

REVIEW ARTICLE**The Role of Non-Surgical Interventional Pain Management in Reducing the Rate of Spine Surgery**

*Prof. Iyad Abbas Salman
DA, FICMS, CABA & IC, FIPP
Chairman of the Scientific Supervising Committee
of Pain Medicine Subspecialty,
The Iraqi Board for Medical Specializations*

Low back pain is a common global problem. The point prevalence of LBP in 2017 was estimated to be about 7.5% of the global population, or around 577.0 million people⁽¹⁾

Global Burden of Disease studies have defined low back pain (LBP) as “pain in the area on the posterior aspect of the body from the lower margin of the twelfth ribs to the lower gluteal folds with or without pain referred into one or both lower limbs that lasts for at least one day”⁽²⁾

The list of structures causing LBP is extensive and includes the intervertebral discs (IVDs), vertebral bodies, facet joints, spinal nerve roots (NRs), the spinal and para-spinal soft tissues, the sacroiliac and hip joints. This unwieldy list of possible etiologies of LBP can be initially managed by categorizing these conditions into two broad groups:

- a) conditions that, if untreated, can be life threatening or can cause serious neurologic injury
- b) conditions that are benign, self-limiting, and unlikely to cause neural damage.⁽³⁾

The first group patients are typically considered as red flags. A careful history and examination must be performed to search for “red flag” symptoms or findings; These “red flags” include a history of trauma, fever, incontinence, motor weakness, weak anal sphincter, unexplained weight loss, a cancer history, Space occupying lesions, long-term steroid use, parenteral drug abuse, and immune suppression. The presence of red flags in acute low back pain suggests the need for further investigations and referral to related specialist, so no role of non-surgical interventional pain management here as part of overall strategy.

The second category of spinal pain generators consists of a wide range of benign and self-limiting conditions that includes lumbar sprain and strain,

myofascial pain syndrome (MFPS), herniated disc (HD), lumbar spinal stenosis (LSS), degenerative disc disease (DDD), internal disc disruption (IDD), lumbar facet syndrome (LFS), sacroiliac joint dysfunction (SIJD), spondylolysis, spondylolisthesis, and spinal instability (SI).

Failed back syndrome (Post-laminectomy syndrome) is a condition when back surgery did not provide expected benefit to the patient. It has been estimated that as many as 30% of patients will have ongoing pain after decompression. Likewise, approximately 75% of patients have persistent low back pain 10–20 years following discectomy.⁽⁴⁾

There are several failed back syndrome scenarios. Patient's condition may not be due lumbar degenerative disease. For example, Piriformis syndrome is a compression neuropathy of sciatic nerve at the buttock level. The symptoms of this syndrome are pain, numbness and weakness -very similar to lumbar disc herniation.

Therefore, misdiagnosis may lead to unnecessary low back surgery and obviously will not improve patient's condition. Another common condition frequently misdiagnosed as degenerative lumbar disease is Sacroiliitis. This condition is due to either degenerative or autoimmune inflammation of the joint between sacrum and ileum. It causes pain in the lower back and very often under-diagnosed or misdiagnosed as degenerative lumbar disease.⁽⁵⁾

According to Mark L. Graber, (founder of the Society to Improve Diagnosis in Medicine) “The diagnosis is extremely hard, there are 10,000 diseases and only 200 to 300 symptoms.”

But according to a John Hopkins Hospital study, chronic pain is misdiagnosed 40–80% of the time.⁽⁶⁾

Many claim that the main reasons for this are:

- Doctors not spending enough time with their patients for history taking and performing adequate physical examination.
- Ordering the wrong tests and therefore missing key information.⁽⁷⁾

The limits to imaging tests such as X-rays and MRIs that can capture images of structures inside the body rather than capturing an image of the pain for example patient with LBP with LSS MRI finding of disc prolapse, the actual pain generator can be sacroiliac joint (or SI joint) syndrome which represent about 14-22% of LBP according to recent studies.

The basis behind the pain caused by disc prolapse in addition to mechanical compression of related nerve root is chemical mediators that are released from a disc after injury to that disc. This results in the release of phospholipase A2 (PLA2) from the nucleus pulposus into the epidural space. PLA2 is an enzyme found in high concentrations in disc material. PLA2 is highly inflammatory and propagates an inflammatory cascade with the liberation of arachidonic acid with inflammatory responses via leukotrienes and prostaglandins.

