is taken from all patients for this report.

Discussion

The present case series highlights PEMF as a potential safe and non-invasive modality of treating LBP secondary to PIVD in lactating mothers.

The management of intra or postpartum PIVD presents a significant challenge, as conventional pain medications, while effective in alleviating pain and discomfort, often raise the worrisome prospect of drug transfer through breast milk which exposes the infant to potential adverse effects that could impact their health and development.[1, 2]

Non-steroidal anti-inflammatory drugs (NSAIDs), like ibuprofen or naproxen, are commonly used for pain management but can cross into breast milk and potentially cause discomfort for the baby's delicate digestive system. Additionally, they might interfere with the production of prostaglandins, which play a crucial role in various physiological processes, potentially impacting the infant's well-being.[2] The American Academy of Pediatrics considers ibuprofen, indomethacin and naproxen safe drugs in breast feeding women although they displace bilirubin, hence are contraindicated in women breastfeeding a neonate with jaundice. Furthermore, large doses of NSAIDs have to be avoided as potential neonatal salicylate-linked intoxication and bleeding risk. Therefore caution should be used for prolonged use during breastfeeding, because neonates excrete salicylates very slowly. [2] Neonatal seizures and nephrotoxicity have been reported after indomethacin use during breastfeeding. As paracetamol, caffeine and ibuprofen seem to have negligible effect when assumed during lactation they are continued in lower doses in breast feeding mothers.[2] Muscle relaxants like baclofen are prescribed to alleviate muscle spasms and associated pain. While muscle relaxants might provide relief to lactating mothers, there's a lack of comprehensive data regarding their safety in breastfeeding infants. The potential for these medications to pass into breast milk raises concerns about potential sedation or other side effects in the baby. [2] Etoricoxib is a selective COX-2 inhibitor used for pain management. While COX-2 inhibitors were initially considered safer for lactating mothers, recent studies have shown that etoricoxib, too, can be found in breast milk, albeit in small amounts. The potential impact on the nursing infant remains a concern hence contradicting during pregnancy and avoided in lactation. [2] Pregabalin and gabapentin are anticonvulsant medications often used for nerve-related pain. The effects on breastfeeding by second generation antiepileptic drugs are insufficiently studied. The passage into breast milk is extensive hence care should be taken with high doses of these drugs metabolized by uridine-diphosphate glucuronosyltransferase (UGT) due to the low metabolizing capacity in infants. The infant's developing nervous system raises questions about the potential long-term effects of these drugs on the child's neurological development. [2] Opioids, such as codeine or morphine, pose another set of challenges. While these medications can be effective in managing severe pain, their passage into breast milk can lead to unwanted effects in the nursing baby. These effects range from drowsiness, lethargy and poor feeding to more concerning issues like respiratory depression. As during lactation, an extremely small amount of tramadol and its metabolites (about 0.1% of dose) have been found in breast milk.[2] Antidepressants are often used in management of chronic neuropathic pain. Amitriptyline, nortriptyline, and desipramine are all excreted into human milk. As pharma- cokinetic models suggest that infants are exposed to approximately 1% of the maternal dose, amitriptyline, nortriptyline, desipramine, clomipramine, and sertraline are recommended as antidepressants of choice for breastfeeding women where essentially needed. [2] Local anaesthetics like lidocaine, often used in epidural procedures for pain relief during childbirth, can also find their way into breast milk. Although the risk is considered low, potential side effects on the baby's central nervous system are the reasons epidural analgesics are not opted by obstetricians or physicians in lactating patients. [2]

In lactating populations, invasive treatment options of epidural steroids, and surgical procedures often have relative or absolute contraindications due to potential adverse effects on the breastfeeding infant. Steroids may be excreted in milk or affect milk supply, and surgery

can disrupt breastfeeding routines or require temporary cessation.[2]

PEMF is a non-invasive treatment that uses electromagnetic fields that can penetrate deep into tissues and cells, affecting various physiological processes. PEMF employs a multifaceted approach to promote healing. It enhances ATP production in mitochondria, thus boosting cellular metabolism and tissue repair. This treatment also influences calcium ion channels, impacting cell signaling and fostering healing processes. Additionally, it activates the SIRT1-dependent autophagy pathway, providing protection for the extracellular matrix.Furthermore, PEMF reduces the pro-inflammatory cytokines, and has been shown to enhance blood circulation, including microcirculation, which can provide oxygen, nutrients, and other essential factors for tissue repair and thus effectively alleviating CBP. [4-6]

Compared to conventional treatments, PEMF therapy offers several advantages for lactating patients with PIVD. Firstly, it provides localized pain relief without the need for systemic medications that may pose risks to the infant. Secondly, PEMF does not involve invasive procedures or surgical interventions, which might necessitate anaesthesia and pose additional safety concerns. Furthermore, the avoidance of epidural steroids eliminates the potential for exposure to corticosteroids, which could have adverse effects on the infant's development. [2]

While the case series demonstrated encouraging outcomes with no adverse effects, the long-term safety of this intervention requires further investigation through randomized controlled trials to determine the potential of PEMF treatment as a non-invasive and efficacious approach for alleviating LBP secondary to PIVD in lactating patients.

In conclusion, PEMF maybe administered for LBP secondary to PIVD in lactating mothers.

Ethical Clearance: Taken

Conflict of Interest: Nil

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