Dynamic Chiropractic

Symptomatic Disc Bulges and Herniations without Nerve Root Impingement and Compromise

Are disc bulges or central disc herniations clinically significant findings when revealed on anatomical studies such as MRI or CT scanning, when there is clinical correlation on physical examination? While this is a controversy in some circles, clearly the scientific literature supports that central/paracentral disc herniation or bulge without neural impingement as significant when there is clinical correlation. Recent studies with CT/discography have shown that there is an entity of internal disc disruption that can cause the patient pain prior to disc protrusion that may be evident on MRI or CT scans.[1,2,3] Bogduk has published similar work where he describes "internal disc disruption" based on CT discography studies.[4] CT discography is an invasive diagnostic test whereby dye is injected into the nucleus of a disc and subsequent CT scans are obtained to see if and where there are leaks and whether or not there is pain-provocation and reproduction of symptoms.

These studies show that not only can disc herniation or bulge cause pain without nerve root compression, but there can be internal disc disruption of the annulus with apparent MR/CT changes that can cause pain. The annulus of the disc has been shown by Bogduk and others to be well innervated with both sensory and autonomic/sympathetic fibers of the sinuvertebral nerve.[5,6] There are mechanoreceptors, nociceptors, and chemoreceptors that can detect all types of mechanical and biomechanical changes occurring in the periphery of the disc. So a bulge or herniation can cause c-nocipection by mechanical distension or the disc and irritation of the sinuvertebral nerve branches that have been demonstrated in the periphery of the annulus to a one-third depth.

Other studies by researchers have shown that chemicals and enzymes are present with disc protrusion (phospholipise A, bradykinin, stromeolysn, histamine, VIP, and substance P) that all can cause a patient to have pain by chemoreceptors.[7] So disc herniation or bulge can cause a release of vasoactive substances that cause pain. This must be present because studies by Wiesel and others have shown that up to 30 percent of patients that are asymptomatic will have MRI or CT changes consistent with herniation, indicating it is an inactive disc protrusion since the patient is asymptomatic.[8] A research study by Olmarker et al., showed that when they injected autologous nucleous pulpusis material into the spinal canal of rabbits, nerve conduction latency delays were noted to occur. This suggests that a herniated disc can cause electrodiagnostic changes despite no nerve root compression.[9]

Another study by Jinkins et al., published their findings on 250 patients with disc herniation without nerve root compromise. They found referred pain zones in the back and extremities that were not dermatomal but were actually autonomic referred pain zones due to irritation of the sympathetic nerves of the sinuvertebral nerve.[10] Again this study shows that nerve root compression is not always necessary for the disc to be considered active and pain producing.

In a single blinded study I published in *Manual Medicine,*[11] a group of patients with MRI documented disc herniations and bulges were correlated with infra-red thermography. The infra-red thermography scans showed good sensitivity for documenting nerve irritation in the lower extremity. Since CT, discography, MRI are anatomical tests, clinical correlation and neurophysiologic tests are needed to determine the definitive diagnosis and treatment approach. CT discography is highly invasive and is not done on a regular basis. Neurophysiologic tests that can be used include NCV, EMG, SSEP, and thermography. Infra-red thermography is not painful, risk free, noninvasive, and can help identify if a disc bulge or herniation is an active one. Infra-red thermography can pick up somatosympathetic nociception and activation due to innervation of the annulus by the sinuvertebral nerve.

Another test which may be useful is SSEP and DSSEP. Studies are beginning to be published on the utility of segmental and dermatomal evoked potentials since these techniques measure sensory dysfunction. A recent study by Green et al., found that infra-red thermography has a high sensitivity and specificity when compared to SEP/CT/EMG and NCV.[12]

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