There are several non-surgical interventional procedures can be done for patient with disc prolapse as an example, one of simplest procedure is trans-foraminal epidural injection which has dual effect on both above mentioned mechanism of pain. Different drugs administered through the same needle like Hyaluronidase, hypertonic saline, local anesthetic, and steroid. As well as pulsed radio-frequency for neuro modulation effect can be conducted via the same needle. The steroid acts by blocking PLA2 activity and can exert an anesthetic like activity by blocking nociceptive C-fiber conduction. This effect is reversed when the corticosteroid is removed, suggesting a direct membrane effect. Glucocorticoid receptor sites have also been located on norepinephrine and 5-hydroxytryptamine neurons within the dorsal horn substantia gelatinosa.

The second anti-inflammatory effect is reducing the edema that result in relieving or reducing the nerve root compression producing pain relief.

North American Spine Society reported that TFESI are safe procedures with minor transient side effects. It was also reported that catastrophic complications of lumbar TFESI, such as spinal cord injury or infarction, are rare but possible and can result from the vascular injection of particulate

steroids.⁽⁸⁾ Nowadays, there are many considerations & recommendations to avoid these complications.

Transforaminal ESIs (TFESIs) allow for maximum medication delivery to a specific nerve root and are a good option when there is nerve compression along a specific dermatome. Nerve impingement can occur in the subarticular zone or neural foramen. Contrast or medications injected at a foraminal level will spread along the nerve root exiting the foramen, as well as the descending nerve root in the subarticular recess. For example, radicular pain in the anterior right leg in the L4 distribution could be caused by a disc herniation in the right subarticular zone at L3–L4 or in the right neural foramen at L4–L5. TFESIs could be at the L3–L4 level, which would treat L3 in the neural foramen and L4 in the subarticular zone or at L4–L5 treating L4 in the neural foramen and L5 in the subarticular zone.^(9,10)

This procedure will alleviate the symptoms of intervertebral disc diseases, and it can reduce pain and enhance the probability of the spontaneous resorption of the herniated disc.

Hence, even in cases of severe intervertebral disc disease spontaneous resorption⁽¹¹⁾ can be expected if the pain is well-managed.

In the end this simple non surgical procedure can reduce the need for surgical procedures.

REFERENCES:

1. Wu A, March L, Zheng X, Huang J, Wang X, Zhao J, Blyth FM, Smith E, Buchbinder R, Hoy D. Global low back pain prevalence and years lived with disability from 1990 to 2017: estimates from the Global Burden of Disease Study 2017. *Ann Trans Med* 2020; 8: 299-313.
2. Hoy D, March L, Brooks P, Blyth F, Woolf A, Bain C, Williams G, Smith E, Vos T, Barendregt J, Murray C, Burstein R, Buchbinder R. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Ann Rheum Dis* 2014 ;73: 968–974
3. Maher C, Underwood M, Buchbinder R. Non-specific low back pain. *Lancet*. 2017;389:736–47.
4. Deyo R, Gray D, Kreuter W, Mirza S, Martin B. United States trends in lumbar fusion surgery for degenerative conditions. *Spine*. 2005;30:141–45.

-
5. Aghayev K. Kamran aghayev [Internet]. Kamranaghayev.com. [cited 2022 Aug 10]. Available from: <https://kamranaghayev.com/page/failed-back?lang=EN>
 6. Hendler N. Why chronic pain patients are misdiagnosed 40 to 80% of the time? *J Recent Adv Pain.* 2016;2:94-98.
 7. Landro L. The Key to Reducing Doctors' Misdiagnoses. *Wall Street Journal* [Internet]. 2017 Sep 12 [cited 2022 Aug 10]; Available from: https://www.wsj.com/articles/the-key-to-reducing-doctors-misdiagnoses-1505226691?reflink=share_mobilewebshare
 8. Baheti DK. *Interventional pain management : a practical approach.* New Delhi ; Philadelphia: Jaypee, The Health Sciences Publisher; 2016.
 9. Jeong HS, Lee JW, Kim SH, Myung JS, Kim JH, Kang HS. Effectiveness of transforaminal epidural steroid injection by using a preganglionic approach: a prospective randomized controlled study. *Radiology.* 2007;245:584–90.
 10. Kamble PC, Sharma A, Singh V, Natraj B, Devani D, Khapane V. Outcome of single level disc prolapse treated with transforaminal steroid versus epidural steroid versus caudal steroids. *Eur Spine J.* 2016;25:217–21.
 11. Ming Z, Zin TL, Hong J, Mo W, Yu PF, Li XC, et al. Incidence of spontaneous resorption of lumbar disc herniation: a metaanalysis. *Pain Physician.* 2017;20:45–52.