Comparative study between Caudal and Lumbar Epidural Steroid Injection in Low Back Pain and Lumbar Radiculopathy (Short Term Follow Up)

Thesis

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List of abbreviations

Abbreviation	Description
ADL	Activities of daily living
AF	Anulus Fibrosus
ALL	Anterior longitudinal ligament
AP	Anteroposterior
CSF	Cerebrospinal Fluid
DDD	Degenerative Disc Diseases
ESI	Epidural steroid injection
HIZ	High intensity zone
IDD	Internal Disc Disruption
IVD	Inter Vertebral Disc
LSI	Lumbar Spinal Instability
MRI	Magnetic resonance imaging
NRS	Numerical rating scale
NSAIDS	Non- steroidal anti-inflammatory drugs
ODI	Oswestry disability index

OPLL	Ossification of Posterior longitudinal ligament
PLL	Posterior longitudinal ligament
PSIS	Posterior superior iliac spines
VAS	Visual analog scale
VNRS	Verbal Numerical rating scale

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Abstract

If the condition not improved by medical treatment, Epidural Steroid Injection

have a role to reduce pain and improve disability by decrease inflammatory process at the nerve root caused by herniated disc.

Different types of Epidural Steroid Injection are present according to the rout of needle entry to reach to epidural space. There are three types of ESI which are 1) caudal, 2) lumbar interlaminar and 3) transformaminal.

In this study we evaluate and compare the clinical improvement of cases treated by caudal and lumbar interlaminar ESI.

Clinical improvement represented by pain reduction and improvement of disability after 4 weeks of ESI (which obtained by visual analog scale and Oswestry disability index score).

Key words

Comparative study between Caudal and Lumbar Epidural Steroid Injection in Low Back Pain and Lumbar Radiculopathy (Short Term Follow Up)

Introduction

Low back pain is a highly common problem and causes much morbidity and socioeconomic loss in the community. Although most low back pain is self –limiting, it leads to functional limitation when it is persistent and associated with radicular pain .This is among the most common reason for use of medical services ***(Umit et al.,2007).***

Low back pain is considered as the fifth cause of referrals to medical centres. Both sexes are involved and individuals have this problem more frequently between ages 30 and 50 years. Smokers and people with sedentary or active jobs are at increased risk ***(Owlia et al.,2007).***

The treatment of low back pain must follow a logical consequence of diagnosis and management. The vast majority of patients with low back pain suffer from some mechanical derangement of the disc, ligaments, facet or nerve root complex. Majority of these discogenic problems resolve with conservative treatment ***(Sethi et al.,2003)***.

The recent researches that have been conducted within the last decade show that a definite trend towards non-surgical management of lumbosacral disc herniations with radicular symptoms has occurred. Non-surgical treatment of lumbar radicular pain includes non-steroid anti-inflammatory drugs (NSAIDs), analgesics, oral or parenteral steroids, therapeutic exercises and the epidural injections. The treatment options are considerable and yet the outcomes

associated with many treatments are either questionable or not well investigated ***(Umit et al., 2007).***

Epidural steroid injections are considered when the conservative measure with rest and analgesics fail. These are low risk alternatives to surgery. They are effective in patients with symptoms of up to three years. They have the advantage of simplicity, cost effectiveness, minimal invasion and early relief of symptoms. It is also a method of crisis intervention and prognosticator, thereby meaning that they are more effective in acute and severe form of radiculopathy. They also reduce the need for narcotics. They can avoid operative intervention for a period of up to five years. Epidural steroids can be given either through lumbar or caudal route ***(Shahzad et al.,2008).***

Epidural injections in the lumbar spine are provided by caudal, lumbar interlaminar, or transforaminal routes. While interlaminar entry is considered to deliver the medication closely to the assumed site of pathology, the transforaminal approach is considered as target-specific requiring the smallest volume to reach the primary site of pathology. Caudal epidurals were considered as the safest and easiest, with minimal risk of inadvertent dural puncture, even though requiring relatively high volumes ***(Boswell et al,2007)***. They have also been shown to be significantly effective compared to interlaminar epidural injections. ***(Abdi et al,2007)*** Even then, controversy continues with regards to the medical necessity and indications of lumbar epidural injections ***(Ann Conn et al,2009)***

Anatomy of lumbar spine

The lumbar vertebrae: fig. (1)

In a normal individual there are five lumbar vertebrae with five associated discs. In a thirteen percentage of individuals, abnormal segmentation results in the form of either sacraliazation of the fifth lumbar vertebra or in lumbarization of the first sacral segment **(Weinstein, 1993)**.

Each lumbar vertebra consists of a vertebral body and a neural arch. The neural arch consists of two pedicles, the transverse processes, the superior and inferior articular facets, the laminae, and the spinous process. The lumbar vertebrae are attached to each other by the intervertebral discs, a variety of spinal ligaments, and the articular facet joints **(Weinstein, 1993)**.

