

Role Of Provocative Discography In Minimally Invasive SED

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Introduction:

Lindblom first described discography as a useful tool to identify intervertebral disc ruptures in 1948.

The management of chronic low back pain presents a challenge to the spine specialist. With improved understanding of its pathophysiology, a discogenic etiology is widely accepted and exists in a considerable number of patients with chronic back disorders. The disc has nociceptive innervation capable of pain generation.

An annular tear is the most common cause of chronic low back pain and it may be that annular injuries that do not adequately heal, evolve into painful degenerated discs. Surely chronic discogenic pain results from mechanical stimulation of annular fissures and chemical irritation (neuropathic pain) from inflammagenic disc break-down substances.

We agree that the screening of these patients with magnetic resonance imaging (MRI) delivers a global view of the degenerative process including focal pathology; there is however, no abnormal disc signal pattern that specifically indicates whether a disc is painful. Although high intensity zones (HIZ) are detectable within the posterior annulus of some abnormal discs, it is not always associated with a concordant pain response during discography.

In multilevel degenerative disc disease the "worst looking" or black discs on MRI are not necessarily the source or sole generators of pain. Therefore, discography remains the only method for symptomatic assessment (functional) in lower back pain.

With the introduction of minimally invasive spinal procedures such as endoscopic surgery and as alternative option to fusion in degenerative disc disease, it is evident that;

1. we must identify exactly the painful segment(s) and
2. by visualization, spinal probing and tissue modulation together with the functional feedback (provocative discography) we can perform a patient or pathology tailored procedure.

Discography therefore has a fundamental role in the diagnosis of low back pain. If a vital dye is added to the radioopaque agent, annular tears and degenerated disc material can be labeled for tissue modulation.

Yeung Classification of Annular Tears (by discogram pattern)

Incorporates:

- a. pattern descriptions by Adams Grade I-V
- b. radial extension per Dallas
- c. extent of circumferential tear according to Osti

- I. Cotton ball (normal finding)
- II. Oval lobular with painless extension
- III. Radial extension to inner annular fibers producing pain. Limited circumferential component
- IV. Radial extension to outer annular fibers. Presence of circumferential component 1-4 quadrants (90°, 180°, 270° and 360°)
- V. Radial extension past outer annulus into epidural space or along nerve root

- I. no pain
- II. no pain
- III. pain at moderate pressures
- IV. strong pain / predominantly lumbar area. Leg pain varies depending on the size and pattern of the tear
- V. strong pain / predominantly lumbar area. Leg pain varies depending on the size and pattern of the tear

Case Examples

36 year old female patient with chronic back pain associated with leg pain left>right. No improvement with conservative treatments and failure of epidural blocks. There was no clear dermatome distribution of her pain radiation to the lower extremities (pseudoradicular).

MRI examination revealed a mild degenerative disc disease at L4/5 level.

Provocative discography showed a normal finding L2/3 but identified a grade V tear at L3/4, a grade III tear at L4/5 and a grade IV tear at L5-S1. Pain was elicited in all three of these levels. L2/3 was asymptomatic, serving as negative control.

Selective endoscopic discectomy was performed on all three symptomatic levels as well as thermomodulation (annuloplasty) by means of the holmium-YAG laser.

39 year old female patient with chronic back pain and an S1 component on the right side. Conservative treatment was inefficient and even though epidural blocks had produced an initial transient relief the patient's symptoms had worsened. There was no clear radiculopathy present in the various clinical examinations.

MRI study disclosed a multilevel degenerative disc disease as well as transitional anomaly with lumbarization of S1 and : left lateralized disc protrusion L1/2, central disc herniation L4/5 and central disc protrusions L5/6 and L6-S1. L3/4 was normal.

Provocative discography confirmed a normal finding at L3/4 and positive findings for structural changes and reproduction of pain in L4/5, L5/6 and L6-S1.

A selective endoscopic discectomy with the aid of chemodiactin was performed at the L1/2 level and furthermore selective endoscopy with thermomodulation was carried out in the last three

functional lumbar segments.

Discussion/Conclusion:

Discography remains controversial to those orthopaedic and neurosurgeons treating lower back disease who don't rely on this technique to assist them in their decision making. This diagnostic technique is understood better by pain management physicians who use it not only to evaluate the disc architecture but in addition can determine if a disc is the source of a patient's pain (provocative-functional test).

Based on the senior author's experience with 818 patients and 1160 endoscopically operated discs, disc stimulation is highly specific. A discogram is considered positive only if significant pain and an abnormal image are present (degree of pain elicited in a scale from 1-10). The provocation of pain (back and/or leg) in a specific patient is real and there can be only a false interpretation of the pain generated by the procedure (not a false discogram). This is why the authors consider it important for treating physicians to perform the examination.

Discography has been found to be more sensitive than MRI in detecting annular tears or fissures which are the primary cause of chronic multilevel back pain, especially in the presence of posterolateral tears.

By incorporating to the procedure vital tissue staining (with indigo carmine 1cc/10cc of Isovue M 200) and then performing selective endoscopic discectomy (SED) the results of the blind percutaneous procedures improve by:

1. intradiscal degenerated material is targeted and removed (degenerated disc material lowers pH and shows affinity to the dye),
2. possible non-contained disc material is outlined (extravasation of the dye),
3. the annular defect is outlined and can be precisely addressed under direct vision for example by thermomodulation with laser (annuloplasty), and
4. possible trapped or incarcerated fragments of disc between the annular fibers are visualized and can be removed allowing for healing*.

* MRI cannot detect interposition disc material between the annular fibers. This is, in our opinion, a primary cause for failure of the blind percutaneous techniques. The not recognized residual disc which is trapped continues to chemically irritate the area with appearance of an inflammatory membrane and ongoing pain.

Provocative discography in combination with selective endoscopic discectomy leads to a better understanding of discogenic disease and helps address the pathology directly in a minimally invasive manner.

This diagnostic procedure allows for a pin-pointed less invasive therapy.