Discordant Provocation during Lumbosacral Epidural Steroid Injections resulted in Greater Pain Reduction than Concordant Provocation

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Learning Objective
To assess in a prospective study the incidence and predictive value of discordant versus concordant provoked pain during transformaminal epidural steroid injections.

Background
Many individuals presenting with low back pain and associated radicular symptoms have failed conservative approaches may require interventional treatments (1-4). The use of lumbar epidural steroid injections (LESIs) for short term relief of radicular pain associated with lumbar disk herniation is a well-established intervention (4). The methods used for epidural injections vary with different physicians and pain reduction from epidural steroids varies from 20% to 95% and may be dependent on the route of injection (5).

Epidural injection can be achieved by one of three methods: caudal (C), interlaminar (IL), or transformaminal (TF) (6-9). Interlaminar epidural steroid injections (ILESIs) and caudal epidural steroid injections (ESIs) have been used for longer periods in comparison to TF (2-15.20). Similar to the discogram provocation model, some physicians have felt the patient feedback received during the performance of epidural steroid injections, especially transformaminally, may potentially be useful in predicting outcome. Concordant provocation with ESIs, essentially reproduction of the patient’s baseline pain during the injection phase, may be a sign of injection at the site of inflammation and the actual pain generator and may predict clinical response.

Conceptually, this is similar to diagnostic discograms in that symptomatic concordance at a disc may correlate with the pain generator. There are numerous proposed theories relating to the mechanism of action of steroids in the treatment of pain, which attempt to explain how epidural steroids produce their analgesic effects (16-18). The most commonly accepted theory, focuses on the activation of anti-inflammatory pathways by steroids. Whether endogenous or exogenous, act as regulators in the inflammatory response which releases multiple chemicals and cytokines, believed to induce pain (3-6,10,21-24). A known inflammatory enzyme, phospholipase A2, located in the nucleus pulposus, plays a pivotal role in lumbosacral radiculopathy (4). The interaction of corticosteroids with norepinephrine and Hydroxysteroidamine neurons in the dorsal horn suppresses response to noxious stimuli is another proposed mechanism of action with regards to steroid analgesia (3-4).

Synthesizing these theories, steroid intervention increases the number of inflammatory compounds in the epidural space (3).

Results

Study Sample
All patients that returned for a follow up evaluation after initial injections were included in the study. Altogether, forty-seven subjects with a mean age of 48.3 years ± 12.6 years (mean ± standard deviation) were administered TFESI for subacute pain and completed the follow-up assessment.

Concordant versus non-concordant pain
The injection related provocation was concordant with the radicular pain in 66% of the patients and discordant in 34% (Table 2). At follow up, the discordant group achieved a statistically significant greater decrease in self-reported pain (76%) compared to the concordant group (58%; t=2.1; df (45); p <0.04). The percentage of individuals who reported 50% or greater pain reduction after the injection did not differ significantly between the concordant (20/31, 65%), and discordant (15/16, 94%) groups (z=1.825; p<0.08). There were no statistically significant differences between concordant and discordant groups with respect to improvements in activity level, 77% and 100% respectively. There were no statistically significant differences between concordant and discordant groups with respect to analgesic intake, 68% and 81% respectively.

Discussion

• 34% of the patients experienced discordant provocation which could be potentially explained by less nerve root inflammation, and a lesser amount of inflammation of the surrounding tissue such as at the duram annulus and other soft tissue. Most lumbar disk herniations are situated posterior to the vertebrae and inflammation occurs primarily in the ventral epidural space (6-8,10).

• Because this type of lateral disc herniation creates elevated inflammation to the surrounding areas, it may also leads to nearby root impingement and therefore limiting response to ESIs in regards with concordance.

Conclusion
The assessment of the study may provide valuable outcomes for lumbar disk herniations that receive TFESI. Epidural injections in chronic function-limiting low back pain demonstrated effectiveness in concordant radicular pain on 66% of the patients and discordant on 34%. 100% incidence of injection related provocation presented with transformaminal approach. Discordant group achieved a statistically significant greater decrease in self-reported pain (76%). Although there is no proof yet that discordant provocation is a predictor of improved outcomes in TFESI, the fact that the study addresses clinical outcomes including usage of pain reduction, pain medications, and functional outcomes is likely to be of benefit to interventional clinicians.

References: