

CASE REPORT

Subsiding of Dependent Oedema Following Chiropractic Adjustment for Discogenic Sciatica

Eric C. P. Chu* and John T. H. Wong†

Background: Subsiding of dependent oedema with chiropractic treatment for sciatica has not been described in the literature.

Case presentation: A 40-year-old woman presented with unbearable sciatic nerve pain which restricted her in doing daily activities. She also had bilateral leg swelling for some time and no apparent physical causes could be found after being reviewed by a cardiologist. The patient subsequently sought chiropractic care to relieve her pain. She unexpectedly experienced a beneficial outcome from spinal adjustment in which both sciatic nerve pain and leg oedema were simultaneously resolved. It is reasonable to say that ease of mobility from pain relief and increased lymphatic return from sympathetic responses can help eliminating leg oedema following spinal adjustment.

Conclusions: The pathophysiology of oedema formation is multifactorial and the therapeutic role of chiropractic remains inconclusive in this case. Further researches are needed in this area before the integration of chiropractic into cardiovascular practice.

Keywords: chiropractic adjustment; lymph; oedema; sciatica; sympathetic response

Introduction

The physiopathology of oedema formation is multifactorial, sometimes not related to a specific disease. Lack of mobility due to unbearable pain plays an essential role by initiating the hemodynamic alternation. Unwanted reaction of certain drugs might also play a role. Treatment of leg oedema is actually beyond the scope of chiropractic practice. Following chiropractic adjustment, pain relief in turn promoting ease of mobility and possible sympathetic response accelerating lymphatic return might have helped in alleviating leg oedema.

Case presentation

A 40-year-old woman was referred here with exacerbated low back pain due to sprain 2 months prior. She had numbness and tingling sensation in the lower back radiating down the left buttock and the back of the leg. In the first place, the patient was referred to an orthopedic consultant and was given a diagnosis of discogenic sciatica (**Figure 1**). She took acetaminophen (Tyleno®) and celecoxib (Celebrex®) which provided only temporary relief. Owing to her unbearable pain, she was unable to lie flat on her back and could only sleep in a semi-upright position. Stiff fingers in the morning and bilateral leg

swelling were noted for some time. Her medication was discontinued for suspicion of causing oedema, replaced with pregabalin (Lyrica®), tramadol (Ultram®) and vitamin B1. The patient had been treating with an oral bisphosphonate (Fosamax®) for osteoporosis and also with acupuncture for low back pain in the past 8 months. She denied other allergic or cardiopulmonary symptoms.

On examination, the patient ambulated with an antalgic and waddling gait. Her vital signs were normal. Her feet were pinkish and swollen up to the calves. Cutaneous telangiectasias, reticular veins and bluish (cyanotic) tinge to the skin were also noted in both legs (**Figure 2**). Her pain was provoked by extension and left bending of the trunk, and with left ankle inversion and eversion. She rated her pain to be 10/10 on a Numeric Pain Scale (NPS). Neurological examination of the lower limbs including sensory, motor and reflex testing indicated diminished light touch of the left ankle and feet. Her laboratory abnormalities were an elevated AST of 44 U/L (reference <35), elevated potassium of 5.5 mmol/L (reference 3.5–5.1), and low urea of 1.7 mmol/L (reference 2.5–6.4). Normal white cell count and inflammatory markers, and borderline low albumin of 34 g/L (reference 34–50). A cardiac consultation excluded deep venous thrombosis, structural heart and other systemic diseases.

