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Integrative Medicine Approach for the Management of High Cholesterol, Chronic Back Pain and Lower Limb Parasthesia: A Single Case Report

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Abstract

Background: Hypercholesterolemia is a condition characterized by elevated levels of cholesterol in the blood. In patients with a history of stroke or transient ischemic attack (TIA), hypercholesterolemia plays a crucial role in the progression of vascular disease, necessitating strict lipid control, lifestyle modifications, and medical management to prevent further cerebrovascular events.

Case Presentation: A 72-year-old woman with a history of TIA and prior carotid endarterectomy remains functionally independent but recently developed leg numbness, back pain, and limited mobility. Elevated lipid levels on routine check-up highlight ongoing vascular risk.

Intervention and Outcomes: The patient underwent a 12-week integrative program involving acupuncture, therapeutic diet, chair yoga, and chair suryanamaskar. She reported significant reduction in pain, improved mobility, and normalization of lipid levels.

Keywords: Hypercholesterolemia, Transient ischemic attack, Stroke, Yoga, Acupuncture, Diet therapy, Low back pain, Integrative medicine.

Abbreviations:

LDL	Low Density Lipoprotein
CEA	Carotid Endarterectomy
LBP	Low Back Pain
PCSK9	Proprotein Convertase Subtilisin/Kexin type 9
NSAID	Non-Steroidal Anti-inflammatory Drug
IHD	Ischemic Heart Disease
VAS	Visual Analogue Scale
NPSI	Neuropathic Pain Symptom Inventory functional disability
ODI	Oswestry Disability Index
BBS	Berg Balance Scale
DN4	Douleur Neuropathique 4
LDH	Lactate Dehydrogenase

IL	Interleukin
TNF	Tumor Necrosis Factor
GV	Governor Vessel
GB	Gall bladder
ST	Stomach
EX	Extraordinary
LI	Liver
UB	Urinary bladder

INTRODUCTION:

Cholesterol is a waxy, fat-like substance mainly produced by the liver, and its levels can rise with diets high in saturated fats [1]. When total cholesterol reaches ~260 mg/dl and LDL ~200 mg/dl, endothelial-dependent vasodilation becomes impaired, indicating reduced nitric oxide activity and increased risk of atherosclerosis [2]. Globally, hypercholesterolemia affects over 30 million people [3]. In 2019, elevated LDL accounted for 3.78 million IHD deaths and 0.61 million ischemic stroke deaths worldwide [4].

Low back pain (LBP) is a common musculoskeletal condition, with cases increasing from 377.5 million in 1990 to 577 million in 2017. Disc degeneration is a major cause, and neuropathic pain can occur when herniated discs compress nerve roots. Painful degeneration is linked to ingrowth of the sinovertebral and basivertebral nerves into disc fissures [5]. Paresthesia—such as tingling, numbness, or burning—may result from disruptions in sensory pathways, including cortical dysfunction or small infarcts in the diencephalon or mesencephalon [6]. Medications for lowering LDL include statins, ezetimibe, PCSK9 inhibitors, bile acid sequestrants, omega-3 fatty acids, and bempedoic acid [7]. LBP is typically managed with acetaminophen, NSAIDs, muscle relaxants, and opioids [8]. Despite their effectiveness, these drugs may carry side effects and long-term risks. As a result, interest has increased in non-pharmacological and integrative treatments. Naturopathic approaches—such as yoga, exercise, acupuncture, and dietary changes—aim to reduce symptoms, improve mobility, and support overall well-being [9]. Yoga and stretching help improve flexibility and strengthen muscles, while acupuncture and diet may reduce pain and inflammation. However, stronger evidence is still needed to establish these integrative methods as alternatives to conventional treatment for LBP with limb numbness and high cholesterol.

CASE DESCRIPTION:

A 72-year-old woman with a past TIA and carotid endarterectomy (CEA) five years ago had been fully independent, but recently developed leg numbness after walking and severe back pain affecting daily activities. MRI was unremarkable, yet her symptoms persisted. Routine tests showed markedly elevated lipid levels, raising concern for ongoing vascular risk. This case highlights the need for thorough cardiovascular risk control, musculoskeletal evaluation, and pain management in post-CEA patients. A detailed review of her medical history and prior treatments was conducted to guide a holistic management plan.

THERAPEUTIC INTERVENTIONS:

Yoga has become an increasingly popular and natural therapeutic choice [10]. Electroacupuncture (EA) stimulates the release of β-endorphin, enkephalin and endomorphin [11]. The amount of fiber in the diet affects cholesterol levels as well, and taking a diet high in fiber helps lower LDL cholesterol [12].

YOGA INTERVENTION:

Chair Suryanamaskar [13].

Chair based yoga [14].

