



Promising Results of Pulsed Electromagnetic Treatment for Severe Pain in Post Tubercular Angular Kyphosis (PTAK): A Case Report

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Abstract

Introduction: Post tubercular angular kyphosis (PTAK) is a rare spinal deformity resulting from a complication of tuberculosis infection and can be challenging to treat even with a multidisciplinary approach.

Methods: The present patient presented with severe pain unresponsive to conventional analgesics and physical therapy. PEMF treatment was administered locally to the back for a total of 30 sessions of 45 minutes duration, 4-5 times/week for 6 weeks.

Results: 50% reduction in pain NRS after ten sessions and 70% reduction in pain NRS after 30 sessions was noted. Patient also reported improvement in ability to perform daily activities and quality of life after the completion of the PEMF treatment.

Conclusion: This case report describes successful treatment of severe pain secondary to Post Tubercular Angular Kyphosis (PTAK) with non-invasive pulsed electromagnetic field (PEMF) treatment and suggests its possible role which should be further explored.

Keywords: TB, Kyphosis, Post Tubercular Angular Kyphosis, Spinal deformity, PEMF, Pulsed Electromagnetic Field, Pain, Spinal Tuberculosis.

Introduction

Post-tubercular angular kyphosis (PTAK), with a prevalence of 12.5% to 90%, is a common complication of spinal tuberculosis.¹ The formation of the gibbus deformity in PTAK is a complex interplay between the destructive effects of the tuberculosis infection, vertebral collapse, and compensatory changes within the spine.² Early diagnosis and appropriate treatment of spinal tuberculosis is crucial to preventing or minimizing the development of PTAK and its associated complications.² The severity of PTAK varies from mild to severe, depending on the degree of spinal

deformity and is often associated with severe chronic pain in the affected areas impacting the quality of life.² Different management strategies of PTAK include medical drugs, surgical decompression and epidural steroids which often results in incomplete therapeutic benefits failing to improve quality of life in patients.²

Pulsed Electromagnetic Field (PEMF) treatment is a new novel non-invasive treatment found effective in reducing pain associated with various musculo-skeletal conditions such as osteoarthritis, fibromyalgia, and neuropathic pain.³ However, its role in PTAK has not been explored.

We report one such patient.

Case Description: A 24-year-old male patient, height 155cm and weight 45kgs, was referred from the Orthopaedics department to the Pain Clinic Out Patient Department (OPD) with the complaints of CBP extending to the left ankle secondary to tuberculosis of the spine

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which occurred two years back. Patient defaulted on tuberculosis medication and restarted on Anti-Tubercular Therapy (ATT), three months back with calcium, vitamin supplements, and non-steroidal anti-inflammatory drugs (NSAIDs). Patient presently complained of weight loss and a kyphotic deformity at upper back associated impairing in his daily activities with increasing pain not responding to conventional medical drug treatment.

Musculoskeletal examination revealed an exaggerated lumbar lordosis and dorsal kyphotic deformity at the level D12 with no associated scoliotic deformity (Figure 1). A non-mobile hard mass yielding on palpation of size 7.5cmx5cmx2.5cm was noted at the level. (Figure 4(a). Motor power was 5/5 in both lower limbs. Antero-posterior and lateral view radiographs and contrast-enhanced magnetic resonance imaging of the spine showed osteolytic destruction and collapsed D12 vertebral body with a kyphotic deformity of 90°(Figure 2: (a) (b), Figures 3:(a) (b). Histopathological diagnosis revealed healed fibrosis with abscess in the centre of the vertebral body.

Patient refused epidural steroids for CBP due to invasive modality. He consented to receive PEMF treatment via the full body gel mattress of QRS 101 system wherein he lied

supine on the mattress connected to power supply and received 45-minute sessions at least 4-5 times a week. Treatment sessions were decided to be continued till 50% reduction in Numeric Rating Scale (NRS) was noted. A total of 30 sessions over the next 6 weeks resulted in 40% reduction in pain NRS at the D12 region from 8 to 6, 50% reduction in pain NRS in L1-2 from 8 to 4 and 40% reduction in pain NRS from 8 to 6 in the left lower limb. Patient reported acceptable functionality and was satisfied with the results with above sessions. A change in consistency of the swelling at the kyphotic bulge at the D12 level was noted from hard non yielding mass to a soft compressible mass. (Figure:4 (b) (c)) Follow-up assessments post 24 weeks of treatment revealed, 60% reduction in pain NRS in the lower back (L1-2) and legs and 50% reduction in Pain NRS in upper back(D12). (Table 1) Improved sleep, improvement in carrying out day-to-day activities and resumption of work after completion of sessions were reported by the patient with a general feeling of well-being. Patient is no longer on any pain medications and improvement is consistent for last one year.

Patient has consented for the present report.