The first phase of chiropractic regimen is to reduce pain, release nerve compression and optimize motion in the spine. The patient started with spinal adjustment used in Thompson Technique daily for the first 2 weeks. Her nerve pain was reduced to 3/10 on NPS. She related that she could lie on the bed to sleep normally. Unexpectedly

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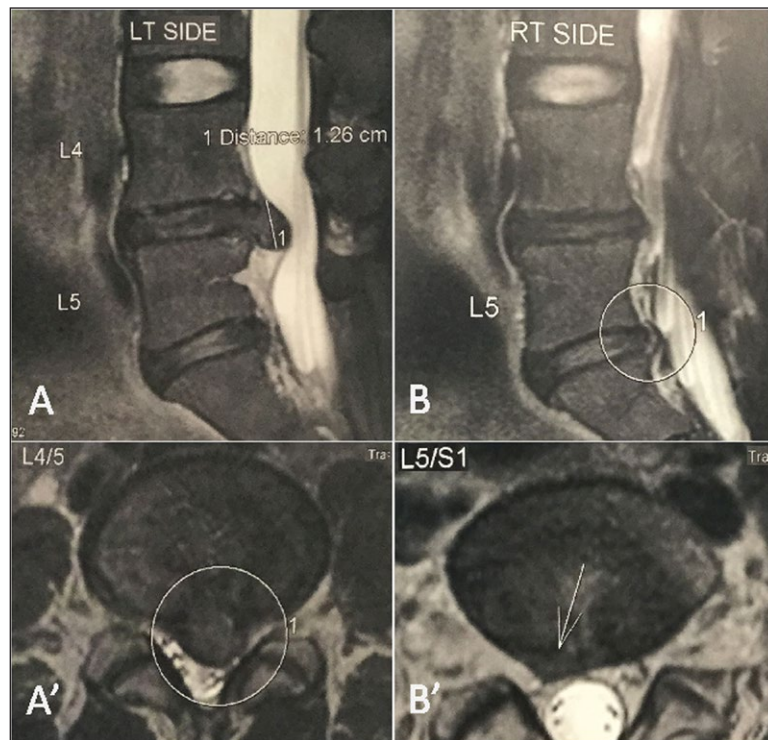


Figure 1: Lumbar magnetic resonance imaging. A magnetic resonance imaging showed (A, A') a pronounced disc extrusion towards the posterior central and left subarticular zones at L4/5 level, and (B, B') another disc protrusion in right L5/S1 subarticular zone. Impingement onto the left L5 traversing nerve root was noted.



Figure 2: Subsiding of dependent oedema. Asymmetric pitting oedema was observed in both feet and legs, more on the right. Cutaneous telangiectasias, reticular veins and bluish (cyanotic) tinge to the skin were also noted. Oedema subsided over 5 days following spinal adjustment.

her leg swelling also subsided following commencement of treatment (Figure 2). The second phase treatment was focused on spinal decompression by intermittently stretching and relaxing in a controlled manner, to create a negative intradiscal pressure and promote faster healing. Treatment was scheduled to perform thrice weekly for the next one month. Sciatica symptoms and leg edema disappeared and her blood test came back normal after the

treatments. The patient continued with maintenance care on a monthly basis to prevent sciatica return and achieved stable therapeutic effect in the past 8 months.

Discussion

Various pathological conditions including infection, peripheral vascular disease, cardiac disease, renal failure, fluid and electrolyte problems, and hypoproteinaemia

(Zhang et al. 2012) can cause dependent oedema, which may sometimes not be related to a specific disease. Prolonged immobility can slow blood stream, in turn causing fluid retention in dependent parts affected by gravity. In chair-bound patients, oedema is in the feet and lower legs. Patients requiring prolonged bed rest develop oedema in the buttocks, genitals and posterior thighs. Venous stasis eventually leads to venous hypertension, dilation of the small veins and dermal capillaries, and inflammatory events in the inner lining of the veins (Spentzouris & Labropoulos 2009). The deoxygenated venous blood stagnated in the cutaneous microcirculation can lend a bluish or purplish tinge to the skin and permit fluid shifting into the interstitial compartment, as illustrated in this patient (**Figure 2**).

