Serum Cholesterol & Chronic Low Back Pain!

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There have thousands of papers, research studies on the mysterious condition referred to as non-specific chronic low back pain (LBP). As physiotherapists, we are all well aware of the numerous potential sources and contributing factors to LBP, which include various patho-anatomical and psychosocial causes. However, one contributing factor that many health care providers including physiotherapist may often fail to recognize, is the influence of serum cholesterol on LBP. The objective of this short article is to summarize a few of the research papers on the topic of atherosclerosis, cholesterol and LBP.

. Several papers have been written on the association between trans fats and a wide range of diseases including Alzheimer's disease, coronary heart disease, prostate cancer and obesity[1]. There is also little debate that trans fats increase LDL cholesterol (the bad cholesterol) and decrease HDL (the good cholesterol) [1]. Now the question is, is there an association between trans fats, LDL cholesterol and LBP?

The branching arteries of the abdominal aorta, including the four paired lumbar arteries and the middle sacral artery feed the lumbar spine (Fig. 1). Atherosclerosis in the wall of the abdominal aorta may block the relatively small orifices of *lumbar and middle sacral arteries*. Obstruction of these arteries inevitably leads to ischemia in the lumbar spine [2, 3.] . It has been suggested that the reduced blood flow into the intervertebral discs, vertebral bodies and myofascial structures could result in various back symptoms[2].

The aim of this recent systematic literature review[2] was to evaluate the links between atherosclerosis and degenerative disc disease (DDD) or LBP. Following a Medline/PubMed database search for all published articles on atherosclerosis and DDD/LBP, 179 papers were identified. The search was performed with the medical subject headings atherosclerosis, cardiovascular risk factor, or vascular disease and keywords "disc degeneration", "disc herniation", and "back pain". After the exclusion of low quality studies, 25 papers were included.

The 6 basic findings of this systematic review were:

1: Post-mortem studies showed an association between **aortic atherosclerosis** and **DDD**.

2: Post-mortem studies showed a strong association between **occluded lumbar arteries** and a life-time of LBP.

3: Clinical studies showed that **aortic calcification** was associated with **LBP**.

4: Clinical studies showed that **stenosis of lumbar arteries** was associated with **both DDD** and **LBP**.

5: Epidemiological studies showed that **smoking and high serum cholesterol** levels were **the most consistent associations with DDD** and **LBP**.

6. Cohort large studies showed clear associations between elderly people with **cardiovascular risk factors** and **LBP**.

Here is a summary of one sample paper published in the journal *'Spine'* which was included in the above-mentioned systematic review [3]. Magnetic resonance (MR) aortography and LDL cholesterol blood tests were performed on patients with persistent non-specific LBP. The patients ranged from 35 to 70 years of age (mean of 56 years). The 4 basic findings of this study were:

1: Over 75% (that's 3 out of 4 patients) of both the men and women showed **occluded lumbar and/or middle sacral arteries**.

2: The prevalence of occluded lumbar arteries was **2.5 times more** in the LBP patients than the age matched control group.

3: Disc degeneration was significantly associated with occluded lumbar/middle sacral arteries.

4: Patients with **higher serum LDL cholesterol** levels had significantly greater **neurogenic symptoms** and complained **more often of severe pain** than those with normal LDL cholesterol.

Clinical Relevance / Personal Comment:

Firstly, is it not impressive that there are this many studies published in peer reviewed medical journals on this rarely spoken topic… cholesterol, atherosclerosis, DDD and back pain? With so much focus on patho-anatomical and psychosocial causes of LBP, vascular disease as a contributing factor to chronic, non-mechanically responsive LBP has been regrettably undermined. Inevitably patients with lumbar and sacral artery atherosclerosis fail to respond to NSAIDs, extension exercises, manual therapy, modalities, traction, acupuncture, stabilization, etc. It is also probable that some patients with 'failed back surgery' may have had a coincidental disc herniation, but an underlying deficient lumbar vascular supply as the primary contributing factor to their LBP and 'sciatica'. The ever so widely accepted idea that DDD is inevitable and is simply due to 'old age' may in fact not be fully accurate. Perhaps by controlling atherosclerosis through proper medical care, nutrition and exercise, the progression of DDD can be controlled. Longitudinal studies are still not available to support this hypothesis.

Secondly, considering the direct association between cardiovascular disease, high LDL cholesterol and LBP, every patient with non-mechanically responsive persistent LBP should be questioned about their cardiovascular health. Therefore, clinicians should ideally ask the following questions to see if diet, cholesterol and atherosclerosis are potential contributing factors to a patient's LBP.

- **Do you know if you have above normal LDL cholesterol level?**
- **Do you have hypertension / high blood pressure?**
- **Do you smoke?**
- **Do you have a history of heart disease?**
- **Do you do any aerobic or physical exercises at least 3 times per week?**
- **Do you eat at least 2 servings of fresh fruits everyday?**
- **Do you eat at least 3 servings of fresh vegetables everyday?**

Clinical Management Options:

- Consult a Registered Dietician or a naturopathic doctor for a nutritional evaluation
- Consult a family MD to control cholesterol levels
- Avoid or at least reduce the consumption of **processed** grains, sugars, high fructose corn syrup
- Avoid or at least reduce **processed** animal fat consumption
- Avoid or at least reduce the consumption of high fat dairy products
- Consider a Mediterranean type of diet, consisting of daily fresh fruits and vegetables, virgin olive oil and fish
- Consider eating fish more often (not deep fried!) and/or take fish oil capsules (for Omega 3s)
- With the guidance of a physiotherapists, start a gentle yet progressive aerobic exercise program …anything for 10-30 minutes at least 5X/week
- Stop smoking

My intention for sharing this information with fellow physiotherapists is not to undermine the importance of physiotherapy intervention for a sub-group of patients with chronic LBP; in fact it is the opposite. Based on hundreds of clinical trials on the topic of exercise and serum cholesterol levels, the value of a regular aerobic exercise program for individuals with cardiovascular disease cannot be over emphasized.

Regrettably, the primary medical intervention and focus for the management of high LDL cholesterol and hypertension continues to be only a pharmaceutical approach[4]. Three separate meta-analysis studies examining the effects of aerobic exercise on lipids and lipoproteins have concluded that regular aerobic exercise is efficacious for increasing HDL cholesterol and decreasing LDL cholesterol, and triglycerides[5-7]. Exercise has been shown to be even more effective in subjects with initially high total cholesterol levels or low body mass index[5].

As physiotherapists, we are the “exercise specialists” with the most favourable educational training to provide an effective and patient specific exercise prescription for individuals presenting with either LBP or cardiovascular disease and in some cases both.

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