The bodies are wedge-shaped and increase in breadth from above downwards, and a progressive widening between the articular processes reflects this posteriorly. The sides of the bodies are concave from above downward, having the pedicles attached to its upper half ***(*Roberts, 2002*).***

The transverse processes are variable in length, but the fourth is usually the longest. In the upper four they are spatulate and set well back on the pedicle and are characterized by vertical ridge on the anterior surface. The transverse process of the fifth, however, is quite characteristic, short, massive, and pyramidal, with its base attached from the pedicle on the lateral side of the body itself ***(*Roberts, 2002*).***

The spinous process is roughly horizontal. The upper border is straight but the lower border curves down, producing the so-called hatchet shape ***(*Roberts, 2002*).***

The articular processes: *the* upper pair rise up and carry articular facets that face medially (the upper facets of the fourth and fifth vertebrae face posteriorly as well as medially). The articular surfaces are cylindrical, being concave from front to back. The lower pair projects down from the lateral angles of the laminae to join the superior processes of the vertebra below. Each carries a reciprocal concave facet. The inferior articular processes of fifth vertebra face well forwards, and are received into backward-facing facets on the sacrum, and this locking prevents sliding forwards down the slope of the first sacral vertebra. The fifth lumber vertebra may be fused on one or both sides to the first sacral vertebra.

The bony surfaces of the joints are covered with articular cartilage which enables them to move smoothly. Each facet joint is encapsulated by a fibrous joint capsule that contains synovial fluid which lubricates the joint and enables friction-free joint movement. Because of the laxity of their joint capsules, there is considerable range of motion in different directions. ***(*Rashbaum et al, 2009*)***

The capsule serves to limit bending forces and to resist a backwards sliding motion during extension. This capsule is highly innervated with nociceptive and autonomic nerve fibers. The only movement permitted by the joint is a sliding movement in a vertical direction, which is executed during flexion and extension of the vertebral column. The maximum pressure applied to the joints occurs during extension. The capsular ligaments protect the posterior annulus of the disc from excess flexion and torsion forces. The joints play an important role in limiting rotation about to the intervertebral disc**. *(*Roberts, 2002*).***

Innervation includes mechanoreceptors, fibers containing substance P & numerous other neurotransmitters linked to nociception. The facet joint is innervated by the medial branch of the dorsal ramus of the spinal nerve which also innervates the multifidus muscle.Each facet joint receives nerve endings from two heights. For example the facet joint L4- L5 receives nerve endings from the dorsal ramus from the 4th spinal nerve for the upper parts and from the 5th spinal nerve from the lower parts **(Binder et al, 2009).**

The mamillary process is a breast-shaped convexity projecting back from the superior articular process behind the margin of the articular facet.

The accessory tubercle lies below the mamillary process, at the root of the transverse process, it varies from a prominent sharp spike to complete absence ***(*Roberts, 2002*).***

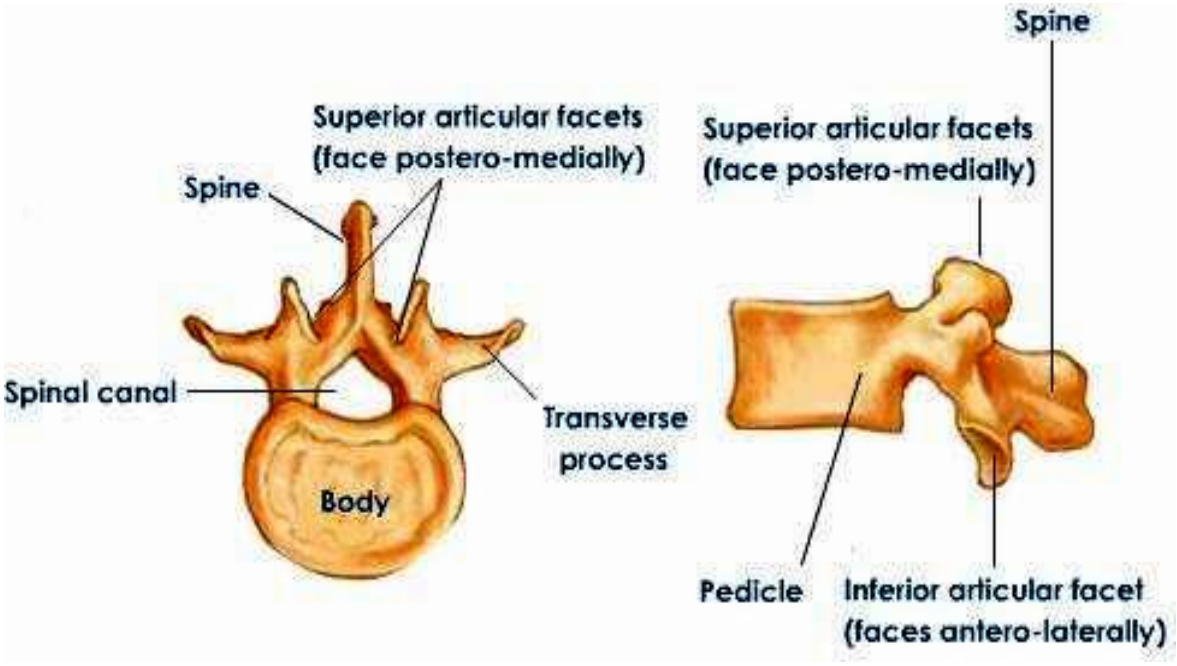

Fig. (1) Lumbar vertebra ***(*Wong et al, 2007*)***