Table 1: Baseline vs Post PEMF Treatment parameters

	Pre PEMF (Baseline)	Post PEMF (at 30 sessions)	Follow up (1 month)	Follow up (3 months)	Follow up (6 months)
Upper Back Pain NRS (D11-12)	8	6	6	5	4
Lower Back Pain NRS(L1-2)	8	5	4	4	3
Radicular pain- Pain NRS	8	6	6	5	3
PQAS	166	142	121	106	96
Modified ODI	52	40	33	22	22
Consistency of bulge	Hard; yielding	Soft compressibl e	Soft compressible	Soft compressible	Soft compressible
Oral medications: NSAIDS/ Skeletal muscle relaxants/TCA equivalent dose (mg/day)	Acetaminophe n = 1gm Tramadol = 125 mg Baclofen= 20 mg Amitriptylline = 25 mg	Acetaminop hen = 500 mg Tramadol = 37.5 mg Baclofen= NR Amitriptylli ne= NR	Acetaminophen = 325 mg Tramadol = 37.5 mg Baclofen= NR Amitriptylline= NR	Acetaminophe n = sos Tramadol = sos Baclofen= NR Amitriptylline = NR	Acetaminophen = sos Tramadol = sos Baclofen= NR Amitriptylline= NR

NRS- Numerical Rating scale ; PQAS- Pain Quality Assessment Scale; ODI – Oswestry Disability Index; NSAIDS- Non steroidal anti inflammatory drugs; TCA- Tricyclic Antidepressants; PEMF – Pulsed Electromagnetic Field ; NR- Not required

Figure 1: Clinical picture of the patient shows spinal kyphotic deformity



Figure 2: Anteroposterior (a) and Lateral (b) X-ray of a dorsolumbar spine shows severe kyphosis secondary to tuberculosis spine with complete destruction at D11–12.



Figure 3 : Contrast enhanced MRI of whole spine shows (a) severe focal kyphotic deformity at D12 level along with severe anterior wedging and near complete collapse of D12 vertebral body with partial bony ankylosis of D11 and D12 vertebrae with mild residual marrow edema and (b) shows a healed kyphosis at D12 with dorsal and lumbar canal stenosis, mild marrow and discal enhancement seen along anterior aspect of D9, D10, D11 vertebral bodies. Mild diffuse marrow enhancement also seen in L1, L2 vertebral body levels.



Figure 4: (a) hard non compressible mass on visit 1.



Figure 4: (b) soft compressible mass post 15 PEMF sessions.

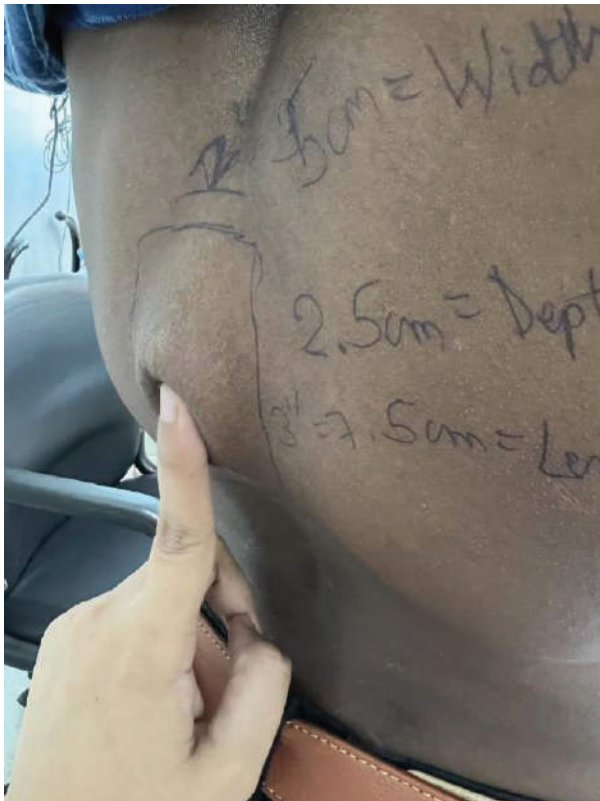


Figure 4: (c) soft compressible mass post 30 PEMF sessions



Discussion

Spine tuberculosis often causes varying degrees of kyphosis in different segments of the spine [Figure 1] causing alteration of spine biomechanics. Kyphosis in spinal TB continues to progress even on treatment especially in children. 4 In PTAK, proximal and distal segments of the spine compensate by creating reverse deformity and the consequent degenerative process produces back pain and/or radiculopathies. 2 The lumbar or lumbosacral kyphosis may produce a compensatory hyperlordosis proximally and distal to healed lesion. 5 Long standing kyphosis can lead to severe lumbar canal stenosis with gradual impingement of costal margins over iliac crest and painful costopelvic impingement, reduced vital capacity, lumbar canal stenosis and late onset paraplegia which can be extremely painful and debilitating. 2, 5, 6 The development of kyphosis can be prevented by diagnosing it in pre-destructive stage. 2

Various treatment modalities described in literature for management of post TB kyphosis includes surgical decompression like internal kyphectomy or surgical kyphosis correction, epidural steroid blocks for local reduction of inflammation and medical pain management with drugs or acupuncture. 2, 5 But often treatment provides incomplete therapeutic benefits and fails to improve the quality of life in patients.

PEMF is a non-invasive treatment that uses electromagnetic fields to stimulate the body's tissues and promote healing by enhancing the production of various chemical mediators like adenosine triphosphate, calcium, Sirtuin 1, pro-inflammatory cytokines etc. It is shown effective in reducing pain associated with various orthopaedic conditions like osteoarthritis and Failed Back Surgery Syndrome. 3,7, 8

No previous report has determined the efficacy of PEMF in PTAK. In the present patient, PEMF resulted in alleviation of back pain and a change in kyphotic mass consistency. 7 The plausible explanation is that enhanced blood flow and oxygenation to targeted tissues from PEMF causes inflow of immune cells and fibroblasts to the region which might have caused breakdown of fibrous tissue causing regenerative milieu. This resulted in tissue remodelling and repair. 9,10

Further research is essential to elucidate the intricate interplay between PEMF and tissue remodelling processes.

Conclusion

In conclusion, PEMF QRS maybe considered as non-invasive management option for alleviating pain,

increasing functionality and thereby improving quality of life in PTAK patients.

Ethical Clearance: Taken

Conflict of Interest: Nil

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