Steps of chair Suryanamaskar:

The Chair Suryanamaskar session will consist of 12 physical postures (asanas) performed in the following order each time [Table]:

1) Pranamasana→ 2) Hasta Uttanasana→ 3) Hasta Padasana→ 4) Anjaneyasana→ 5) Ek Padhastasana→ 6) Dandasana→ 7) Hasta Uttanasana→ 8) Hasta Padasana→ 9) Anjaneyasana→ 10) Ek Padhastasana→ 11) Hasta Uttanasana→ 12) Pranamasana.

Chair based yoga:

The yoga practice is modified as needed to allow the patient, considering their specific medical condition and functional ability, to participate safely.

1. Muscle strengthening
2. Stretching
3. Simple breath movement synchronization actions
4. Balancing asanas
5. Asanas with support

A single-subject research design was used to monitor the patient over three months. Along with yoga and acupuncture, she followed a personalized diet to support metabolic balance and reduce inflammation. She was advised to return for follow-up after one month or sooner if new or recurring symptoms appeared, ensuring timely monitoring and intervention.

ASSESSMENT CRITERIA:

The patient's condition was assessed before and after the intervention using various measures (Table-), including height, weight, and BMI. Pain intensity was evaluated using the Visual Analogue Scale (VAS), Neuropathic Pain Symptom Inventory (NPSI) , functional disability was assessed with the Oswestry Low Back Pain Disability Questionnaire, Berg Balance Scale (BBS) , Neurological examination (sensory testing- pinprick, vibration,temperature, proprioception) and blood parameters were analyzed to monitor changes in high cholesterol levels.

RESULT:

The study was conducted with a single female patient, age of 72 years. The baseline and clinical characteristics of the study subjects are summarized in table 2. After 12 weeks of integrative treatment, the patient showed significant improvement and mobility improved with reduced stiffness and better balance. Paresthesia episodes decreased noticeably. Biochemical markers also improved—total cholesterol dropped from 357.1 mg/dL to 168.7 mg/dL, and LDL levels reduced from 241.9 mg/dL to 93 mg/dL. The patient reported better sleep, increased energy, and no adverse effects throughout the program.

TABLE:1

TREATMENT	DURATION
YOGA	

● SUKSHMA VYAYAMA ● CHAIR SURYANAMASKAR ● CHAIR BASED YOGA ● RELAXATION **ELECTROACUPUNCTURE** **For back pain:** ● Main points (GV-3, GV-4, UB-23, UB-25, UB-32, UB-54) ● Supplementary points (GV-20, LI-4) **For lower limb numbness:** ● Main points (GB-34, GB-37, ST-36, ST-39, ST-41, EX-36).	10 MINS/DAY 20 MINS/DAY 20 MINS/DAY 5 MINS/DAY 30 MINS/DAY

Table 2: Results on parameter-Baseline characteristics and other outcome measures

VARIABLES	PRE INTERVENTION	POST INTERVENTION
Height	150 cm	150 cm
weight	58 kg	53 kg
BMI	25.78 kg/m²	23.56 kg/m²
ODI	48% (severe)	38% (moderate)
VAS	8/10	3/10
NPSI	30/80	20/80
DN4	4/10	2/10
BBS	46	50
Cholesterol	357.1 mg/dl	168.7 mg/dl

Table 3: DIET

Types of foods	Content
Dietary fibre	Wheat, rice, barley, oat bran
Legumes	Potato, carrot, beet, turnips
Fruits	Mango, guava
Green vegetables	Cabbage, lady's finger, lettuce, celery
Juice	Coriander juice