Some medications can induce bothersome oedema. Pregabalin (Lyrica®) is a voltage-gated Ca^{2+} calcium channel antagonist that subtly reduces the synaptic release of several neurotransmitters, and may entail reduction of abnormal neuronal excitability (Lee 2013). The result of antagonism can cause a secondary reduction in vascular smooth muscle contractility thereby leading to vasodilatation and oedema (Gallagher & Apostle 2013). Pregabalin is also shown to modulate different potassium channels including K_{ATP} channels probably be another mechanism responsible for its analgesic or anticonvulsant effect (Verma, Singh & Singh Jaggi 2014). Elevated serum potassium has also been observed among people taking pregabalin, as seen in this case. Celecoxib (Celebrex®) is a COX-2 inhibitor, which blocks the enzyme for prostaglandin synthesis. Celecoxib is used to treat inflammation and its accompanying pain and fever. Inhibition of COX-2 enzyme in the kidney could also lead to interruption of the renal synthesis of prostaglandins resulting in peripheral oedema, and other renal adverse effects (Harris Jr 2002). Leg oedema is not listed side effect of acetaminophen (Tyleno®), tramadol (Ultram®) or oral bisphosphonate (Frosamax®).

It has been assumed that chiropractic manipulation reflexly mediates autonomic responses in association to the particular segment(s) adjusted (Welch & Boone 2008). The sympathetic nerves originate from the spinal cord in the thoracolumbar region and extend down to the third lumbar segment of the spine. The parasympathetic nerves arise with cranial nerves III, VII, IX and X, as well as from the caudal portion of the spinal cord. The primary function of the lymphatic system is to return the fluid that has leaked from capillaries back to the bloodstream (Ikomi, Kawai & Ohhashi 2012). Peripheral lymphatic function is controlled by the autonomic nervous system, and the sympathetic activity has been shown to increase lymphatic vessel contraction and lymph flow (McHale 1990). When the lymphatic vessels appear overwhelmed during oedema, an increase in pumping efficiency would be expected to restore proper fluid balance (Scallan, Huxley & Korthuis 2010). Chiropractic adjustments have been assumed to affect the autonomic nervous system by helping to down-regulate the sympathetic nervous system and promote parasympathetic activity (Welch & Boone 2008).

Our speculation has centered on the fact that the patient had been immobilized for sciatic nerve pain and sleeping in a semi-upright position over the past two months. Furthermore, she had been taking more than one drug (i.e. pregabalin and celecoxib) which might predispose her to or worsen dependent oedema. Elevated serum potassium once noted was possibly another drug-induced effect in this case. Therapeutic goal of chiropractic adjustment was releasing neural impingement and restoring sensorimotor function. It is reasonable to say that ease of mobility and improved sleep performance from pain relief and increased lymphatic return from sympathetic responses can help eliminating leg oedema following spinal adjustment. The main limitation of this case report is that the cause of leg oedema and mechanism of symptom relief are still uncertain. Our speculation for the therapeutic outcome is based on the inclusion of clinical possibilities. Withdrawal of the potential offenders should be a straightforward approach to confirm drug-induced reaction. Nevertheless, it would be inappropriate to ask a patient of multidisciplinary care to suspend prescription from the primary treating surgeon. Moreover, a single case report is not proof of concept, but the patient's experience is supportive. Published reports of the successful spinal adjustment for peripheral oedema are not available yet. Further researches to better clarify the role of chiropractic are necessary.

Conclusion

The pathophysiology of leg oedema might be attributable to complex factors and remains inconclusive in this case without solid evidence. Despite spinal adjustments do not actually alter peripheral blood circulation, the manipulations reflexly mediate autonomic responses might have helped alleviating oedema via lymphatic return.

Competing Interests

The authors have no competing interests to declare.

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How to cite this article: Chu, ECP and Wong, JTH. 2018. Subsiding of Dependent Oedema Following Chiropractic Adjustment for Discogenic Sciatica. *European Journal of Molecular & Clinical Medicine*, 5(1): 12–15, DOI: <https://doi.org/10.5334/ejmcm.250>

Accepted: 17 March 2018 **Published:** 18 April 2018

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