Figure 1: Chair Suryanasmaskar

Figure 2: Chair- Based Yoga

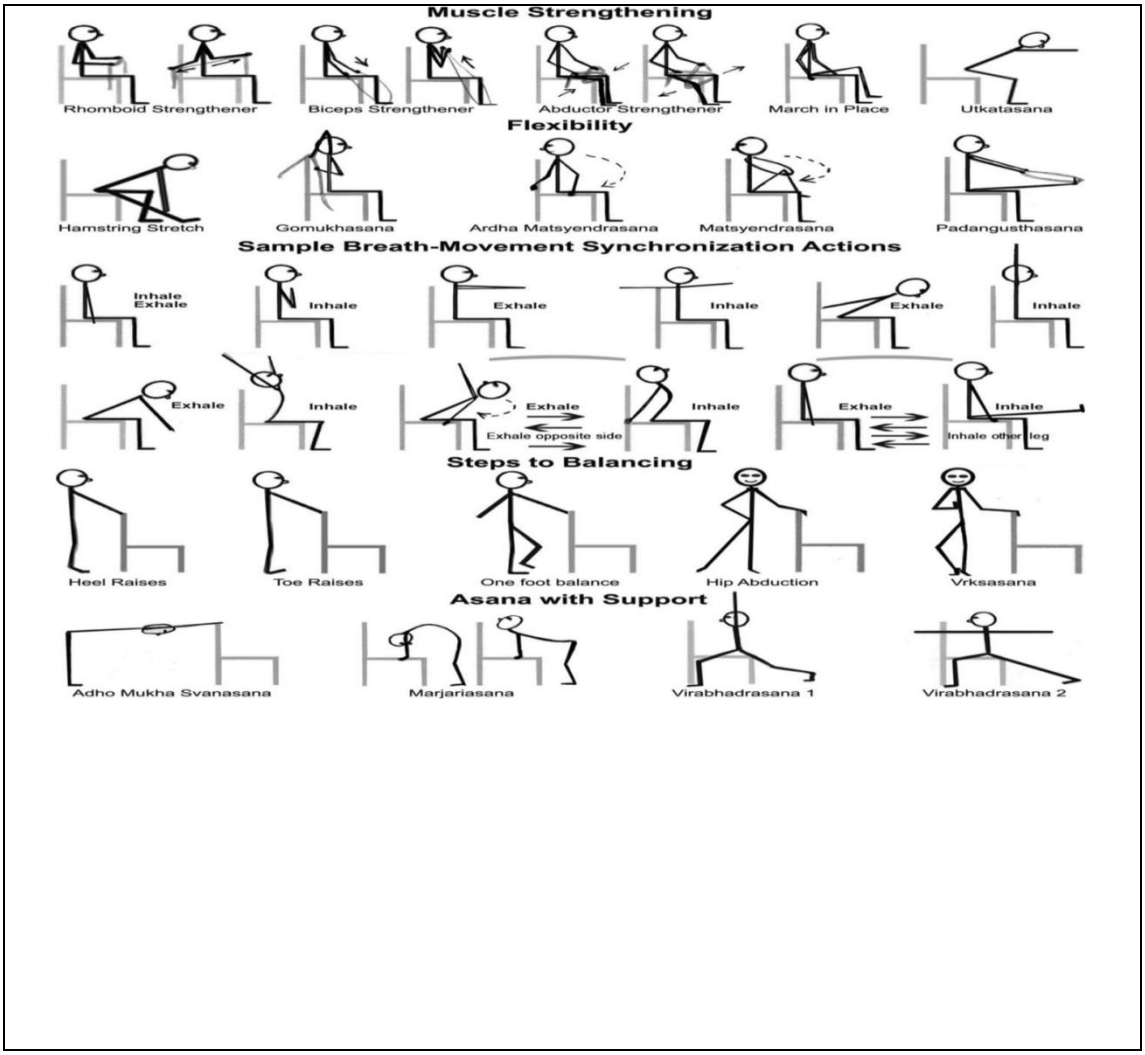
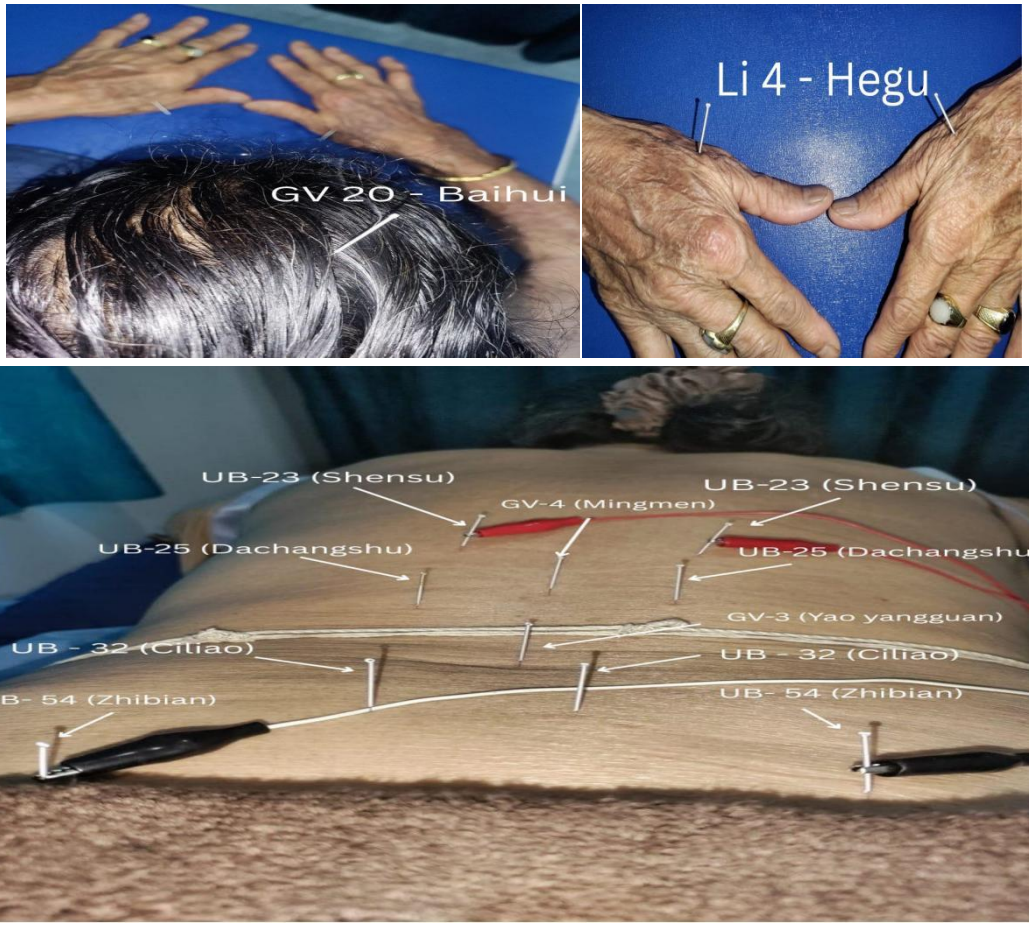


Figure 3: Electroacupuncture Therapy



DISCUSSION:

A multidimensional integrative care approach proved effective in alleviating neurological symptoms, back pain, elevated cholesterol levels, and excess body weight. In this single-case study, a female patient showed a marked reduction in total cholesterol after adopting a personalized yoga regimen along with dietary changes and electro-acupuncture. Yoga and naturopathy emphasize a holistic treatment model that integrates postures, breathing practices, relaxation, meditation, acupuncture, nutritional adjustments, lifestyle guidance, and counseling to enhance overall health.

Research conducted by Nisha Shanthakumari and colleagues (2013) demonstrated that yoga, when practiced as a holistic lifestyle intervention combining physical postures with stress-management techniques, can significantly lower elevated lipid levels. Their findings showed improvements in lipid profiles, reductions in body mass index (BMI), and a decreased risk of macrovascular complications in individuals with diabetes [15].

The study indicates that yoga practices overall tend to promote parasympathetic dominance while suppressing excessive sympathetic activity. These physiological adjustments are associated with lowered cortisol and adrenaline levels, diminished lipolysis and hepatic cholesterol synthesis, and a reduction in pro-inflammatory cytokines such as IL-6 and TNF-α [16].

Yildirim and Gultekin (SPINE, 2022) reported that a structured yoga program incorporating stretching and strengthening effectively alleviates neuropathic pain in individuals with lumbar disc herniation. Stretching practices enhanced spinal mobility and alignment, reducing nerve root compression and

associated sensory symptoms. Core muscle strengthening improved lumbar stability and minimized mechanical stress on the affected discs. Additionally, controlled breathing and relaxation promoted parasympathetic activation, lowered stress hormones, increased endorphin release, and facilitated central pain modulation. Enhanced neural mobility and circulation further contributed to symptom relief, supporting yoga as a safe and effective conservative intervention for LDH-related neuropathic pain [17].

Chair-based yoga practices, including Chair Suryanamaskar, provide a safe and accessible form of exercise for older adults with limited mobility. These modified movements improve circulation, flexibility, and neuromuscular coordination without stressing the joints. For individuals with high cholesterol, chair yoga enhances insulin sensitivity and offers mild aerobic activity that may help reduce LDL and improve HDL levels. In chronic low back pain, it strengthens core stabilizing muscles and promotes better spinal alignment, reducing stiffness and discomfort. For neuropathic pain, chair yoga supports improved peripheral circulation, lowers inflammation, and increases parasympathetic activation, helping to modulate pain perception [17,18].

According to Su and Qian (2021), acupuncture relieves acute low back pain through both physiological and contextual mechanisms. It stimulates the release of endorphins, activates descending pain-modulating pathways, and influences spinal and brain pain-processing centers, helping reduce central sensitization. Additionally, patient expectations and the therapeutic setting enhance its analgesic effect. Together, these mechanisms contribute to effective pain relief [19].

CONCLUSION:

The integrative approach combining acupuncture, therapeutic diet, chair yoga, and chair Suryanamaskar demonstrated significant improvements in pain relief, mobility, and overall well-being in this patient. This case highlights the potential of a holistic, non-pharmacological treatment strategy in managing musculoskeletal conditions, particularly for individuals with limited mobility. The synergistic effect of mind-body practices and targeted interventions such as acupuncture emphasizes the value of personalized, integrative care. Further studies with larger sample sizes are needed to validate these findings and establish standardized protocols.

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